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THE INFLUENCE OF INVESTMENTS ON THE TECHNICAL-ECONOMIC PERFORMANCE OF THE AGRICULTURAL SECTOR IN ROMANIA

Abstract. *The article presents the results of a quantitative analysis, of dynamic structural type, regarding the impact that the investments in the agricultural sector have on the performances of this sector. The numerical evaluation of the impact of investments on the performances of the agricultural sector was based on an econometric approach, respectively on the use of simple linear regression models. Within these econometric models, the explanatory variable was represented by the investments in the agricultural sector, and as dependent variables were considered, successively, three performance indicators specific to the agricultural sector: the gross domestic product, the added value and the number of machines. The data used in the analysis and for estimating the econometric models have as source the database of the National Institute of Statistics. The obtained results highlight the fact that the investments in the agricultural sector overwhelmingly influence the performances of the agricultural sector, measured through the three performance indicators. Indeed, the correlation coefficients between the investments and the three performance indicators have very high values, higher than 0.75. Also, in the case of all the three estimated econometric models, the multiple determination ratio has very high values, over 0.75, which means that over 75% of the variant of the three performance indicators are formed under the impact of investments.*

Keywords*: agricultural investments, economic performance, Romania, influence, agricultural sector, econometric analysis.*

JEL Classification: Q14, Q19

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1. Introduction

According to various researchers (Vasilescu, 2003; Vasilescu, 2004; Scholtz, 2007) the notion of investments presents two spheres of coverage: widened and restricted. For the first approach, most definitions lead to a common result, namely investments represent those expenses that bring profit. Therefore, according to Vasilescu (2004), investments mean most of the expenses related to an activity undertaken in order to obtain profit (trading bonds and shares, opening bank deposits, starting, and developing a business, etc.). The same author states that investments should not be confused with any expenditure made in the economic system as they are not considered to be investment efforts, but efforts regarding the development of economic activities in optimal conditions.

The dynamics, but especially, the volume of investments made significantly influence the growth and development of the world's economies. In the economic sphere, investments are positioned in a central place, having a dynamizing role, with implications in the activities of production of goods and services, but also with implications on consumer activities (Khan & Rouillard, 2018). Thus, it can be stated that investments can have multiple approaches and implications, representing a complex concept, the issue of which can be quite difficult to address (Dillon et al., 2011, Aït-Youcef, 2018, Tămășilă et al., 2018).

The impact of investments on agriculture are widely investigated all around the world as they are considered direct ways to socio-economic development (Sadowski et al., 2020; Bellemare et al., 2020; Gao et al., 2017) and, more recently for sustainable development (Branca et al., 2020; Assa et al, 2020; Mason-D'Croz et al., 2019).

The above statements are also supported by research conducted by Gunasekera et al (2015), which studied the key issues surrounding foreign direct investment (FDI) in agriculture and examine the potential impacts of FDI in African agriculture. The authors use a global economy modelling framework to simulate the effects of rising FDI in African agriculture. The results illustrate that combined efforts to improve land productivity and FDI growth could increase Africa's share of global agricultural production and exports. Similar ideas have been studied by Pazienza (2015) for the OECD countries.

Another research, by Lavers and Boamah (2016), shows the impact of agricultural investment on state capacity, this analysis being conducted for Ethiopia and Ghana, claiming that agricultural investment transforms the power of state infrastructure depending on the type of political approach, resulting that an expansion of authority limits the power of state infrastructure by undermining the state's ability to regulate investments.

The links between agricultural investment and changes in the national economy were analysed in the work of Benfica et al. (2019), these being studied in Mozambique. The authors conducted an econometric analysis to measure the

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impact of investments on farm productivity and economic development, both at the household and macroeconomic levels. At national level, in Mozambique, the investment plan in agriculture aimed at increasing the resources allocated to subsidies and irrigation, and the authors' analysis found that the expansion of agriculture is not based on these two elements alone, but modest changes in growth can be justified. These ideas are reinforced by Vander Donckt et al. (2020), who prove through a longitudinal study that countries that are consistently investing in agriculture are far more developed. Therefore, following these findings, previous papers recommend better prioritization and high efficiency of investments in this sector to support economic growth. This recommendation can be followed in the case of Romania, as other studies (Chivu et al., 2020) showed that agriculture may be considered a major economic sector for developing Romanian regions.

2. Methodological aspects

The data used to evaluate the impact of investments on the three performance indicators of the agricultural sector were obtained from the National Institute of Statistics of Romania. The numerical evaluation of the link between the investments made in the agricultural sector and the indicators used to express the performance of the agricultural sector was based on the estimation of simple Pearson-type correlation coefficients and on the construction of simple linear regression models (BV & Dakshayini, 2018; Zeynoddin et al., 2020). Assuming the existence of T observations, the estimates for the simple correlation coefficient between the random variables Y and X, coefficient defined as:

$$\mathrm{Cor}(Y,X) = \frac{\mathrm{Cov}(Y,X)}{\sqrt{(\mathrm{Var}(Y)\mathrm{Var}(X))}} \quad \text{or} \quad \rho(Y,X) = \frac{\sigma_{YX}}{\sqrt{\sigma_{YY}\sigma_{XX}}},$$

Where, Cov (Y, X) represents the covariance between the variables Y and X, and Var (Y) and Var (X) represent the variants of the two variables, were obtained with the help of the estimator:

$$r(Y,X) = \frac{S_{YX}}{\sqrt{S_{YY}S_{XX}}} = \frac{\frac{1}{T-1}\sum_{t=1}^{T}(Y_t-\bar{Y})(X_t-\bar{X})}{\left[\frac{1}{T-1}\sum_{t=1}^{T}(Y_t-\bar{Y})^2\frac{1}{T-1}\sum_{t=1}^{T}(X_t-\bar{X})^2\right]^{1/2}} = \frac{\sum_{t=1}^{T}(Y_t-\bar{Y})(X_t-\bar{X})}{\left[\sum_{t=1}^{T}(Y_t-\bar{Y})^2\sum_{t=1}^{T}(X_t-\bar{X})^2\right]^{1/2}},$$

Where:

$$\bar{Y} = \frac{1}{T}\sum_{t=1}^{T} Y_t; \quad \bar{X} = \frac{1}{T}\sum_{t=1}^{T} X_t.$$

As it is known, the Pearson correlation coefficient measures the intensity and the direction of the connection between two random variables (Benesty et al.,

DOI: 10.24818/18423264/55.1.21.16

2009). The intensity of the bond is given by the magnitude of the correlation coefficient, and the meaning of the bond is given by its sign. Thus, the closer the value of the correlation coefficient is to 1 in absolute value, the stronger the connection. A positive value of the correlation coefficient highlights a direct link between the two variables, which means that their values tend to change in the same direction from one observation to another. Similarly, a negative value of the correlation coefficient highlights an inverse link, which means that the values of the two variables change in the opposite direction from one observation to another. (Strat, 2020).

Regarding the econometric models used to evaluate the impact of investments on performance indicators, simple linear regression models were chosen, in the form of:

$$Y = \beta_0 + \beta_1 X + \varepsilon,$$

Where, Y represents the dependent variable, respectively GDP agriculture or GVA agriculture or Number of agriculture equipment, X represents the investments in agriculture, β0 and β1 are the parameters of the regression model, and ε represents the stochastic perturbation of the model. The least squares estimators for the two parameters of the simple linear regression model are given by the relations:

$$b_1 = \frac{S_{YX}}{S_{XX}} = \frac{\sum_{t=1}^{T} (Y_t - \bar{Y})(X_t - \bar{X})}{\sum_{t=1}^{T} (X_t - \bar{X})^2}; \quad b_0 = \bar{Y} - b_1 \bar{X}.$$

The estimation of the two parameters of the model was done using the least squares method, using the 21 available observations regarding the explanatory variable and the three dependent variables.

3. Results and discussion

Given that the objective of this study is to answer the research question stated above, before determining the impact that investments can have on economic performance indicators in the agricultural sector, the investment volume in the agricultural sector in Romania must be measured structurally and dynamically.

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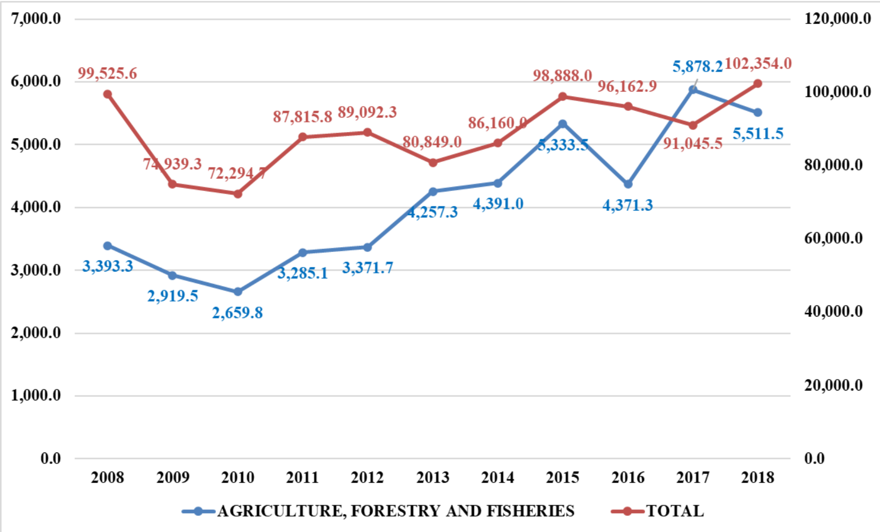

Figure 1. The evolution of total investments in Romania and the level of investment in the agricultural sector (in million lei)
Data Source: NIS, 2020

According to figure 1, it can be observed that the dynamics of investments in all economic branches of Romania is somewhat constant, slightly increasing in the analysed period with an average annual growth rate of 0.28%. Comparing the investments in general, with the dynamics of investments in agriculture, it is noticeable that the pace is different, but the trend is the same. Thus, investments in the agricultural sector are also on the growth trend, but at a much faster rate than total investment, which is 4.97% per year, which places this sector in second place according to the higher growth rate among all economic sectors, being surpassed only by the field of public administration and defence.

Analysing the volume of investments in the agricultural sector, in 2008 there was a value of investments of 3.4 billion lei, later in 2010, their level decreasing to 2.6 billion lei, but since then, the trend has been increasing, the maximum of the analysed period being registered in 2017, when investments in agriculture were 5.88 billion lei, and in the last year analysed, investments decreased to 5.5 billion lei. The shares of annual investments in agriculture in total investments varied in the analysed period, 2008-2018, from 3.41% (in 2008) to 6.46% (in 2017).

However, investments in this economic activity "agriculture, forestry and fishing" are not the only investments made in this complex sector, there is also the industrial part. Thus, analysing the components under the manufacturing industry sector, two sub-branches will be found, namely: food industry and beverage manufacturing, their dynamics may be followed in figure 2.

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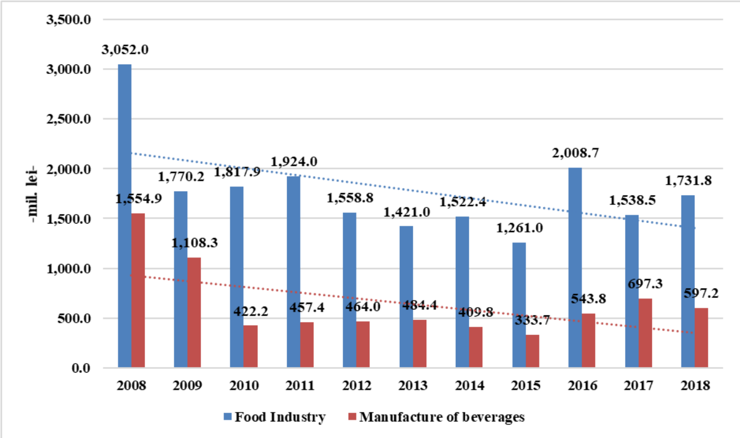

Figure 2. Dynamics of investments in the food processing sector
Data Source: NIS, 2020

The investments made in the food industry registered a decreasing evolution, from 3 billion lei (in 2007), reaching in 2018 the value of 1.7 billion lei, which represents a decrease of 43.25%. On average, a change rate of -5.5% was registered every year. The average value of investments in the food industry was 1.78 billion lei.

Regarding the manufacture of beverages, the investments made in this field registered faster average annual decreases, registering an average rate of change of -9.12%, which determined in 2018 a value of investments of 597 billion lei, 61.6% lower than in the first analysed year. The average value of investments in this field is 643 million lei.

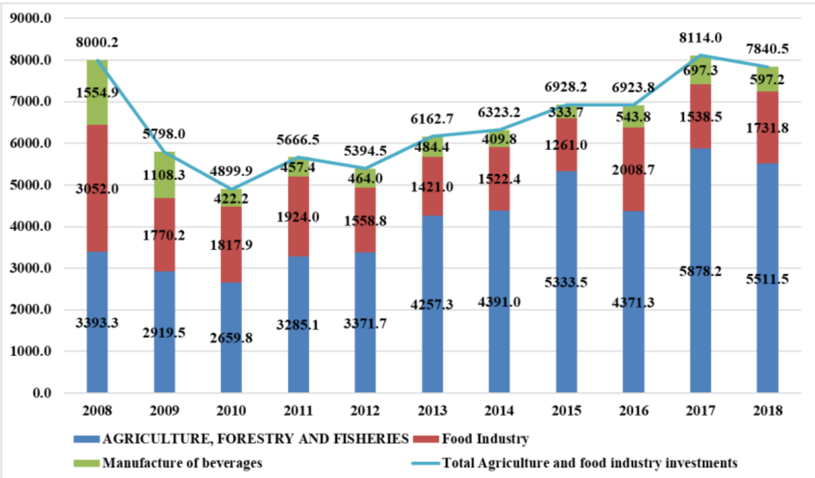

Figure 3. Dynamics and structure of total agricultural investments
Data Source: NIS, 2020

DOI: 10.24818/18423264/55.1.21.16

Summarizing the investments registered in the agricultural field, as a separate sector of the national economy with the two sub-branches of the manufacturing industry, will result the total investments in the agricultural sector, and they are found in figure 3. For this investment level, it can be considered that it becomes a constant or even a decreasing one, with an annual rate of change of -0.2%, given the fact that investments in processing have decreased significantly, the average value of these investments being 6.55 billion lei, with a minimum value of 4.9 billion in 2010, and with a maximum value of 8.11 billion in 2017. The deviation from the average value was 1.1 billion, which determined a coefficient of variation of 16.7%.

In order to determine the efficiency of investments in Romanian agriculture, a series of effect indicators will be analysed that could be correlated with the investment level, in order to determine the impact of investments on the agricultural sector in our country (Cicea et al., 2010). Therefore, these indicators can later be considered dependent variables in a regression analysis, which may vary depending on the level of investment.

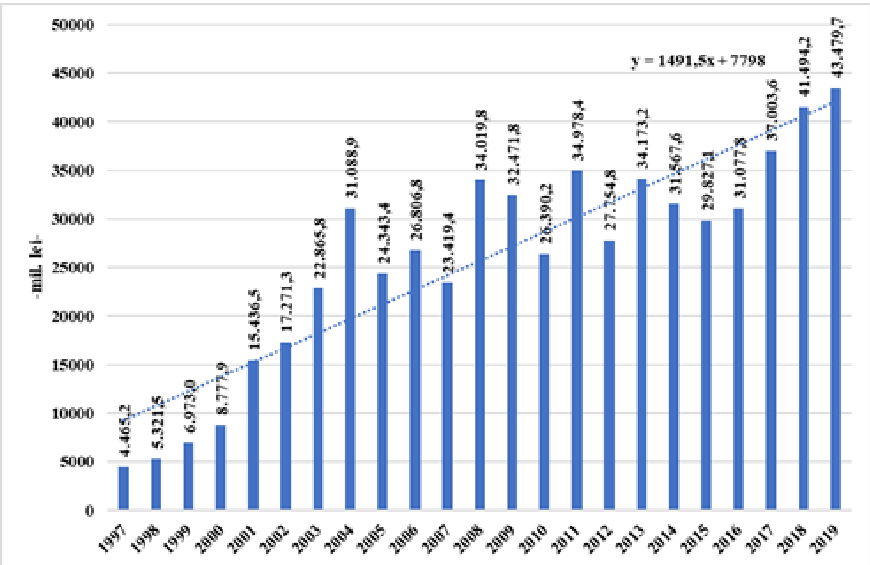

Figure 4. GDP dynamics in the agricultural sector

Data Source: NIS, 2020

Figure 4 shows the value of GDP in agriculture from 1997 to 2019. It can be seen that this value shows an overall upward trend, although the values of GDP in the last 10 years have had an oscillating evolution, but on average still increasing. If in 1997 there was a value of 4.47 billion lei, in 2019, the GDP in the agricultural and forestry sector was worth 43.5 billion lei, which means an increase

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of 9.7 times. Realizing the average value of GDP, it was 25.7 billion lei, from this average registering a standard deviation of 11.2 billion lei, which led to a significant variation, of 43.7%. This confirms that GDP values form a nonhomogeneous string of data, given the rather significant increases in the first period, and the equally significant fluctuations in the second part of the period. Referring to the significant increases, on average, the GDP of agriculture registered an average growth rate of 10.9% per year. This increase in GDP can be explained by at least two reasons, namely considering the expansion and development of agriculture, but also taking into account the inflation rate.

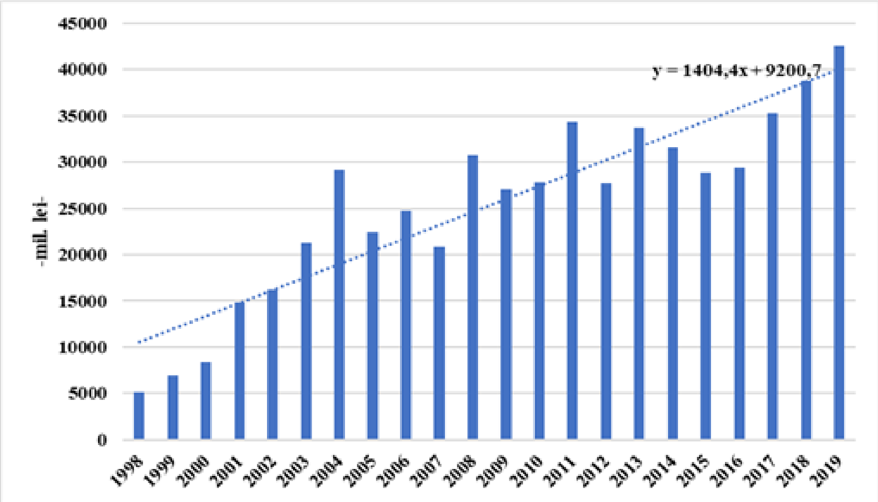

Figure 5. Dynamics of gross value added (GVA) for the agricultural sector
Data Source: NIS, 2020

The analysis of the evolution of the gross value added in agriculture is found in figure 5, this analysis being performed over a long period of time, respectively 1998-2019. From the graphical representation it can be seen that the general trend of this indicator is one of growth for the analysed period. If in 1988 there was a GVA in agriculture of 5.14 billion lei, this indicator increased, reaching in the last year analysed to the maximum value of 42.6 billion lei, being higher than in the first year by 8.3 times. Realizing the arithmetic average for the entire period, it was established that, on average, in every year a gross value added in agriculture of 25.35 billion lei was registered. Compared to this average, a deviation of 10 billion lei was observed, which led to a variation of 39.7%. This value demonstrates that the data recorded for these indicators are nonhomogeneous, this situation being confirmed by large fluctuations in recent years. On average, the gross value added in agriculture increased from year to year by 10.6%.

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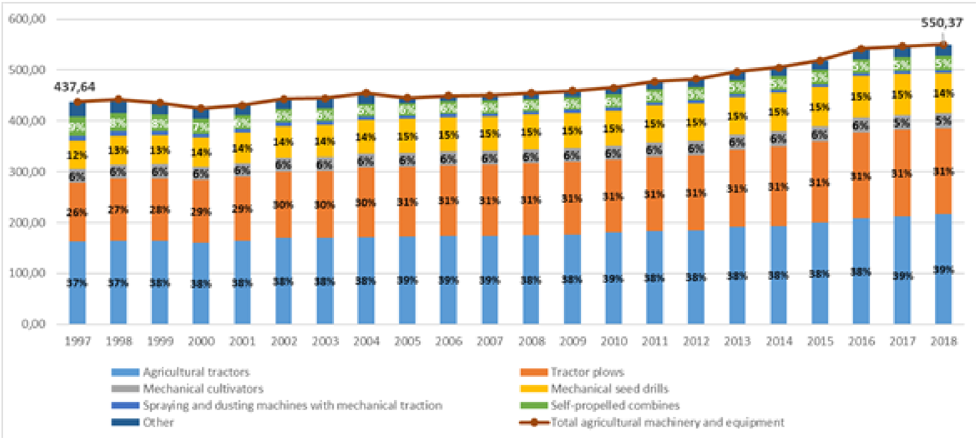

Figure 6. Dynamics of the fleet of agricultural machines and equipment (thousand units)

Data Source: NIS, 2020

As can be seen in figure 6, the fleet of agricultural machinery and equipment shows an increasing trend, with an increase over the period from 437.64 thousand units in 1997 to 550.37 thousand units in 2018. Analysing the categories of machines and equipment, the majority of the total shares are held by agricultural tractors and ploughs.

In the case of tractors, there is an increasing trend, so if in 1997 there were 163.02 thousand, in 2018, their number reached 215.19 thousand, by 24.50 percent more. The average value of tractors recorded during the analysed period was 180.34 thousand units, with a standard deviation of 16.5 thousand units, which determined a small coefficient of variation of 9.2%, from which it can be deduced that the data string is homogeneous. The annual growth rate of this category was 1.34%. The number of agricultural equipment such as the ploughs followed the same trend, so that in 2018 it reached the maximum value of the period, of 169.96 thousand units, this being 32.50% higher than in 1997 (114.72 thousand units).

One factor that has contributed to the increase in the number of agricultural machinery and equipment is the investment in mechanization of this sector. After 2007, farmers had at their disposal a series of funds and measures that allowed the purchase of new and used agricultural machinery and equipment, thus supporting the endowment of farms, in order to modernize and increase their economic performance.

In order to be able to determine the possible influences of the investments on these previously analysed indicators, an econometric analysis will be used: the correlation coefficient (Benesty et al., 2009; Strat, 2020) and the linear regression model (BV & Dakshayini, 2018; Zeynoddin et al., 2020).

DOI: 10.24818/18423264/55.1.21.16

Table 1. Analysis of the correlations (Pearson) between agricultural investments and the main indicators of economic efficiency in this sector

	Agricultural investments	*GDP in agriculture*	*GVA in agriculture*	*No. of machines*
Agricultural investments	x			
GDP in agriculture	0.886	x		
GVA in agriculture	0.872	0.990	x	
No. of machines	0.754	0.722	0.747	x

Data source: Authors' calculations based on MS Excel

As shown in table no. 1, the correlation coefficients between investments and indicators that were previously considered to capture the effect of technical and economic efficiency was determined. It can be seen that all correlation coefficients are over 0.75, which suggests that there is a close and direct link between investments and dependent variables, respectively when one of the variables increases and the other increases, as it is natural. Next, the econometric analysis between these variables will be performed to identify the degree of influence of investments.

Table 2. Linear simple regression model between investment and agricultural GDP

Regression Statistics	
Multiple R	0.88638
R Square	0.78568
Adjusted R Square	0.7744
Standard Error	4760.1539
Observations	21

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1578271600	1578271600	69.6529	0.000000089
Residual	19	430522248.9	22659065.73		
Total	20	2008793849			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	5721.0838	2627.1454	2.17768	0.042236	222.4051	11219.762
Investments in the agri-food sector	4.0336	0.4833	8.3458	0.00000009	3.022	5.0452

Data source: Authors' calculations based on MS Excel

A correlation coefficient of 0.8863 was determined between the volume of investments in agriculture and the agricultural GDP, a value that attests a close relationship between these two variables, as well as directly proportional, therefore when one of the two variables increases and the other registers the same trend.

By squaring the value of the correlation coefficient, a value of 0.7856 (R Square) was obtained, representing the coefficient of determination. With its help it can be determined the degree to which the dependent variable is explained by the independent variable, so the Gross Domestic Product is explained by investments in agriculture in a share of 78.5%.

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According to Henson, 2015, the ANOVA table presents the analysis of variance, and with its help the validity of the statistical model analysed can be established. With the help of the F parameter, the research hypotheses can be validated or not, and later the statistical model can be validated. The statistical parameter F will be compared with its critical value, the latter being established according to the degrees of freedom and the level of significance. In this case, the value of parameter F is 69.65, and the critical value of the parameter, for a significance level of 0.05% and for the degrees of freedom related to this model, is 4.38. Therefore, a clear distinction can be observed between the real value of the parameter compared to the critical one, much higher for the first case. In addition to this aspect, the level of significance of the parameter F can be observed, which is much lower than the maximum accepted threshold of 0.05, therefore it can be seen that the statistical model presented is valid.

For the model to be valid, not only the analysis in the ANOVA table is sufficient, but an analysis will also be performed in the table of coefficients. Thus, the null hypothesis must be ruled out, namely that the value of the coefficients can be zero (0). In this context, the parameter t (t State) will be analysed, which will be compared with its critical value, similarly to the previous analysis. In this respect, for a level of degrees of freedom found in the model (20) and a standard level of significance of 0.05% (respectively a confidence interval of 95%) results a critical value of the parameter t of 2.086. Analysing the table of coefficients, it can be seen that both values of the parameter t corresponding to the two coefficients of the regression equation are higher than the critical value of the parameter. At the same time, the significance level is lower than the maximum accepted threshold of 0.05, and during the confidence intervals the null value is not included, thus, it can be stated that the null hypothesis rejects, with a probability of 95%, the value of the coefficients it cannot be null, thus there is no possibility that the model will be invalidated.

Following these analyses on the validity of the model and the rejection of null hypotheses, the regression equation between the two analysed variables can be presented, namely the explanation of the GDP in agriculture according to the agricultural investments:

GDP in agriculture = 4.0336 * Agricultural investments + 5721.08

For the regression function, it can be seen that the value of the coefficient of x is 4.034, thus, when the value of x, respectively of investments, increases by one unit, the value of GDP in agriculture increases by 4.034 units.

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Table 3. Linear model of simple regression between investments and Gross Value Added in agriculture

Regression Statistics	
Multiple R	0.8721
R Square	0.7606
Adjusted R Square	0.7480
Standard Error	4782.318
Observations	21

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	1380452541	1380452541	60.36	0.00000026
Residual	19	434540694,6	22870562.88		
Total	20	1814993235			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	5694.207	2639.378	2.1574	0.044	169.926	11218.488
Investments in the agri-food sector	3.7724	0.4856	7.76913	0.00000026	2.7561	4.789

Data source: Data source: Authors' calculations based on MS Excel

A correlation coefficient of 0.8721 was determined between the volume of investments in agriculture and the GVA in agriculture. This value attests a close relationship between these two variables, as well as a direct proportionality, therefore when one of the two variables increases and the other registers the same trend.

By squaring the value of the correlation coefficient, a value of 0.76 (R Square) was obtained, representing the coefficient of determination. With its help it can be determined the degree to which the dependent variable is explained by the independent variable, so the Gross Value Added is explained by investments in agriculture in a share of 76%.

The ANOVA table presents the analysis of variance, and with its help the validity of the statistical model analysed can be established. With the help of the F parameter, the research hypothesis can be validated or not, and later the statistical model can be validated. The statistical parameter F will be compared with its critical value, the latter being established according to the degrees of freedom and the level of significance. In this case, the value of parameter F is 60.36 and the critical value of the parameter, for a significance level of 0.05% and for the degrees of freedom related to this model, is 4.38. Therefore, a clear distinction can be observed between the real value of the parameter compared to the critical one, much higher for the first case. In addition to this aspect, the level of significance of the parameter F can be observed, which is much lower than the maximum accepted threshold of 0.05, therefore it can be seen that the statistical model presented is valid.

For the model to be valid, not only the analysis in the ANOVA table is sufficient, but an analysis will also be performed in the table of coefficients. Thus, the null hypothesis must be ruled out, namely that the value of the coefficients can be zero (0). In this context, the parameter t (t State) will be analysed, which will be compared with its critical value, similarly to the previous analysis. In this respect, for a level of degrees of freedom found in the model (20) and a standard level of significance of 0.05% (respectively a confidence interval of 95%) results a critical

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value of the parameter t of 2.086. By analysing the table of coefficients, it can be seen that both values of the parameter t corresponding to the two coefficients of the regression equation are higher than the critical value of the parameter. At the same time, the significance level is lower than the maximum accepted threshold of 0.05, and during the confidence intervals the null value is not included, thus, it can be stated that the null hypothesis rejects, with a probability of 95%, the value of the coefficients it cannot be null, thus there is no possibility that the model will be invalidated.

Following these analyses on the validity of the model and the rejection of null hypotheses, the regression equation between the two analysed variables can be presented, namely the explication of the GVA in agriculture according to the agricultural investments:

Gross Value Added in agriculture = 3.7721 * Agricultural investments + 5694.21

For the regression function, it can be seen that the value of the coefficient of x is 3.7721, thus, when the value of x, respectively of investments, increases by one unit, the value of GVA in agriculture increases by 3.77 units.

Table 4. Linear model of simple regression between investments and the number of agricultural machineries

Regression Statistics	
Multiple R	0.753635335
R Square	0.567966218
Adjusted R Square	0.545227598
Standard Error	26504.69466
Observations	21

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	17547045832	17547045832	24.978042	0.00008
Residual	19	13347477940	702498838,9		
Total	20	30894523772			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	405344.3364	14628.03295	27.71010551	7.922E-17	374727.511	435961.16
Investments in the agri-food sector	13.44951155	2.691084362	4.997803764	0.00008	7.81700725	19.082015

Data source: Authors' calculations based on MS Excel

A correlation coefficient of 0.754 was determined between the volume of investments in agriculture and the number of agricultural machineries, a value that attests a close relationship between these two variables, as well as a direct proportionality, therefore when one of the two variables increases, the other registers the same trend.

By squaring the value of the correlation coefficient, a value of 0.568 (R Square) was obtained, representing the coefficient of determination. With its help it can be determined the degree to which the dependent variable is explained by the independent variable, so the number of agricultural machineries is explained by investments in agriculture in a share of 56.8%.

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The ANOVA table presents the analysis of variance, and with its help the validity of the statistical model analyzed can be established. With the help of the F parameter, the research hypotheses can be validated or not, and later the statistical model can be validated. The statistical parameter F will be compared with its critical value, the latter being established according to the degrees of freedom and the level of significance. In this case, the value of parameter F is 24.98 and the critical value of the parameter, for a significance level of 0.05% and for the degrees of freedom related to this model, is 4.38. Therefore, a clear distinction can be observed between the real value of the parameter compared to the critical one, much higher for the first case. In addition to this aspect, the level of significance of the parameter F can be observed, which is much lower than the maximum accepted threshold of 0.05, therefore it can be seen that the statistical model presented is valid.

For the model to be valid, not only the analysis in the ANOVA table is sufficient, but an analysis will also be performed in the table of coefficients. Thus, the null hypothesis must be ruled out, namely that the value of the coefficients can be zero (0). In this context, the parameter t (t State) will be analyzed, which will be compared with its critical value, similarly to the previous analysis. In this respect, for a level of degrees of freedom found in the model (20) and a standard level of significance of 0.05% (respectively a confidence interval of 95%) results a critical value of the parameter t of 2.086. Analyzing the table of coefficients, it can be seen that both values of the parameter t corresponding to the two coefficients of the regression equation are higher than the critical value of the parameter. At the same time, the significance level is lower than the maximum accepted threshold of 0.05, and during the confidence intervals the null value is not included, thus, it can be stated that the null hypothesis rejects, with a probability of 95%, the value of the coefficients it cannot be null, thus there is no possibility that the model will be invalidated.

Following these analyses on the validity of the model and the rejection of null hypotheses, the regression equation between the two analyzed variables can be presented, namely the explanation of the number of agricultural machineries according to the agricultural investments:

Number of machines = 13.45 * Investments + 405344.33

For the regression function, it can be seen that the value of the coefficient of x is 13.45, thus, when the value of x, respectively of investments, increases by one unit, the number of agricultural machineries increases by 13.45 units.

4. Conclusions

In this paper the authors aimed at determining the impact of investments on the economic performance of the agricultural sector in Romania, starting from the hypothesis that investments directly and significantly influence the economic performance of the sector, but wanting to determine the extent to which this

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phenomenon happens. By comparing the dynamics of total investments in Romania, regardless of the economic sector, with the dynamics of agricultural indicators it was found that total investments have a constant evolution, with an average annual rate of 0.28%, and investments in agriculture show a more pronounced growth with an average year-on-year growth of almost 5%. Also analyzing the food sector, respectively the processing of agricultural products, it was found that the investments made in the food industry and in the manufacturing of beverages registered a decreasing dynamic.

Summing up the investments in agriculture, food industry and beverage manufacturing, the level of investments in the agri-food sector in Romania was determined, finding that it becomes a constant or even decreasing, with an annual rate of change of -0.2%, given that investments in processing have decreased significantly.

The study of indicators that can express the level of economic performance in agriculture, and the correlation between these indicators and the level of investment in the sector, were than covered in this paper. The first indicator studied is the GDP in agriculture, finding that there is an increasing evolution in the analyzed period, the indicator increasing yearly, on average, by about 1.5 billion lei. The second indicator that can present the level of economic performance in agriculture, but also to capture the possibility of the influence that investments can have on it, is the gross added value. There was an increase of this indicator, in the analyzed period, on average by 1.4 billion lei annually. The third indicator that was analyzed was the number of agricultural equipment. The evolution of this indicator increasing in the analyzed period, mainly due to the increasing investment level of agriculture, the equipment category representing approximately half of this investment level.

Following the analysis of these indicators, they were correlated using the Pearson correlation coefficient, and the results show that there are close and positive relationships between investments and technical and economic indicators, when one of the variables changes and the other variable changes in the same sense. Thus, it can be stated that the hypothesis is true, and the investments are closely related to the technical-economic indicators of the agricultural sector.

Next, the three relationships between investments and technical-economic indicators were studied, using the linear regression model, and the results for the final equations were as follows: when investments increase by one unit, GDP in agriculture increases by 4.033 units, value added increases by 3.77 units, and the number of agricultural machineries increases by 13.45 units. Therefore, the research hypothesis is true, the investments significantly and positively influencing the technical and economic performance of the agricultural sector.

The current study reinforces previous research on the importance of investment in agriculture for the socio-economic development of a country (Cicea et. al, 2010, Chivu et al., 2020), contributing to the body of research by determining clear and direct relationships between investments in agriculture and

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the growth of GPD, GVA and agricultural machinery, therefore the paper being of interest in the design of new agricultural policy for Romania.

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