

Prediction investment support for agriculture of Ukraine

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Abstract

The article considers the necessity and the possibility of applying economic forecasts in the part of constructing a forecast of the flow of capital investments into agriculture in Ukraine, which is due to the need for optimization of investment volumes. According to the results of retrospective assessments the period of the highest investment activity was discovered. The analysis of the different types of models trend in investments to establish such which would most accurately predict the behavior of investors, the current tendency of development and with which it would be possible to make the most reliable forecasts of indicators of investing income from investments in agriculture. It was found that among all variations of the forecast polynomial trend allowed to get the highest level of probability that is realization of the developed script of investment is quite probable. The projected volumes of investment and the probable share of profits and gross output which should be directed by agricultural producers to provide sufficient investment are established. It is revealed that, according to the forecast one can expect a gradual expansion of the investment process in the country's agriculture.

Keywords: investment, agriculture, prediction.

Introduction

In the market conditions of managing and maintaining economic growth, the effectiveness of modernization transformations, increasing the efficiency of the agricultural sector is conditioned by the possibility of providing agricultural commodity producers with appropriate investment resources. Providing investment is the most important prerequisite for the effective functioning and development of agricultural enterprises as it helps them share increase production, increase of production potential, to increase the efficiency of the industry and strengthen the country's food security; creates preconditions for the development of the social sphere and increasing the fertility of soils. Through investments create opportunities for the modernization of the agro industrial complex, introduction of innovations, increase of qualitative and quantitative indices of industrial-economic, social and ecological activity. In analyzing the investment process in agriculture, one should proceed from the fact that Ukraine is a leading agrarian state in Europe with significant potential for development of high-efficiency exportable agricultural production. Adequate forecasting volumes of investment in agricultural production in Ukraine is relevant in the system of activation of investment activity in the transformational economy of Ukraine.

Literature review

A fundamental scientific analysis of the process of managing investment activities in a market economy is made in the works of such foreign scientists as G. Aleksander, M.D. John, T. Man, D. Ricardo, A. Smith, I. Fischer, W. Sharp, J. Schumpeter and others. Problems of realization of investments in the agrarian sphere are devoted to the work of researchers I. Blank (2001), I. Bezpyatova (2015), M. Kodynska, P. Sabluk (2012), M. Kissil (2015), Lupenko Y. (2012), M.K. Asanaliev, T. A. Taipov, S. A. Meldebekov (2014), P. G. Pardey, J. M. Alston, V. W. Ruttan (2010) and others. Scientists are inclined to explain the current trends of investing in agricultural production in Ukraine with such key aspects as the state of the offer on the investment market which is conditioned by the presence and degree of deterioration of fixed capital, decrease in capital intensity; demand characteristics due to the reduction of the share of agricultural production in the gross product; distribution that is defective due to prolonged price disparity between the prices of direct producers and the agricultural sector, industrial prices for resources. Because of these features the problem of recovery of investment activity in Ukraine agriculture remains an urgent and requires further in-depth study.

Results of empirical research

The justification of the investment needs for expanded reproduction in agriculture is based on an analysis of the actual provision of fixed and fixed assets by the enterprises in the sector and the forecast production and sales volumes. In the course of the research, it was found that in the long term by 2022 a significant increase in gross production can be ensured in Ukraine. Thus during 1995-2017 the average growth rate of production of all agricultural products amounted to 103.5% including plant growing 105.7% and livestock production 99.6% (Table 1).

Table 1: Determination of average annual growth rates of production gross agricultural output (in %)

Indexes	1995	2000	2005	2010	2011	2012	2013	2014	2015	2016	2017	Annual growth rate
Indexes	96.4	109.8	100.1	102.5	119.9	95.5	113.3	102.2	95.2	106.3	97.8	103.5
The growth rate of gross agricultural output total:	102.6	121.3	97.5	95.9	130.4	91.9	117.9	103.2	94.8	109.9	97.0	105.7
including : plant growing	89.0	95.3	105.1	103.4	101.3	103.9	104.0	99.7	96.3	98.0	100.1	99.6

Source: State Statistics Service of Ukraine, 'Agriculture of Ukraine'

It should be noted that in order to determine the prediction of the bases, the period from 1995 was chosen, when a certain stabilization of production and economic processes in the agrarian sector was initiated. However, if even such a slight growth dynamic is maintained in the long run by 2022, one can expect growth of agricultural production to UAH 309.7 billion, including crop production of up to UAH 230.5 billion, livestock production up to UAH 79.2 billion (Table 2).

Table 2: Estimated forecast of gross agricultural output to 2022, million UAH (at constant prices in 2010)

Indexes	In fact, 2017	2018	2019	2020	2021	2022
Gross agricultural output, total:	249.2	268.7	279	289.2	299.4	309.7
including: plant growing	179.5	195.1	204.0	212.8	221.6	230.5
livestock	69.7	73.6	75.0	76.4	77.8	79.2

Source: own research.

It should be noted that in the case of intensification of activities the results of management can be significantly better. According to the results of forecasting of expected volumes of investment flows

for the period up to 2022 in agriculture of Ukraine established which is likely to be a significant increase. Thus since the investments are volatile value of the cyclical nature of implementation then the assessment of changes in the future it may be appropriate to use polynomial trend. The polynomial trend is used for perspective estimates of the behavior of cyclic time series without a noticeable tendency to increase or decrease, but with significant fluctuations of the investigated value in the studied period.

Since in the investigated period of investment in agricultural production in Ukraine since 2005 there were several extremes with a tendency to increase and fluctuations in investment volumes at the highest point during 2016-2017, a second-degree polynomial trend may be used.

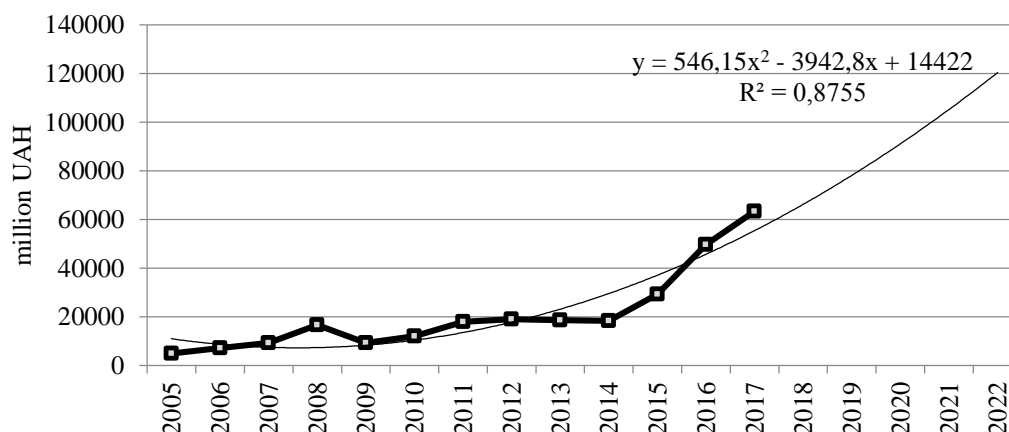


Fig. 1. Dynamics and the forecast of capital investments in agriculture of Ukraine in 2005-2022 for a polynomial trend, UAH million
Source: own research.

As can be seen from Fig. 1, according to the forecast for the polynomial trend of the 2nd degree already in 2019-2022, one can expect rapid expansion of the investment process in the agricultural sector.

Since among all the variations of the forecast, this trend allowed the highest R^2 (0,876), according to the results of unformalized estimates and taking into account that several dynamic extremes were allocated in the investigated period can be asserted that realization of the given scenario of investment is quite probable.

According to this variant of development of events, the annual growth of investments will amount to UAH 154 billion, or 19.9% for each year.

Using logarithmic approximation and linear trend filtration proved impractical because the probability of such forecasts is rather low. Prediction using other tools (power and linear approximation), although not showing a complete stop of investment processes indicates a rather sluggish growth trend; the exponential trend shows a slightly higher investment growth rate. In fig. 2 shows the results of the forecasting of capital investments in agriculture by exponential, power, logarithmic and linear trends, for which the corresponding level of probability was found.

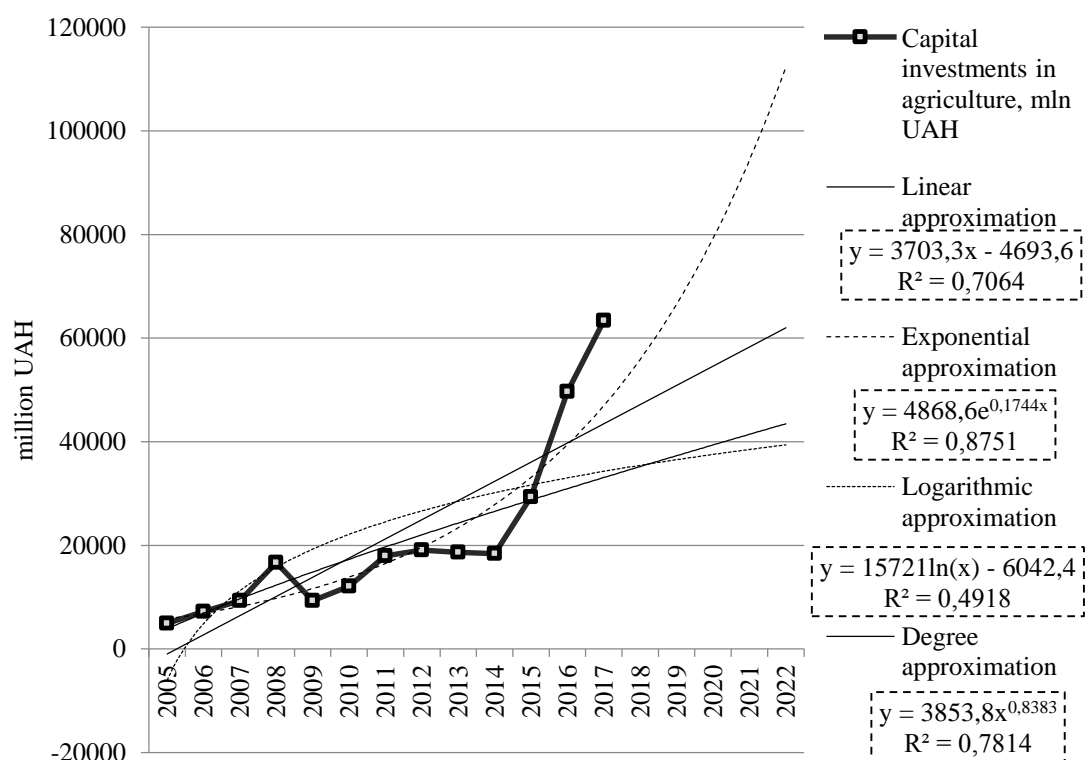


Fig. 2. Dynamics and forecast of capital investments in agriculture of Ukraine in 2005-2022, mln. UAH

Source: own research.

In addition to the logarithmic approximation, a rather high determination value of the determination coefficient R^2 is obtained for all the trends presented. So the exponential approximation provides the value of the coefficient R^2 at the level of 0.8751. If this scenario changes the flow of capital investment in agriculture Ukraine to 2022 can be expected to increase annual investment of 112.4 billion USD, or 15.5% per year. According to the linear trend by which the determination coefficient reaches 0.7064, it can be expected that the inflow of investments will decrease to UAH 62.0 billion. By the power approximation of 0.7814, the volume of capital investments in 2022 will decrease to 43.5 billion UAH. At the same time, the investment needs and opportunities of agricultural producers are much higher than projected indicators. Thus, the provision of theft of only half of the net profit received, with the allocation of these funds for industrial development, the amount of capital investment will exceed UAH 39.4 billion. While in the case of maintenance investments in the amount of 18.1 billion USD (polynomial trend) for investment purposes directed only 22.9% of the profits of producers. In comparison with the production of gross agricultural products, the volume of investments will reach 5.2% (Table 3).

Table 3: Estimated annual volumes of investments in fixed assets in agriculture of Ukraine up to 2022

Kind of approximating curve	Forecast of investment volume by 2022, billion UAH	Estimated annual growth (decrease) of investments, billion UAH	Average annual growth rate (decrease) in investments, %	Additional investment,% of:	
				the value of gross output	Inc
Polynomial approximation	154.0	18.1	2.,6	7.3	22.9

Exponential approximation	112.4	9.8	15.5	3.9	12.4
Degree approximation	43.5	-4.0	-6.3	-	-
Logarithmic approximation	38.5	-5.0	-7.9	-	-
Linear approximation	62.0	-0.3	-0.4	-	-
At the minimum reasonable average annual growth	110.9	9.5	150.0	3.8	12.1
For the most reasonable average annual growth	158.5	1.,0	30.0	7.6	24.1

Source: own research.

In the case of providing additional investments in the amount of UAH 9.8 billion annually (exponential trend) for investment purposes will need to direct the resulting 12.4% of net income producers and amounts of additional investments compared with gross output of agriculture reached 3.9%.

Conclusions

As the results of the analysis showed, for the agricultural production of Ukraine, a certain stability of the results of the economic activity of enterprises and their improvement in dynamics is characteristic. Even under the influence of the crisis gross agricultural production has not undergone a significant decline and has practically remained at the level of previous years. This provided for an increase in producers' own funds and an increase in investment in agriculture. Now it is necessary to preserve the existing investment trends through active investment policy to ensure the development of agriculture. This should keep the level of investment activity that was provided during the highest economic growth in the upward phase of the economic cycle. According to the results of retrospective assessments, it was found that during the period of the highest investment activity in 2015-2017 the average annual growth rate of capital investment in agriculture exceeded 50%. It is possible to upgrade production facilities and receive a significant increase in production. So if the process of investing in agricultural production in Ukraine will continue to develop on the basis of current trends, with 95% probability it can be argued that investment in agriculture in 2022 will be at 154 billion USD. Obviously, such a forecast will provide the opportunity to choose the most profitable of possible investment options with some justification.

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