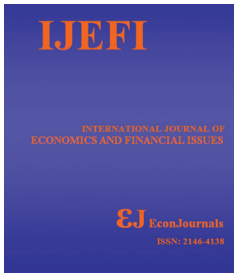

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Analysis of the Oil Market and the Role of Investment in the Agrarian Sector in Kazakhstan

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ABSTRACT

The research study examines the economic development of the oil industry of Kazakhstan. It is noted that in view of the decline in world oil prices, the growth of the various methods of oil production, including shale technology - low income from its production dropped. Therefore, with a view to sustainable development and the maintenance of macroeconomic stability should strengthen the development of the agricultural sector. The agro-industrial sphere amid growing global consumer demand and prices is gaining momentum. The benefits of attracting investment in this area can be attributed - availability of a vast territory, favorable climatic conditions, a lot of experience in the production of agricultural crops. In conclusion, given the findings on the forecast of development of the oil market and recommendations for improving the flow of investments in the agricultural sector of the country.

Keywords: Oil Industry in Kazakhstan, World Oil Prices, Investments, Agricultural Sector
JEL Classifications: Q1, Q2, Q3

1. INTRODUCTION

The Republic of Kazakhstan (RK) occupies a huge territory and takes the 9th place in the world on territory square. Country has huge reserves of fossil fuels (oil, gas) and metals (uranium, copper, zinc). Kazakhstan is the largest economy in Central Asia. Over the years, the mining industry is the main components of economic development.

One of the strategic objectives of the country is to strengthen efforts to attract foreign investment and the increase the growth of international trade relations. For example, from the period of independence of Kazakhstan (1991), the foreign trade has reached more than $120 billion, where more than 90% were with World Trade Organization (WTO) member states. In 2015 Kazakhstan carries out trade relations with 185 countries all over the world.

The manufacturing process involves the natural resources that have a direct impact on the country's economic potential. A significant contribution of natural resources to provide the mining sector. Republic is a group of states possessing large reserves of hydrocarbons that have a significant influence on the formation and the state of the global energy market. On its territory is opened for more than 200 deposits of hydrocarbons, of which half - oil, a third - oil and gas, and the rest - gas and gas condensate. Petroleum picked among the natural competitive advantages, which are an important factor in economic development.

Kazakhstan's main wealth - oil, is a national export raw materials, inferred resources are estimated at more than 25 billion barrels. It is predicted that significant reserves of Kashagan oil reserves increase. In addition, the full completion of the Kazakhstan part of the project of expansion of the Caspian Pipeline Consortium is scheduled in 2016, according to which exported the bulk of the raw material produced from the Tengiz field.

So, if the world price of crude oil (Brent) reached more than USD 100/bbl in 2007, then in March 2016 amounted to about USD 40/bbl. In 2015, an oil price in the world, as well as energy and other raw materials is quite fallen. In recent years, mining

methods have been introduced for oil shale technology. This makes it possible to extract oil from difficult mining resources. In this procedure, the oil recovery reduces its production costs. All this together led to the fact that in the world in the last 2 years produced about 1.5-2 million barrels per day. This situation leads to the overproduction of oil in the world, and thus prices fall. This led to the fact that Kazakhstan mining industry volumes in 2015 decreased by almost 3% in relation to 2011.

The decrease in oil production severely reduced revenues in the revenues of the national budget. Therefore, in 2014 and 2015, Kazakhstan's budget deficit amounted to 2.7% and 2.2% of gross domestic product (GDP) respectively. This budget deficit is among the highest in the history of Kazakhstan's independence since 1991.

The price-slashing on world commodity markets led to the fact that the domestic mining and metallurgical complex today is experiencing a negative market pressures. It is clear that the fall in prices on the economy, different commodity dependence, a serious threat.

In this regard, in the circumstances in order to maintain macroeconomic stability should be funded and to strengthen the development of those industries, which today already have a favorable growth rate.

Within the 2015, the highest increase of all sectors in the Kazakhstan's GDP has shown the agricultural sector and reached 4.4%. Due to the transition to a market management structure, the agricultural sector becomes an economically attractive sphere.

The diversification of the economy and institutional transformation occurred because of the certain democratic reforms to improve the business, changes in configuration and structure of the local economy. All this changes have allowed Kazakhstan becoming a full member of the WTO in 2015. Despite these changes, agriculture subsidized by the state at 8.5% from GDP in country.

Agriculture in Kazakhstan plays a significant role under the condition of integration to the world market. The sphere is actively involved in shaping the balance of trade, and in 2015 took 18.4% of total exports and 16.7% of total imports. In particular, Kazakhstan is the third largest grain producer in the CIS after Russia and Ukraine. One of the main sources of foreign exchange earnings in the country's economy is the export of wheat.

Currently there are 300 agricultural consumer cooperatives, 1143 production cooperatives and 346 rural water users' consumer cooperatives in the country. Analysis of the most large-scale agricultural production cooperatives show their certain economic effectiveness and benefits of large-scale enterprise producing highly productive products compared to small farms. However, the biggest part of consumer and producer cooperatives inefficient mainly due to the lack of financial resources, the deterioration of the main agricultural equipment and inconsistency in decision-making.

The carry out analysis determined that the agricultural market in the country is characterized by external food dependence. In the context of trade liberalization and the low level of competitiveness of domestic agricultural products, import expansion resulted in the displacement from the market the domestic producers. According with the Food and Agriculture Organization recommendations, the share of imports necessary to expand the range of products should not exceed 16% of the total consumption. In Kazakhstan, this indicator is 20%, which indicates a relatively low level of competitiveness of the agricultural sector in the country.

Country' tariff policies weakly protects domestic agricultural producers. More than half of all food imports in Kazakhstan taxed at a rate of 5-15% (this is one of the world's lowest tariffs), while, for example, in Bulgaria it is 35%, in China - 15%, in Latvia - 34% and so forth.

Consequently, the agricultural sector is now really takes a priority in Kazakhstan's economy, in particular, is important in the context of Kazakhstan's membership in WTO. Over the past few years, there is a growth of the GAP, primarily the growth of production of grain and flour, with the active financial support from the state. But there are still serious problems with attracting investment, high wear of equipment and machinery and tear and external food dependence.

2. LITERATURE REVIEW

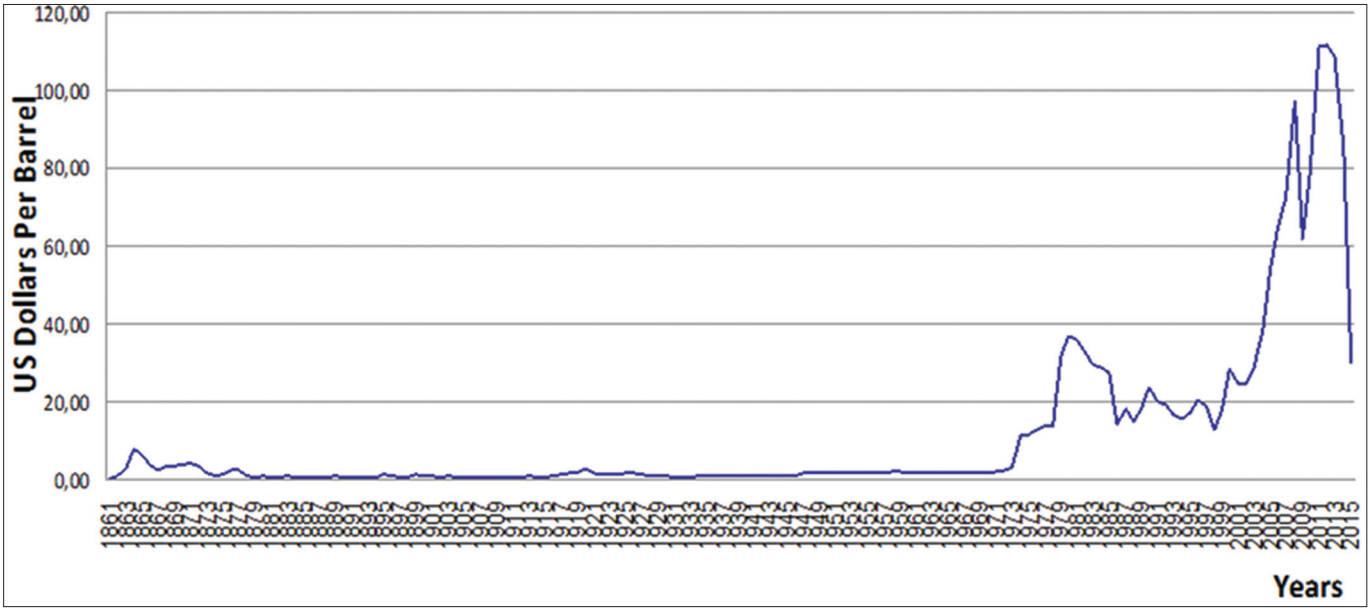
Lobell et al. (2011) analyzed the development and management of the agricultural sector in the most labor-intensive regions for growing agricultural products in Mexico. Authors conducted a research on the cultivation of crops with the protection of ecology and environment position. One of the conclusions was the focus on investment attraction into the use of new technologies and the best fertilizer in order to produce the highest yields of wheat anywhere in the world.

Questions of development of food safety sphere are quite acute for the poor population. Hundreds of millions of people are still suffer from chronic hunger, especially in the countries of sub-Saharan Africa (Naylor, 2014). On the level of global climate change author explores aspects of creating a fair system of property rights to land, investment attraction to the installation of solar-powered into irrigation system in order to improve the food security of the state.

Bournaris et al. (2015), and others analyzed the effect of the processes of water irrigation to the activity of agricultural production sphere. The authors have proposed different types of innovative approaches for the use of irrigation systems on the example of agriculture in Europe. The introduction of irrigation canals and economical use of water based on the attraction of investments to new technologies.

The sharp jump in prices for agricultural food products since 2008 (which is still going on), has led to the social tensions in the world. Barrett (2013) analyzed food security and social stability, also made a forecasts of their development until 2025 all over the

Figure 1: World crude oil prices, 1860-2015



world. Author argues that foreign investors contribute to a rise in prices for agricultural land, thereby contributing to an even higher cost of food.

Essential meaning in the study of the agricultural sector is given in the research of Mazzocchia et al. (2009). Considering the use of a systematic approach scientists are evaluated measures to ensure food safety. Authors used an econometric model of the event studies, based on which it is possible to analyses the arrangements for food security at the level of production costs assessment of agricultural companies. These models make it possible to predict the impact of public policy to the activities of agricultural sector and rapidly reduce their negative consequences in the future.

Bhargava (2006) considered econometric approaches to calculate the indicators of food, nutrition and health. In the research was substantiated the construction of regression equations to bring the studied economic indicators within a specific range. The statistical modeling results are the basis for the development of effective public policy.

In addition to the researches listed above, there are studies deal with business interest in investing in the sphere of agriculture in developing countries (McNellis, 2009). Their describe the features of investors activity in the framework of microfinance and credit institutions, a variety of large funds, banking institutions and so on. The study highlights the significant role of attracting investment in agriculture in developing countries to increase food production in the conditions of international integration.

Bojnec et al. (2014) showed that technical efficiency in agriculture is positively associated with agricultural factor endowments, farm specialization, average farm size, technological change and small-scale farms. Foreign direct investments have an ambiguous effect. An increase in technical efficiency in agriculture and the development of the rural economy are seen as a strategy to boost the level of living standards in agriculture and in rural areas.

Köhn (2014) evaluated the financing of agriculture sphere in developing countries. Research includes the features of forms of lending by commercial banks and risk management procedures are disclosed in the agricultural sector. In other words, research analysed funding of agro-industries from the perspective of the effectiveness of their investment.

3. EVALUATION OF THE OIL COMPLEX IN THE REPUBLIC OF KAZAKHSTAN (RK)

In view of the ongoing global recession in developed economies, world oil prices have fallen by almost three times. In particular the end of 2015, the cost of a barrel of oil was slightly more than 30 dollars. If you look at Figure 1, which is given the change in oil prices from 1860 to 2015, here seen their rise. Significant price increases accounted for in 2007, when they reached the level of 100 dollars.

According to the National Bank of Kazakhstan data for 2015, the current account deficit amounted to USD 5.3 billion. While 2014 was a surplus of USD 6.0 billion. The trade surplus in 2015 - USD 12.6 billion, which is less by 65.6% than in 2014. The value of exports of goods in 2015 amounted to USD 46.2 billion, i.e., it decreased by 42.4% with compare to 2014. A key factor of the export reduction was oil price-slashing in world. In Kazakhstan, the proceeds from the sale of oil and gas condensate decreased 2 times in 2015. Their cost is estimated at USD 26.8 billion. The consequence of this situation was the reduction of budget revenues from the export of raw materials.

In other words, the country is heavily dependent on world oil prices. In Kazakhstan and other oil-importing countries was the era of high prices (last 15 years). During this time, it was obtained in excess of such income, which allowed getting out of recession in the national economy, and going to considerable economic growth rate.

In order to avoid the danger of resource burden and ensuring sustainable socio-economic development, management of oil revenues flow, accumulation of funds for future generations (the savings function) and reduce the dependence of the economy from the impact of adverse external factors (stabilizing function) the National Fund has been established in Kazakhstan (NF) in 2000.

The foundation is the first institution of this kind in the CIS. The revenue forecast calculations take into account a list of the raw materials sector organizations on which the above-plan tax and other obligatory payments shall be credited to the National Fund. The organizations income tax calculation is based on the calculated constant world price of oil to USD 19 per barrel. The use of non-oil revenue mechanism Kazakhstan assumes the maintenance of stable government spending, regardless of the price and demand for oil in the world. Since the general budget revenues are more stable than oil, it provides a smoothing of government spending. This mechanism makes it possible not only to protect the economy from short-term fluctuations in oil prices, but also to uniformly use the limited income from non-renewable natural resources. In fact, we believe this method of oil revenue management is a kind of counter-cyclical fiscal policy.

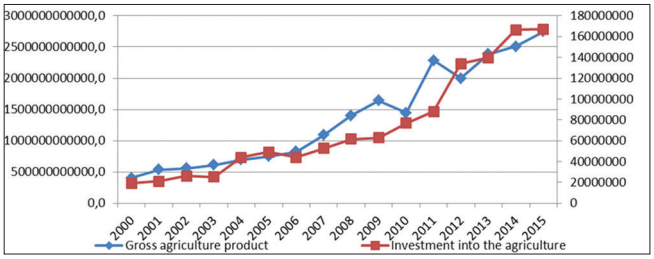
For example, in 2015, in order to conduct counter-cyclical stimulus Kazakhstan began to increase spending from its National Fund. At the beginning of 2016 the National Fund assets amounted to 63.508 billion. They were down 13.29% compared with the beginning of 2015, at least for two reasons. The first is the decline in world oil prices and the second is the removal of part of the funds for the development of Kazakhstan's economy in view of the crisis.

It so happened that in the country the dollar exchange rate is strongly tied to the global price of oil. And the relationship is reversed. The higher the oil price, the lower the exchange rate. Therefore, the volatility of oil prices in the world, in Kazakhstan begins inflation expectations and uncertainty behavior of market actors. In turn, this leads to a further multiplicative growth of the dollar exchange rate, the euro and other currencies against the Kazakh national currency - Tenge. This further stimulates the conditions of the economic slowdown of the country.

Despite the increase in demand over the next 20-30 years, in the structure of world energy consumption share of oil will continue to gradually decline. Thus, according to "Bloomberg New Energy Finance," investment in alternative sources of energy has increased by more than 20% (about 350 billion USD). Thus by 2016 the volume of world consumption of alternative energy was at a level of about 25%.

According to the International Energy Agency, by 2050 half of the world's energy needs will cover renewable energy. In particular, in 2015, the following types of raw materials and resources for the production of electricity in the world - An alternative and nuclear energy, coal and gas. The lowest consumption accounted for by oil. For example, the proportion of liquid hydrocarbons from 1973 to 2013 in the global energy mix has declined by 8.4% and amounts to 39.9% (to 3.72 million tons of oil equivalent). It is predicted that oil would be the equivalent of steam electricity. The main reason

Figure 2: The ratio of investment and GAP, 2000-2015



Source: Committee on Statistics of the Ministry of National Economy of Kazakhstan, 2016

for the use of renewable sources to represent them fairly low cost.

In general, the flow of petrodollars creates an environment that to a certain extent hinder socio-economic development of Kazakhstan. Therefore, the country that owns the vast natural resources, it is necessary to develop the productive sector of the economy. For example, the country has significant advantages for the development of the agricultural sector. This is especially true in connection with the increase in global demand and food prices over the past 10 years.

4. AN ANALYSIS OF THE DEVELOPMENT OF KAZAKHSTAN'S ECONOMY

Despite the sharp increase in prices of some food commodities (wheat, cereals, tea, coffee, vegetable oils, etc.) on world markets in 2007, there is a strong demand for agricultural products in the world. With the growth in prices, the agricultural producers have the incentive to produce more goods that require additional investment.

An analysis of the dynamics of development of agriculture in Kazakhstan shows the positive trend in nominal terms (Figure 2). However, despite the adoption of appropriate measures for the development of agriculture, the radically changes in the industry have not been done. The level of its competitiveness still remains low.

The beginning of XXI century is characterized by the reforms and transition to a market system in agricultural management. This situation made an impact to the low level of production in agriculture as a whole. But the volume of production in agriculture over the past 16 years has increased more than five-fold and exports of it tripled. As an example, in 2015 the agro-industrial complex outputs increased mainly because of the growth of livestock (3.2%) and crop production (5.6%). The fixed capital investment in the food industry increased by 28%, but the volume of investments in fixed capital in agriculture fell by 6.3%.

The growth of profitability in the agricultural sector is attractive for the investors. In the case of investments in agriculture (I) there is a growing trend. They increased by more than 9 times from 2000 to 2015. In addition, the growth after 2010 is mainly because of to the increase of investments in the framework of the country's national and regional programs in agribusiness industry, introduced by the Government.

The favourable conditions for the investor provided by the large areas of land, fertile land in the vast area, as well as predominant geographical position of the RK in the framework of the Eurasian Economic Community (EAEC) market. For China Kazakhstan is attractive from the perspective of capacity and aggregate demand for foodstuffs. An important incentive for investors seems to the introduction in 2015 the opportunities and rights to receive the agricultural land for a period of 25-year for organizations and enterprises (from 10 years). The period is more attractive to foreign investors and provides greater confidence that investment will pay off. This gives confidence to the foreign investors for capital investment and cost-effective activities in the field of agriculture in Kazakhstan.

Business opportunities and huge land resources, favorable geographic location of Kazakhstan, the market capacity of China and the EAEC are attractive to the investors in the production and sales of agricultural products.

The foreign investor in the country's agro-industrial complex is attractive for their experience in agriculture and the high culture of the use of new technologies and knowledge. Kazakhstan is of interest primarily for investors from the EAEC, as there are practically no economic boundaries, language barriers, unified specifications, etc.

However, in recent years, investment in agriculture in Kazakhstan is less than 1% of GDP, while the European countries are investing more than 3-4% of GDP. Note that in 2015 it saw the lowest investment growth in the sphere for the past 6 years. In this case, the maximum value was recorded in 2012 and amounted to 28%.

It should be noted that about 80% of agricultural machinery in Kazakhstan has wear in the range of 80%, despite the annual increase in the number of new machines and equipment. The average age of tractors and combine harvesters is 13-14 years, whereas operating life is 8-10 years. Today, there are about 70% of combine harvesters, tractors, 90% and 95% of seeders are out of there operating time. More than 50% of the machinery engineering in Kazakhstan are from the beginnings of 1990-s. The technique of 2000 is about 30%. Thus, the energy supply of agricultural production amounted to 123 kW per 100 hectares of arable land, while in Russia there are 259 kW and in France are 364 kW, in Germany, the Netherlands are 350 kW, in the UK are 404 kW, in the US are 405 kW per 100 hectares.

The main importers of agricultural equipment to Kazakhstan are Russia and Belarus. This fact is explained by the integration of Kazakhstan to the EAEC. The share of these countries is around 40%, then 11%, 10% and 8% are took the Netherlands, the USA and Germany.

Agricultural producers purchased annually about 2-3 million units of various equipment on the amount of more than 1 billion $. It is should be noted that the demand for agricultural machinery market is about 4-4.5 million units per year. The demand is met mainly by imported vehicles, while domestic manufacturers provide no more than 1% of the total demand. Current period is characterized by the necessary of creating their own assembly factories for the production of a modern, competitive agricultural technology, which meet the safety requirements and capable to support the full domestic demand in the market of agricultural machinery in Kazakhstan.

The greatest potential for the development of agricultural engineering in the RK is in segments of combine harvesters, wheel tractors, attachments and machines for processing of grain and forage crops.

At the same time, state support has contributed to fleet renewal of many agricultural enterprises. Basic state support measures include: Promotion of the program and the expansion of the market of agricultural leasing business, micro-credit programs, updating the machine and tractor in regions at the expense of own funds of agricultural producers and budget programs. However, despite the increase in state support, disposal of fixed assets significantly exceeds their input. This is because the majority of agricultural enterprises do not have enough working capital and savings for the purchase of necessary machinery and tractors. Kazakh market is very attractive and relatively free for foreign companies marketing technologies.

The state regulation of agrarian sphere in Kazakhstan has implemented tax incentives. There is a constant increase in the amount of lending and subsidies. The value- added tax in Belarus is charged on 20%, in Russia - On 18%, in Kazakhstan is only on 12%. Besides, the Kazakh agricultural processing companies pay up to 70% lower. Country applied tax exemptions for all local and foreign agricultural producers, which are aimed at the 70% drop in the payment of all taxes, except the individual income tax and land tax. For example, in 2014 farms were free from the payment of personal income tax in the case of the sale of products to companies and organizations (legal entities), using the VAT refund blank organizations with purchase of agricultural products and services in farms and smallholders, eliminated some of the conventions on the use of special preferential tax treatment.

The part of the growth in agriculture production is the result of a focused agricultural policy, which is carried out in the country. Despite the financial crisis of 2008-2011 and its negative impact till the present time (2016), the financing of agroindustrial sphere steadily increased due to the government programs.

According to the Strategy "Kazakhstan-2050" and other strategic documents, the key indicators for the agriculture till 2020 are: To increase labor productivity in the agricultural sector by at least 4 times; to achieve a wheat yield to 1.4 tons per 1 hectare; to increase the domestic production of food products in the total volume of resources till 80%.

In order to achieve these figures was implemented the state Programme for the development of agro-industrial complex of Kazakhstan for 2013-2020 called "Agribusiness-2020." In general, the implementation of the Programme for 8 years provided more than $16.7 million, which should attract more than $55.5 million of private investment.

Currently, the policy of state regulation of development of agro-industrial complex in Kazakhstan is implemented in such forms as: The insuring of AIC of state support from the public budget in the form of grants, subsidies, government procurement, products export promotion, the creation of the necessary conditions for attracting investment, as well as the rapid development of agricultural infrastructure and NTP. Thus, the volume of government subsidiaries and other resources allocated to the agriculture sector has increased in 2015 up to $1.8 billion, compared to $226.4 million in 2008, i.e., more than 8 times.

The state programme "Employment 2020" has three main directions. The second one is the crediting of the development of agricultural entrepreneurship. Based on this programme the mechanism of micro crediting was updated. Those, who would like to establish their own business in rural area or update existing one could get a microcredit till $16.4 thousand for up to 54 months at 6% per annum (the effective interest rate is 6.2%).

So, in the agrarian sector certain reforms were done, incentives for domestic and foreign investors in the agricultural sector were created. Currently there is an active government support. This reflected by the growth in agricultural production, particularly livestock and crop production. Despite the some upward trend in investment in the last 16 years, their growth rates are quite volatile and are not stable. In agricultural sphere there is still quite lack of investment, which is needed for the working capital of agricultural companies and technical re-equipment, increasing the efficiency of processing and storage and release of competitive agricultural products.

5. DATA AND METHODOLOGY

Authors analyzed and forecasted the attraction of investment resources, which made an impact to the agrarian sector of Kazakhstan. The main hypothesis for the econometric modeling is that the inflow of investment has a direct impact on increasing the gross agricultural product. However, the capacity of investment is not sufficient enough to modernize the technologies in agro-industrial sphere.

In this research were used the methods of econometric modeling and forecasting with considering an annual economic indicators between 2000 and 2014 - Gross agriculture product, Inflation, Investment into the agriculture, index, square, consumption, salary, productivity of land, livestock, gross harvest of major crops.

The particular time period (between 2000 and 2014) was analyzed as for the several reasons: Firstly, starting from 2000, there was a small economic growth in the economy as whole; secondly, the 2008 and 2012 years have an economic recession because of the world financial crisis. After that, in 2012 and 2013 was a certain favorable situation in economy because of the higher demand to the hydrocarbons and metals. The other period of recession in economy of Kazakhstan was the year 2014, starting from the middle.

In the research were used such economic indicators as gross agriculture product, inflation, investment into the agriculture, index, square, consumption, salary, productivity of land, livestock, gross harvest of major crops.

The analysis used the model of multiple regression; all the parameters were given to comparable indicators and paraded, time series were transformed to the logarithmic (Table 1). In addition, these actions allowed considering connections between researched indicators within the same range. The first differences (FD) of logarithms are an approximation of the variables growth rate.

The correlation analysis was done on the first stage. The next steps included the study of cause and effect relationships between the indicators using the Grainger causality (1).

$$y_i=\mu_i+\Sigma\alpha_k y_{i-k}+\beta_k x_{i-k}+\varepsilon_i \quad (1)$$

Where, y_i - The value of variable y in the certain time i

x_i - The value of variable x in the certain time i
k - Temporary delay.

According to the classical approaches in economic and mathematic modeling, the multifactorial linear model are usually used for the regression Equation (2).

$$y=a+b_1\times x_1+b_2\times x_2+\ldots.+b_n\times x_n \quad (2)$$

The two-step method of least squares was used for the calculating the numerical values of the parameters of the regression Model (3).

$$\Sigma_{i=1}^{n}(y_i-y)^2=\min \quad (3)$$

Table 1: The symbols of indicators

Variables	Indicator	The symbols	Logarithm	FD
Y	Gross agricultural product, $	GAP	LOG (GDP)	DLOG (GDP)
X_1	Inflation, %	π	LOG (π)	DLOG (π)
X_2	Investment in to the fixed capital in agriculture, $	I	LOG (I)	DLOG (I)
X_3	The index of physical volume of gross output, %	I	LOG (i)	DLOG (i)
X_4	The squire of agricultural land, thousands hectares	S	LOG (S)	DLOG (S)
X_5	Food consumption by the population (per capita per month)	C	LOG (C)	DLOG (C)
X_6	The average wage in agriculture, $	W	LOG (W)	DLOG (W)
X_7	Yields of main agricultural structures, kg/ha	PL	LOG (PL)	DLOG (PL)
X_8	Livestock, thousands animals	L	LOG (L)	DLOG (L)
X_9	Gross harvest of major crops, thousand tons	GH	LOG (GH)	DLOG (GH)

Source: Committee on Statistics of the Ministry of National Economy of Kazakhstan, 2015, FD: First differences

Table 2: The correlation matrix of indicators

Data	GAP	C	GH	i	π	I	L	PL	W	S
GAP	1.000									
C	0.735	1.000								
GH	0.677	0.564	1.000							
I	0.326	0.246	0.841	1.000						
π	−0.103	−0.284	0.066	−0.032	1.000					
I	0.792	0.864	0.748	0.040	−0.323	1.000				
L	0.889	0.417	0.650	0.216	0.031	0.508	1.000			
PL	0.746	0.542	0.622	0.376	0.032	0.615	0.729	1.000		
W	0.981	0.710	0.551	0.167	−0.077	0.828	0.910	0.752	1.000	
S	0.923	0.580	0.547	0.178	−0.170	0.722	0.948	0.675	0.935	1.000

Source: Compiled on the basis of their own calculations of the authors

Table 3: An interpretation of Granger test results

m=1	m=2	m=3	m=4
No connection	No connection	No connection	No connection
GH→GAP	GH↔GAP	No connection	GH→GAP
No connection	No connection	No connection	No connection
No connection	No connection	No connection	No connection
I→GAP	No connection	I↔GAP	No connection
PL↔GAP	No connection	PL→GAP	PL ↔GAP
No connection	L→GAP	L↔GAP	L→GAP
No connection	W→GAP	No connection	No connection
S↔GAP	нет связи	No connection	No connection

Source: Completed by authors

The checking of time series for the stationary was done by following methods: The construction of autocorrelation plots (correlogram), as well as autocorrelation function and visualization. The autocorrelation function shows the degree of closeness of the connection between the observations of time series, scattered in time *t* sample.

6. RESEARCH RESULTS

Using the regression analysis and multiple regression, were identified main factors (from 9 indicators), included into the econometric model.

According to Table 2, there is a strong linear relationship between indicators. The biggest difficulties in using the multiple regression arise when the multicollinearity presence. This is because factors impact on each other. According with Table 2, there is a multicollinearity between factors in the model (Magnus, 2007).

The results of correlation analysis are falls because the value of pair coefficient between variables is high enough. This is due to the nonstationarity of initial time series. Stationarity can be achieved by the method of the FD.

On the first stage the replacement of resulting indicator was carried out. Then the step by step exception of factors from the model and further analysis of the determinants of the matrices of correlation between factors were done.

Comparing the coefficients of the multiple determinations R^2, the indicators responsible for the multicollineariy were identified. According to research results, such factors were X_1, X_3, X_4, X_5, X_6, X_7, and they were excluded from further analysis as insignificant. The model included factors with a minimum value of the coefficient of multiple regression, which are X_2 (I), X_8 (C), X_9 (GH), therefore, these factors remain for further analysis. The indicators were transformed by the method of FD for further analysis.

Authors have done the analysis of causal relationships between the identified factors for the period between the 2000 and 2014. In case the β_k coefficient in the regression model could be neglected, it is considered that past values of X do not help predict Y, therefore X is not a cause for Y by Granger causality. Conversely, if in the model β_k coefficients are statistically significant and cannot be neglected. It is considered that X is the cause for Y in Granger causality. An interpretation of the test results is presented in Table 3.

Based on the analysis results authors did the interpretation of Granger test (Table 3), which reflects the long-term aspect of the interaction of considered indicators in terms of the relations direction (Ouyang and Fu, 2012). The analysis allowed determining the dynamics of interaction, in particular, the direction of causality of main factors of agro-industrial complex. Thus, each of the selected parameters, except the inflation (I) and the volume index of the product (i), has a relationship with the amount of production of AIC.

For example, the losses in the planting and harvesting affect the score factor during the *t*+1, *t*+2 & *t*+4 time periods or 1, 2 and 4 years. This demonstrates the connection with the deterioration of the equipment used and the imperfection of technologies, as well as natural disasters.

The changings in the volume of capital investment at the time moment *t* affects agricultural production during the next *t*+1 and *t*+3 time periods or according to the original data with 1 and 5 years.

Productivity of land affects the gross outputs of agricultural products during the *t*+1, *t*+3 & *t*+4 time periods or 1, 3 and 4 years. This indicator shows the influence of factors such as soil fertilizer, as well as greenhouses, vegetable stores, the organization of production for the assembly the agricultural machinery and the introduction of drip irrigation technology into the production of horticultural crops. The proposed direction of agriculture modernization could be improved by using the additional investment.

Table 4: The results of econometric modeling

Variable	Coefficient	Standard error	t-statistic	Probability
Investment into agriculture	1,543822	0,468848	3,292800	0,021646
Livestock	−584314,38	89676,81	−6,515780	0,001272
Gross harvest of major crops	470448,92	61175,81	7,690112	0,000592
C	−191448.9	14.17543	−1.350569	0.20981
R^2	0.890817	Mean dependent var		2637548.
Adjusted R-squared	0.887757	SD dependent var		18.40607
SE of regression	203663.8	Akaike info criterion		-2.753399
Sum squared resid	3.73E+11	Schwarz criterion		-2.770782
Log likelihood	−174.9709	Hannan-Quinn criter.		27.49826
F-statistic	323.7040	Durbin-Watson stat		2.004606
Probability (F-statistic)	0.000000			

Source: Completed by authors, SD: Standard deviation

Livestock has an impact to the resulting factor for *t*+2, *t*+3 and *t*+4 time periods, where there is a direct connection with the selection achievements, advanced technologies and feeding, the creation and development of modern large-commodity dairy farms, poultry farms network. In general, the growing cattle must be more than 1 year, which is confirmed by the analysis.

Wages showed the relationship with GAP for 2 years. Unattractiveness of the sector and low wages put agriculture into the category of low-paid workers. Thus, in the agricultural sphere there is a low level of research and skilled labor, which affects the efficiency of the entire production.

On the next stage was done the multifactor linear model. The model used the 2 steps method of Least Squire (Dougherty, 2011), which includes three dominant independent features, such as DLOG (I), DLOG (L) and DLOG (GH). The factors were included in to the model because there were proved their relatively strong correlation with gross output of agricultural products in Kazakhstan (Table 4).

The analysis results showed that Livestock indicator is not statistically significant because the indicator of t-statistic is negative. Thus, further analysis included two indicators - Gross harvest of major crops and Investment into agriculture.

Further, the model included the factor x_1 (DLOG (OP)). After including the second factor R^2 equaled 0.92. Thus, Kazakhstan's GAP depends on 92% from x_1 and x_2, and only 8% include unaccounted random factors. The growth of determination coefficient on 2% indicates the advisability of including x_1 into the model. The final regression equation takes the following form (4):

$$Y=6,37x_1+346999,\ 2x_2+18682604046,3253 \quad (4)$$

Evaluation of reliability of regression equation and the index of closeness of the connection R gives Fisher F-test. In this particular case, F-test > F_{tabl} (323.7 > 6.34). The probability of obtaining a value of Fisher's F-test does not exceed the level of significance of 5%. The resulting value is not by chance, it was formed under the influence of significant factors. This was evidenced by statistical significance of all the equation and closeness of the R connection.

The student criteria t_{b2} = 3.53, and t_{b1} = 6.51, show that the parameters x_1 and x_2 are statistically significant, as $t_{b1, b2}$ is greater than t_{tabl}, which amounted to 3.0005. The regression equation is adequate, and this research can be considered as reliable.

As a result of the econometric study was demonstrated that over the study period GAP mainly depends on two factors - Investment into agriculture and Gross harvest, which have a positive impact to the increase of countries GAP.

7. CONCLUSIONS

It is obvious to the 1st quarter 2016, oil prices began to rise slightly. The reasons for this rise can be called such - reduction of production in Nigeria, Iraq and the UAE, and a weakening US dollar. In addition, in the near future it is expected that the OPEC cartel and major oil producers to agree on a slight decrease in oil production.

In the structure of energy consumption in the long term in industrial activity will decrease the use of oil in the world. There is growing investment in alternative energy, which is cheaper and environmentally cleaner than hydrocarbons.

With high probability it can be argued that the oil market has reached its bottom. The rapid decline in oil production leads to a reduction of its supply in the market. Therefore, inevitably it stimulates the growth of prices. It is likely that prices will then rise more active in the second half of 2016. However, in our view, oil prices will be relatively smooth. We expect by the end of 2016 a range of global oil prices around USD 45-50 per barrel.

Currently agro sphere takes a major share in the structure of the economy of Kazakhstan. The biggest part includes grain production. Agriculture sector has undergone changes in the direction of some improvement because of the measures to diversify the economy. However, it should be noted that in agribusiness is still lacks of investment resources. These factor leads to a lower level of competitiveness, external food dependence and low efficiency of the activities of the agricultural system.

The main problems of the development of the agricultural sector in Kazakhstan include the need to upgrade infrastructure and high wear of agro-industrial assets. Kazakhstani farmers faced with the lack and absence of collateral base from farms. This is a barrier to obtaining credit and financial resources. In turn, this leads to the use of a low level of technological development in agriculture, resulting in small-scale agricultural production and loss.

The paper presents economic and mathematical model to evaluate investment flows in the agrarian sector of Kazakhstan for the period from 2000 to 2014.

In the research was econometrically proved that the increase in investment in agriculture leads to an increase in output, but low volumes and low rates are not lead to significant results. This adversely affects the wear of equipment, lack of refining process, storage areas and low quality of food produced.

Taking into account the results obtained econometrically, authors made the following recommendations.

For further sustainable development of agricultural sector the comprehensive state support is needed. Government support and public funds should be used effectively and priority to direct them to the development of high-performance agrarian infrastructure, improving the industry lending policies, the provision of tax incentives and diversification of agriculture industries.

In order to reduce the import of agricultural products and improve its competitiveness not only inside, but outside of Kazakhstan it is necessary to focus on the attraction of financial resources for the modernization of equipment, the use of advanced farming technologies. Special attention should be paid to the processing sector, where investment inflow could have an impact to the use of innovative approaches.

Due to the deficit of food shortages and rising of world food prices, Kazakhstan faced the task of increasing the competitiveness of agribusiness for expanding the country's export potential. It is necessary to intensify the implementation of investment projects in agro-industrial sector, which are focused on the creation of export production. Therefore it is necessary to attract foreign investment into the agricultural sector, especially to those regions of Kazakhstan, where already exists objectively good climatic and economic conditions.

REFERENCES

Barrett, B. (2013), Food Security and Sociopolitical Stability. USA: Oxford University Press. p512.

Bhargava, A. (2006), Econometrics, Statistics and Computational Approaches in Food and Health Sciences. USA: World Scientific Publishing Co., Ltd. p382.

Bojnec, S., Ferto, I., Jambor, A., Toth, J. (2014), Determinants of technical efficiency in agriculture in new eu member states from central and eastern Europe. Acta Oeconomica, 64(2), 197-217.

Bournaris, T.H., Berbel, J., Manos, B., Viaggi, D. (2015), Economics of Water Management in Agriculture. Boca Raton, FL: CRC Press, Taylor & Francis Group. p370.

Committee on Statistics of the Ministry of National Economy of Kazakhstan. (2016). Available from: http://www.stat.gov.kz.

Dougherty, C.H. (2011), Introduction to Econometrics. NY: Oxford University Press. p512.

Köhn, D. (2014), Finance for Food. Berlin Heidelberg: Springer. p295.

Lobell, D., Ortiz-Monasterio, I., Matson, P., Naylor, R., Falcon, W. (2011), Seeds of Sustainability: Lessons from the Birthplace of the Green Revolution in Agriculture. Washington, DC: Paperback, Island Press. p332.

Magnus, J., Katyshev, P., Peresetsky, A. (2007), Econometrica. Moscow: Delo. p576.

Mazzocchia, M., Ragonaa, M., Fritzb, M. (2009), Stock market response to food safety regulations. European Review of Agricultural Economics, 36(4), 571-595.

McNellis, P. (2009), Foreign investment in developing country agriculture – The emerging role of private sector finance. FAO Commodity and Trade Policy Research Working Paper. 28. Rome, Italy.

Minister of Agriculture presented a seminar about joint UNDP agriculture projects. The official Internet Resource of the Ministry of Agriculture of the Republic of Kazakhstan. Available from: http://www.mgov.kz/en/proon-rasskazal-pro-selskoe-hozyajstvo-kazahstana/. [Last accessed on 2016 Mar 28].

Naylor, R. (2014), The Evolving Sphere of Food Security. USA: Oxford University Press. p394.

On the publication of a preliminary estimate of the balance of payments of the Republic of Kazakhstan for 9 months of 2015 and real effective exchange rate of Tenge for 10 month of 2015 November 11, 2015 Almaty: Press Release No. 59. Available from: http://www.nationalbank.kz/cont/publish682377_30182.pdf [Last accessed on 2015 Nov 11].

Ouyang, P., Fu, S. (2012), Economic growth, local industrial development and inter-regional spillovers from foreign direct investment: Evidence from China, China. Economic Review, 23(2), 445-460.

Production top 3 Crops. Official The website of the Food and Agriculture Organization of the United Nations. Statistics Division. Available from: http://www.faostat3.fao.org/browse/area/108/E. [Last accessed on 2016 Mar 30].

Smagulova, S.H., Radko, N., Doskeyeva, G. (2015), An assessment of investment into the development of agro-industrial complex in Kazakhstan. International Academic Conference on Management, Economics and Marketing in Vienna 2015 (IAC-MEM 2015 in Vienna). p159-165.