

# FORECASTS ON SOME FINANCIAL INDICATORS: A CASE STUDY FOR S.C.D.A SIMNIC

**Ramona-Maria DIMITROV**

University of Craiova, Craiova, Romania

ORCID: <https://orcid.org/0000-0002-3478-9420>

Email: [ramona.dimitrov@yahoo.com](mailto:ramona.dimitrov@yahoo.com)

DOI: 10.52846/MNMK.21.2.01

## *Abstract:*

*In this paper, several financial indicators at S.C.D.A. Simnic are investigated from a statistical point of view. Using the method of least squares, the mathematical functions that model the trend are found and with the help of which financial forecasts are made, also using the growth rates with a chain basis and a fixed basis for the time series corresponding to the period 2008-2022. Finally, an analysis is made of the correlations between these indicators, such as income, expenses, profit, assets, liabilities, stocks, receivables, capital and the results found are interpreted. Thus, the forecasts on the financial indicators and the correlations between them can be of great help in the management of a company, being able to contribute to the efficiency of the activity through adequate budget planning, performance evaluation, investment decision-making or human resources planning. They can help managers identify opportunities and risks, optimize the use of resources, and achieve better financial results for the firm.*

*Keywords: financial indicators, forecasts, time series, correlations.*

## **1. Introduction**

At the agricultural research and development station Șimnic - Craiova, the research theme focused on culture technologies for the main agricultural plants in the pedo-climatic conditions specific to the area, plant protection, fodder production and bull breeding, as well as the mechanization of agricultural production processes. S.C.D.A. Simnic is an agricultural resort that produces and sells cereals and dairy products of the best quality. In this work we will make analyses and forecasts on the main financial indicators from S.C.D.A. Siminic.

Forecasting financial indicators of a company has multiple purposes and benefits. Among the main uses of financial indicator forecasts we mention:

- allows the company to plan and create budgets for future periods. This includes estimating revenue, expenses, profit, cash flow and other relevant financial indicators. Forecasts help set financial goals and align resources accordingly.

- provides a benchmark to assess the firm's current performance against established goals and expectations. By comparing actual results with forecasts, deviations can be identified and corrective actions can be taken to improve financial performance.

- provides essential information for making strategic decisions regarding investments, business expansion, management of financial resources and other key aspects. They can provide insight into the potential impact of decisions on the firm's financial situation and help identify opportunities and risks.
- can be used to attract financing from banks, investors or other external sources. They demonstrate the solvency and financial sustainability of the firm and provide confidence in its ability to repay loans or provide an attractive return to investors.
- are useful in communicating with stakeholders such as shareholders, business partners, customers or employees. They provide insight into the company's financial direction and convey information relevant to understanding its situation and performance.

Forecasts of financial indicators must be based on relevant data and information, sound analysis and appropriate estimation methods. It is important to recognize that forecasts are estimates and that actual results may vary depending on internal and external factors that may affect the business. The analysis and evaluation of a company is aimed at establishing the real value of the business at a given moment, estimating the real wealth of the shareholders and the company's potential to increase their wealth. Thus, the evaluation of an entity does not only consist in establishing the value of a property or an asset, but also involves determining its ability to generate flows in the future (profit, cash flows), from which the owner should benefit, these being able to be predicted by statistical-mathematical methods.

There are several methods of forecasting a company's financial data, but in the paper we will use financial modelling. This method involves the use of statistical-mathematical models to project the company's financial data into the future. These models may include simulation models, regression models, economic models or time series models (see for example Mackinnon, J.G. (2004), Georgescu V. (2005), Iacob S.V. (2019)). They can be customized according to the specifics of the business and the available data. We will use the method of least squares in determining the trend function for forecasting financial data, using the growth rates with a chain basis and with a fixed basis in the analysis of the corresponding time series.

The work is structured as follows. The introductory part presents the advantages of the forecasts of some financial indicators and their usefulness. The second part corresponds to the study of the specialized literature, in which the results obtained in other scientific works and the connection with the present work are presented. In the third part, the research methodology is presented, in which descriptive statistics, time series analysis and the method of least squares are used to determine the trend function. The fourth part contains the new elements of the work, being statistically analysed several financial indicators from S.C.D.A. Simnic. Growth rates with a chain basis and a fixed basis are used in the analysis of the time series corresponding to the period 2008-2022 and forecasts are made on the values of the financial indicators from the year 2023 with the help of the trend functions. Also, an analysis of the correlations between these indicators is made, using the correlation matrix and the results are interpreted. The work ends with the part of conclusions and further developments.

## 2. Literature Review

There is a lot of specialized literature in the field of economic-financial analysis from a statistical point of view. In this work we will present only a part of these works, namely those that use similar research methods. Thus, Anghelache C. and Capanu I. (2000), Gheorghiu Al. (2012) described the economic indicators used in micro and macro-economic analysis.

Spătaru L. (2011) presented the economic-financial analysis as a tool of enterprise management, and Lazăr M., Lazăr C. (2012) made a statistical-economic analysis of the indicators.

Anghelache C., Anghel M.G., Iacob S.V. (2020) highlighted the important aspects regarding statistical indicators, as well as their role in econometric analyses. For economic indicators, a series of variation and correlation coefficients are calculated that highlight the way in which the factors with influence on the economic evolution are interrelated and lead to concrete results over time.

Davidson R. and Mackinnon J.G. (2004), Georgescu V. (2005), Iacob S.V. (2019) describe statistical-econometric methods for quantitative analyses in economics. Anghelache C. and Anghel M.G. (2014) presents economic modelling concepts and case studies.

In their work, Anghelache C., Anghel M.G. (2022) analysed a series of data to make a forecast regarding the yield of investments on the capital market. The authors used data from the international literature and used the method of comparison and other statistical methods of capital market evolution. Also, Anghelache C., Radu I. Stoica R. (2020) analysed through the dynamic series of flows, the way in which a commercial company evolves economically. The calculations were made on the basis of chronological indicators, which are expressed and calculated as indicators with a fixed base or indicators with a chain base.

Boshnakov G.N. and Iqelan B.M. (2009) proposed a method for generating periodically correlated and multivariate ARIMA models having the dynamic characteristics partially or fully specified in the form of eigenvalues, respectively eigenvectors of the associated model matrices. This method uses the spectral decomposition of the multi-companion matrices and their factorization into products of the corresponding matrices. The generated models are needed in simulation, but can also be used in estimation, for example to set sensible initial parameter values for nonlinear optimization.

In their work, Anghelache C., Anghel M.G., Samson T., Stoica R. (2017) present the essential theoretical elements on which economic forecasting must be based. The authors give a wide space to the methodological framework of the economic forecast of the structure of the forecasts and pay attention to the logical flow of the forecasting works, by going through the essential stages of diagnosis, forecasting and planning.

In the book by Bardsen G. et al. (2007), wage and price modelling take a central role as the authors interpret and evaluate the last forty years of international research experience. It also covers inflation modelling, inflation targeting, monetary policy rules and forecasting in one book. It is also emphasized that inflation is a complex phenomenon, not one that can be explained by one or two explanatory variables.

Pesavento E., Rossi B. (2006) found that existing methods for constructing confidence intervals for multivariate impulse response functions can have poor

coverage at long times when the variables are highly persistent. The aim of this paper is to propose a simpler method, which is not punctual and which is efficient in the presence of very persistent processes, using approximations based on the local-to-unit asymptotic theory. This method is shown to have better coverage properties at long horizons than existing methods and can provide different economic conclusions in empirical applications.

Reis R. (2009) pursued two approaches to modelling consumption dynamics, one statistical and one economic. The first statistical approach estimates consumption properties and calculates costs so that consumption fluctuates around its average growth. The second economic approach uses a calibrated model of optimal consumption and measures the costs of eliminating income shocks.

### 3. Research Methodology

Descriptive statistics (Table 16) can be used in analysing a company's financial indicators over a certain period of time to provide a summary and interpretable picture of the data. It involves using statistical methods to describe and synthesize the main characteristics of financial data, such as trends, distribution, variability, and relationships between variables.

Thus, descriptive statistics can be used in the analysis of a company's financial indicators using:

- measures of central tendency, such as mean, median and mode to identify the central or typical value of a financial indicator over a period of time. These measures can provide insight into the average or representative level of the indicator.
- measures of variation, such as dispersion, standard deviation and coefficient of variation, to assess the variability and dispersion of financial data over a period of time. These measures can indicate the degree of fluctuation or stability of the financial indicator. Also, the coefficient of variation is not always the best measure of relative variability, for example when the mean is zero or negative, and it may be useful to use other statistical measures to assess the variation in a data series.
- correlation analysis, by using the correlation coefficient to evaluate the relationships between the company's financial indicators over a period of time. This can help identify dependencies or relationships between different financial aspects of the firm.

By applying these methods and techniques of descriptive statistics, we can gain a deeper understanding of financial data and extract relevant information for decision making. However, it is important to consider other contextual aspects and to use statistical methods appropriate to the nature and distribution of the financial data being analysed.

The method of least squares is a common method used in determining the trend function in financial data analysis. This method involves fitting mathematical functions to the historical data so that the sum of the squares of the differences between the observed values and the estimated values is minimal.

It is important to note that the least squares method provides an estimate of the trend function based on the available data, but cannot anticipate unpredictable changes or external influences. Therefore, it is recommended to use also more methods and to take into account the specific context of the business in the interpretation and use of the obtained results.

## 4. Results and discussion

### 4.1 Statistical analysis and forecast of financial indicators

In what follows, we will do a statistical analysis and forecast on the main financial indicators from S.C.D.A. Simnic.

A firm's total financial income refers to the sum of all income earned by that firm in a given time period, usually a year. To calculate the total revenues of a company, all the revenues generated by it during the reference period are added up. It includes income from the firm's main activities, such as sales of products or services, but also income from secondary or non-operating activities, such as dividends, interest or rental income.

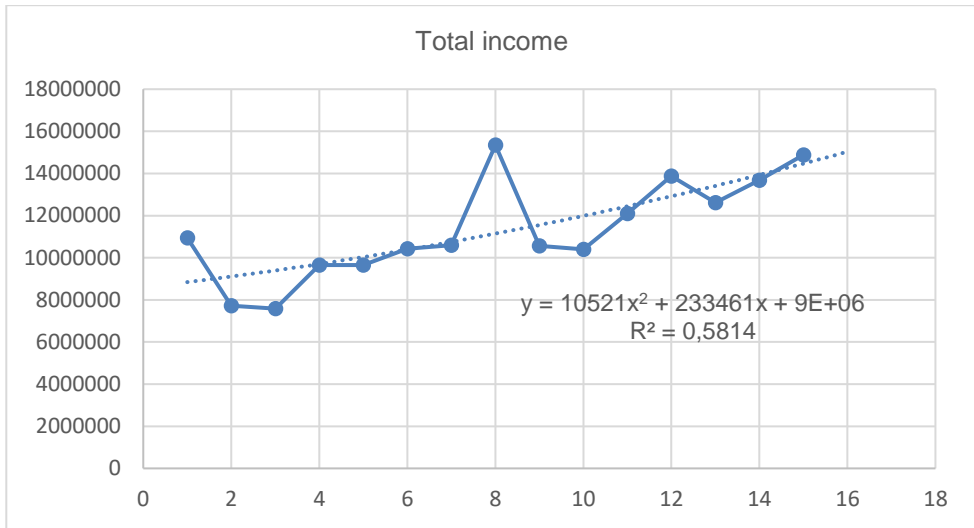
It is found that the average total financial income in the period 2008-2022 at S.C.D.A. Simnic was 11.336.834 with a standard deviation of 2.368.573, with a maximum value of 15.346.011 obtained in 2015, due to the access to European funds and a minimum of 7.584.149 in 2010. The coefficient of variation has a value of 20,8% suggesting a relatively low variability of the data, the series being homogeneous and the mean representative. In general, there is an increasing trend, visible in recent years (Table 1, Figure 1), but inflation also increased during this period. We make the forecast with a polynomial function of the second degree, by the method of least squares and we get

$$f(x) = 10521x^2 + 233461x + 9000000$$

For the year 2023, we calculate the value of the forecast by  $f(16) = 15.428.752$ .

**Table 1. Growth rates for total financial income**

Year	Total income	Growth rate with chain base	Growth rate with fixed base
2008	10951587		
2009	7722384	-29,48%	-29,48%
2010	7584149	-1,79%	-30,74%
2011	9658066	27,34%	-11,81%
2012	9647979	-0,10%	-11,90%
2013	10431235	8,11%	-4,75%
2014	10594708	1,56%	-3,25%
2015	15346011	44,84%	40,12%
2016	10569369	-31,12%	-3,49%
2017	10401397	-1,58%	-5,02%
2018	12097945	16,31%	10,46%
2019	13876620	14,70%	26,70%
2020	12619088	-9,06%	15,22%
2021	13677425	8,38%	24,88%
2022	14874548	8,75%	35,82%



**Figure 1. Total income at S.C.D.A Simnic**

Turnover refers to the total value of sales of products or services made by a company in a given period of time, usually a year. This includes the sum of the values of all sales transactions completed by the company. Turnover measures the volume of the firm's sales activity and reflects its level of performance in generating revenue from its core operations. Thus, the difference between turnover and total revenues lies in the fact that turnover refers strictly to the revenues generated from the main sales activity of the firm, while total revenues include all revenues obtained by the firm, regardless of their source. Turnover is an important indicator for evaluating the performance and size of a business. An increase in turnover can indicate expansion and success in the market, while a decrease can signal difficulties or problems with the company's sales and overall performance.

In the analysed period, an average of 8.595.885 was recorded with a standard deviation of 2.280.353 lei. The maximum value of 12.561.548 was obtained in 2022, and the minimum of 4.797.954 in 2010. The coefficient of variation is 26,5%, resulting in moderate relative variability. This suggests that the data has some variation from the mean, but that variation is still relatively small. There is an increasing trend in the last 6 years (Table 2, Figure 2). We make the forecast using a polynomial function of the second degree, resulting in the expression:

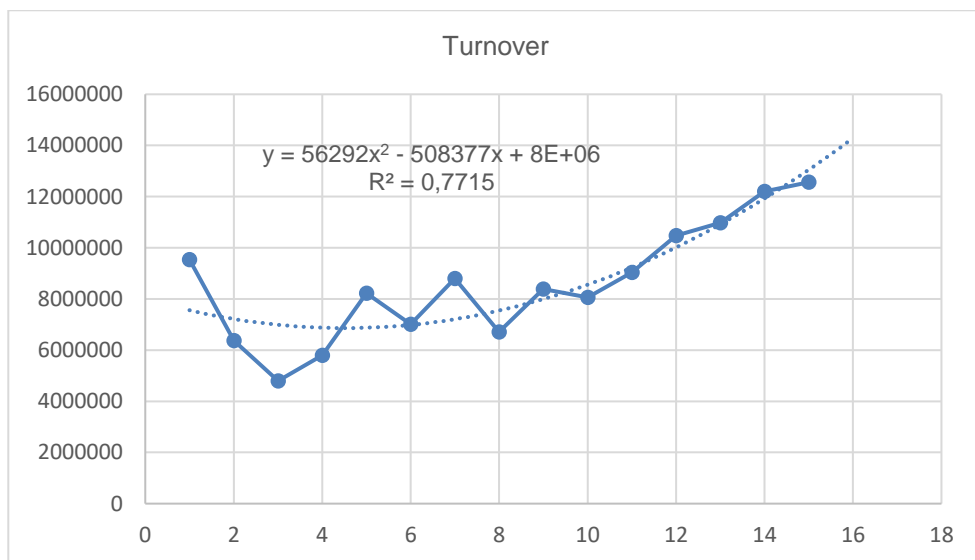
$$f(x) = 56292x^2 - 508377x + 8000000$$

For the year 2023, a value of  $f(16) = 14,276,720$  is expected.

**Table 2. Growth rates for turnover**

Year	Turnover	Growth rate with chain base	Growth rate with fixed base
2008	9542877		
2009	6367257	-33,27%	-33,27%
2010	4797954	-24,64%	-49,72%
2011	5796490	20,81%	-39,25%
2012	8222398	41,85%	-13,83%

2013	7016426	-14,66%	-26,47%
2014	8796428	25,36%	-7,82%
2015	6711821	-23,69%	-29,66%
2016	8382542	24,89%	-12,15%
2017	8055757	-3,89%	-15,58%
2018	9033860	12,14%	-5,33%
2019	10472220	15,92%	9,73%
2020	10981331	4,86%	15,07%
2021	12199368	11,09%	27,83%
2022	12561548	2,96%	31,63%



**Figure 2. Turnover at S.C.D.A Simnic**

Total expenses in a company represent the sum of all costs and expenses incurred in carrying out its activity in a certain period of time. These expenses include all resources and monetary value consumed in the process of production, sale or provision of services. Total expenses are important for evaluating a firm's financial performance because they reflect the costs incurred in relation to the revenues generated. Effective expense management can help increase profitability and improve overall business performance.

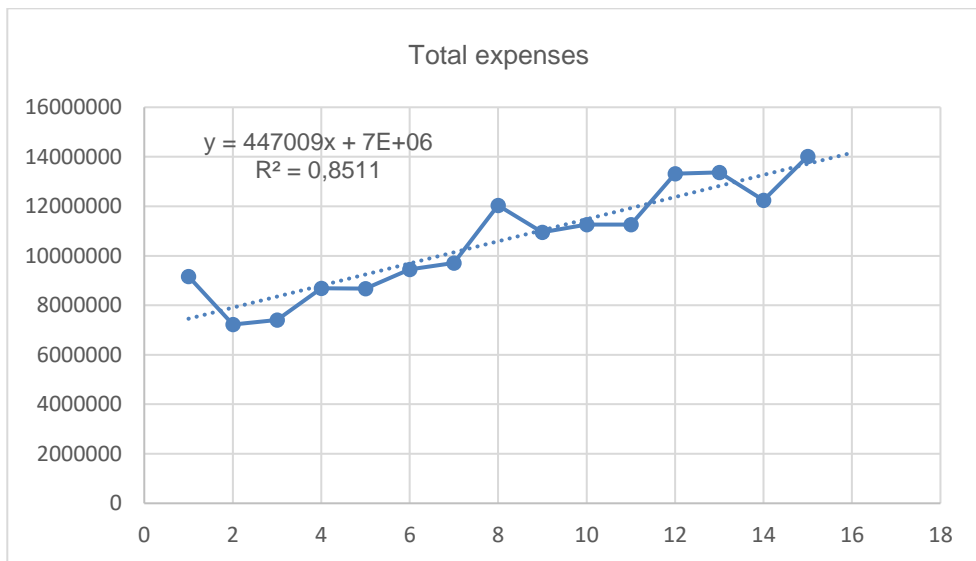
Regarding the period 2008-2022 at S.C.D.A. Simnic, an average of 10.585.419 was calculated, with a standard deviation of 2.166.878, with a maximum value of 14.021.626 in 2022, also due to inflation, and a minimum value of 7.223.260 from the year 2009. The coefficient of variation with the value of 20,4% indicates a sufficiently homogeneous series with the representative average. There is an increasing trend throughout the period (Table 3, Figure 3) with some small fluctuations. The prediction function is chosen linear, given by

$$f(x) = 447009x + 7000000$$

with the predicted value for the year 2023 given by  $f(16) = 14.152.144$ .

**Table 3. Growth rates for total expenses**

Year	Total expenses	Growth rate with chain base	Growth rate with fixed base
2008	9165594		
2009	7223260	-21,19%	-21,19%
2010	7401331	2,46%	-19,24%
2011	8692016	17,43%	-5,16%
2012	8668933	-0,26%	-5,41%
2013	9450079	9,01%	3,10%
2014	9709249	2,74%	5,93%
2015	12032304	23,92%	31,27%
2016	10949014	-9,00%	19,45%
2017	11265472	2,89%	22,91%
2018	11261739	-0,03%	22,86%
2019	13316949	18,24%	45,29%
2020	13374724	0,43%	45,92%
2021	12249009	-8,41%	33,64%
2022	14021626	14,47%	52,98%



**Figure 3. Total expenses at S.C.D.A.Simnic**

A firm's profit is the difference between its total income and its total costs over a given period of time, usually a year. It is a measure of the financial performance of a business and indicates how efficient the company is in generating net income. Profit is an important indicator of a company's financial health and reflects its ability to generate a surplus of income over expenses. A positive profit indicates that the company generated more income than the costs incurred and can be a sign of the success and sustainability of the business. On the other hand, a negative profit or loss indicates that total expenses exceeded total income and the company was unable to generate enough income to cover costs. In these cases, a careful



assessment of business activity and strategy is required to identify and correct financial problems.

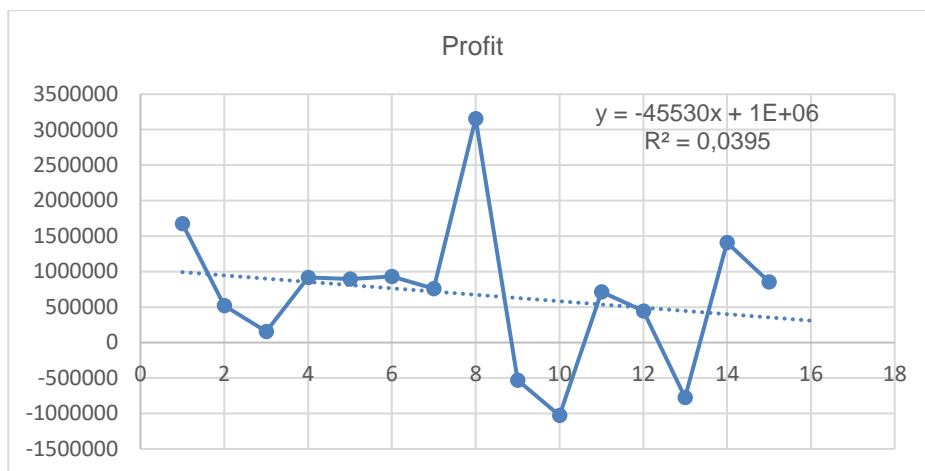
The analysis of the net profit at SCDA Simnic results in an average value of 673.347 and a standard deviation of 1.025.004 in the analysed period, with a maximum value of 3.155.975, obtained in 2015, also due to the access to non-refundable funds, but also a minimum value negative -1.028.248 in 2017. It should be noted that the profit was reinvested and a significant part of the income was used to repay the loans, for this reason resulting in large annual fluctuations (Table 4, Figure 4). Large variations are observed from one year to another, a fact confirmed by the coefficient of variation which has a value of 152%, the data series being heterogeneous and the mean insignificant. It is difficult to make a realistic forecast in these conditions, in which no trend can be distinguished, but we can cautiously try a decreasing linear function, taking into account the unfavourable international situation and the reduced price of grain due to imports from Ukraine, resulting

$$f(x) = -45530x + 1000000$$

and for the year 2023, the forecast is  $f(16) = 271.520$ .

**Table 4. Profit growth rates**

Year	Profit	Growth rate with chain base	Growth rate with fixed base
2008	1674449		
2009	522239	-68,81%	-68,81%
2010	155150	-70,29%	-90,73%
2011	919758	492,81%	-45,07%
2012	895820	-2,60%	-46,50%
2013	931161	3,94%	-44,39%
2014	761228	-18,24%	-54,53%
2015	3155975	314,58%	88,47%
2016	-530805	-116,81%	-131,70%
2017	-1028248	-93,71%	-161,40%
2018	714486	169,48%	-57,33%
2019	442593	-38,05%	-73,56%
2020	-774245	-274,93%	-146,23%
2021	1407747	281,82%	-15,92%
2022	852902	-39,41%	-49,06%



**Figure 4. Net profit at S.C.D.A Simnic**

A firm's total assets represent the total value of all resources owned by the company during a given period of time. Assets include all assets, rights and resources controlled by the firm that have the potential to generate future economic benefits. Total assets are calculated by summing up the values of all the patrimonial elements of the company. Total assets provide a picture of the total value of the resources held by the firm and are used to assess its size and solvency. It is important to note that total assets must be analysed in the context of other financial indicators and accounting reports to obtain a comprehensive picture of a firm's financial position and performance.

At S.C.D.A. Simnic, an average of 50.168.121 is found in the period 2008-2022, with a maximum value of 70.373.168 in 2020 and a minimum value of 11.107.205 in 2008. The coefficient of variation is 41,6 % meaning that the relative variability is high. This suggests that the data have significant variation from the mean, but are not very extreme, with the mean still being significant. There is a significant jump of 338% in 2011 of the total assets (Table 5), due to the retrocession of some lands to the company and the revaluation of the assets. For this reason, for the forecast we will use the period 2011-2022 (12 years, Figure 5) and consider a polynomial function of degree 3, resulting in the expression:

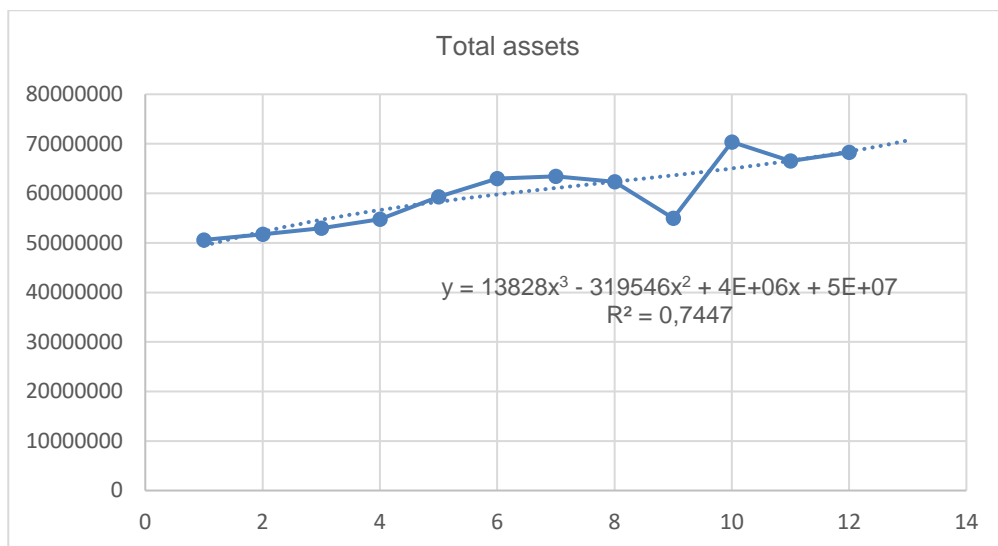
$$f(x) = 13828x^3 - 319546x^2 + 4000000x + 50000000$$

The forecast value for 2023 is obtained by calculating  $f(13) = 78.376.842$ .

**Table 5. Growth rates for total assets**

Year	Total assets	Growth rate with chain base	Growth rate with fixed base
2008	11107205		
2009	11764521	5,91%	5,91%
2010	11538250	-1,92%	3,88%
2011	50595629	338,50%	355,52%
2012	51706716	2,19%	365,52%
2013	52980121	2,46%	376,98%
2014	54744932	3,33%	392,87%

2015	59295536	8,31%	433,84%
2016	62946173	6,15%	466,71%
2017	63430407	0,76%	471,07%
2018	62327564	-1,73%	471,07%
2019	54951800	-11,83%	394,74%
2020	70373168	28,06%	533,58%
2021	66509290	-5,49%	498,79%
2022	68250513	2,61%	514,47%



**Figure 5. Total assets at S.C.D.A Simnic**

Fixed assets represent those long-term assets of a company that are used repeatedly and continuously in the performance of its production or service activity, over a period longer than one year. These assets are often critical to the operation of the business and are not intended for immediate sale.

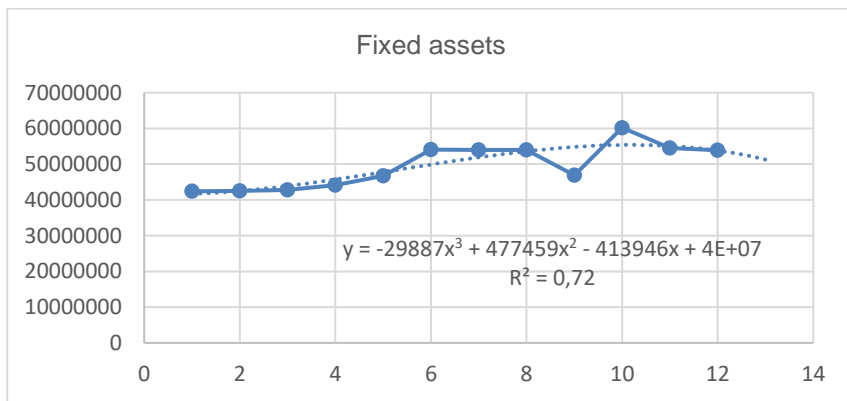
From the descriptive statistics at S.C.D.A. Simnic, an average of 40.500.088 was calculated for fixed assets, with a standard deviation of 19.732.345, having the maximum value of 60.207.160 reached in 2020, and a minimum value in 2009 of 3.739.055. The coefficient of variation has a value of 48.7%, resulting in a high variability, that is, the data have a significant variation compared to the mean, but they are still not very extreme, the mean being somewhat significant. There is a significant increase in the year 2011 of fixed assets (Table 6), due to the retrocession of lands made within the company and consequently for the forecast we will use the period 2011-2022 (12 years, Figure 6), also considering a polynomial function of the third degree, resulting in the expression:

$$f(x) = -29887x^3 + 477459x^2 - 413946x + 40000000$$

Consequently, the forecast for the year 2023 is obtained from  $f(13) = 49,647,534$

**Table 6. Growth rates for fixed assets**

Year	Fixed assets	Growth rate with chain base	Growth rate with fixed base
2008	3865914		
2009	3739055	-3,28%	-3,28%
2010	3875188	3,64%	0,23%
2011	42414526	994,51%	997,14%
2012	42536688	0,28%	1000,30%
2013	42749866	0,50%	1005,81%
2014	44130076	3,22%	1041,51%
2015	46691913	5,80%	1107,78%
2016	54059277	15,77%	1298,35%
2017	53952206	-0,19%	1295,58%
2018	54005497	0,09%	1295,58%
2019	46865725	-13,22%	1112,28%
2020	60207160	28,46%	1457,38%
2021	54527361	-9,43%	1310,46%
2022	53880880	-1,18%	1293,74%



**Figure 6. Fixed assets at S.C.D.A Simnic**

Current assets are those assets of a firm that are expected to be converted into cash or consumed within a normal business cycle, i.e. within a time frame of approximately one year. These assets are liquid and can be easily converted into cash within a short span of time. Current assets are essential for running a company's day-to-day business and help support the liquidity and day-to-day running of the business. They are valued at the lower of realizable value or estimated market value.

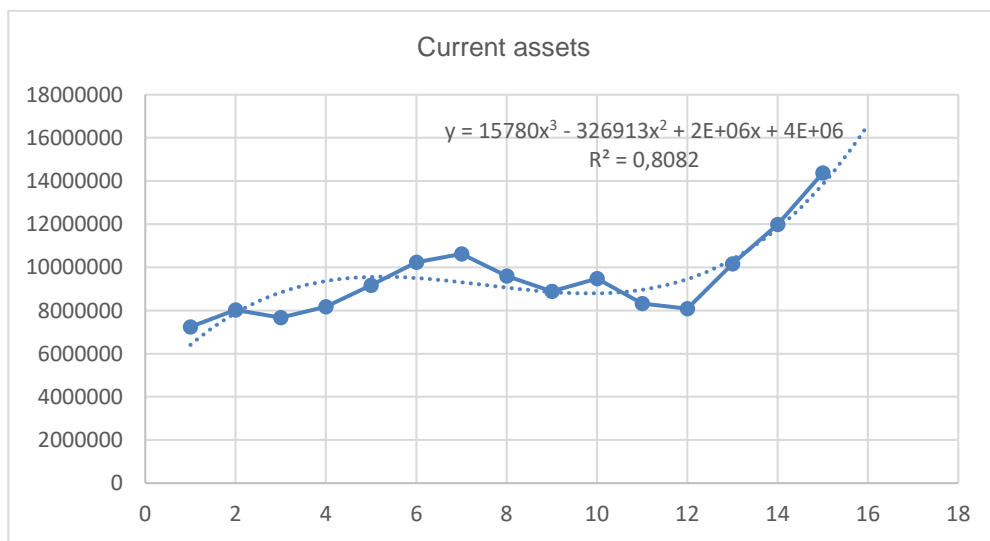
In the analysed period, there was an average of 9.468.032, with a standard deviation of 1.858.383, with a maximum value in 2022 of 14.369.633, but also a minimum value of 7.241.291 recorded in 2008. The coefficient of variation has a value of 19,6% suggesting that the data have a certain variation from the average, but this variation is still relatively small and the average is representative. There is an increasing trend in the last four years (Table 7, Figure 7). For forecasting we also use a polynomial function of the third degree and the expression results:

$$f(x) = 15780x^3 - 326913x^2 + 2000000x + 4000000$$

with the value  $f(16) = 16.945.152$  forecasted for the year 2023.

**Table 7. Growth rates for current assets**

Year	Current assets	Growth rate with chain base	Growth rate with fixed base
2008	7241291		
2009	8025466	10,82%	10,82%
2010	7663062	-4,51%	5,82%
2011	8181103	6,76%	12,97%
2012	9170028	12,08%	26,63%
2013	10230255	11,56%	41,27%
2014	10614856	3,75%	46,58%
2015	9603623	-9,52%	32,62%
2016	8886896	-7,46%	22,72%
2017	9478201	6,65%	30,89%
2018	8322067	-12,19%	14,92%
2019	8086075	-2,83%	11,66%
2020	10166008	25,72%	40,38%
2021	11981929	17,86%	65,46%
2022	14369633	19,92%	98,440%



**Figure 7. Current assets at S.C.D.A Simnic**

Current liabilities in a company are short-term financial obligations of the company that must be paid within a time frame of about one year. These liabilities are usually associated with purchases of goods or services, operational financing or other current financial obligations of the firm. Current liabilities reflect the level of the firm's financial obligations to third parties and represent an important part of the

business's financing structure. Proper monitoring and management of these liabilities is critical to maintaining the company's liquidity and financial stability.

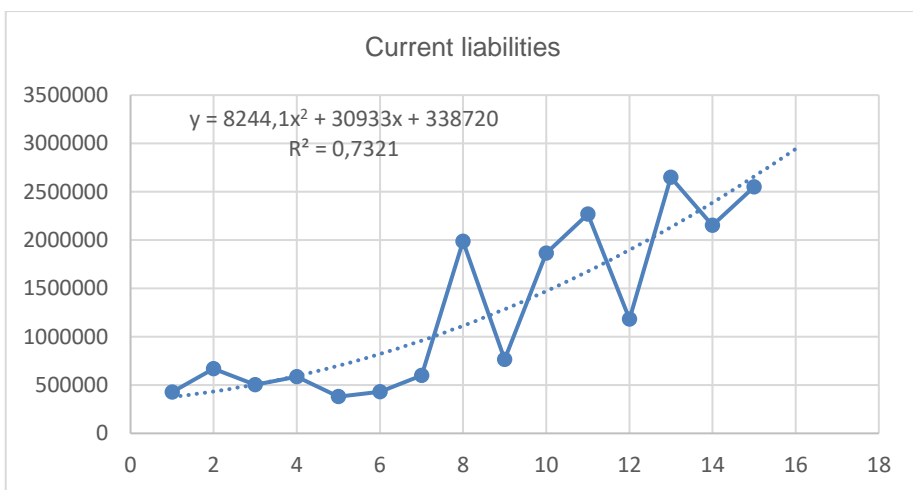
For the period 2008-2022 at S.C.D.A. Simnic was calculated an average of 1.267.697, with a standard deviation of 867.043, a maximum value of 2.648.621 obtained in 2020 and a minimum of 379.759 in 2012. The coefficient of variation has a value of 68,3%, that is the series is heterogeneous with large annual fluctuations, the mean not being significant. The trend is an increasing one, in general (Table 8, Figure 8), and we make the forecast with a second-order polynomial function, resulting

$$f(x) = 8244,1x^2 + 30933x + 338720$$

and for the year 2023 we forecast a value of  $f(16) = 2.944.137,6$ .

**Table 8. Growth rates for current liabilities**

Year	Current liabilities	Growth rate with chain base	Growth rate with fixed base
2008	426199		
2009	669198	57,01%	57,01%
2010	503045	-24,82%	18,03%
2011	585762	16,44%	37,43%
2012	379759	-35,16%	-10,89%
2013	430676	13,40%	1,05%
2014	599195	39,12%	40,59%
2015	1987694	231,72%	366,37%
2016	765709	-61,47%	79,65%
2017	1863174	143,32%	337,16%
2018	2268894	21,77%	432,35%
2019	1182973	-47,86%	177,56%
2020	2648621	123,89%	521,45%
2021	2154053	-18,67%	405,41%
2022	2550503	18,40%	498,43%



**Figure 8. Current liabilities at S.C.D.A Simnic**

Commercial debts represent the sums of money that a company owes to suppliers or other third parties following purchases of goods or services made in the course of its commercial activity. These trade payables are usually short-term financial obligations and are part of a firm's current liabilities category.

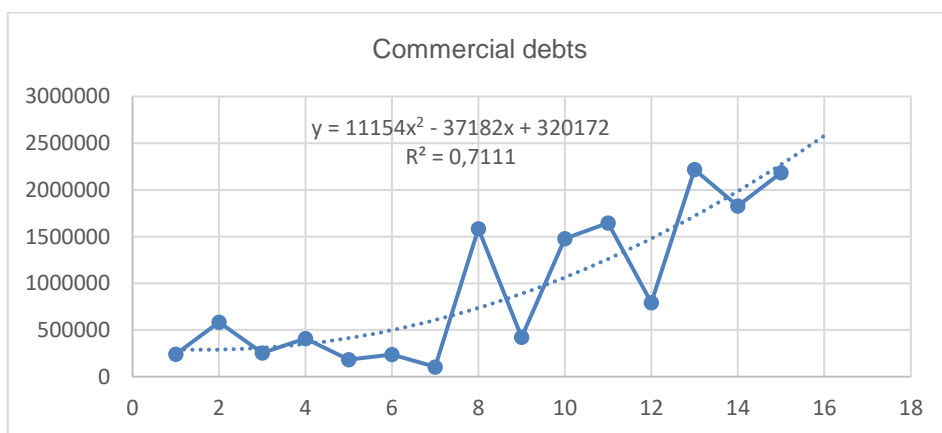
The descriptive statistics show an average of 944.779 in the period 2008-2022, with a standard deviation of 782.895. The maximum value of 2.216.873 was recorded in 2020, and the minimum of 105.545 in 2014. The annual fluctuations are large, a confirmed fact. by the coefficient of variation of 82,8%, the mean not being significant. For the forecast we also use a polynomial function of the second degree, resulting

$$f(x) = 11154x^2 - 37182x + 320172$$

the trend being an increasing one, in general, (Table 9, Figure 9) and the predicted value for the year 2023 is given by  $f(16) = 2.580.684$ .

**Table 9. Growth rates for commercial debts**

Year	Commercial debts	Growth rate with chain base	Growth rate with fixed base
2008	242604		
2009	585060	141,15%	141,15%
2010	255014	-56,41%	5,11%
2011	409350	60,52%	68,73%
2012	183295	-55,22%	-24,44%
2013	238389	30,05%	-1,73%
2014	105545	-55,72%	-56,49%
2015	1585652	1402,34%	553,59%
2016	423306	-73,30%	74,48%
2017	1478341	249,23%	509,36%
2018	1647102	11,41%	578,92%
2019	791615	-51,93%	226,29%
2020	2216873	180,04%	813,78%
2021	1826713	-17,59%	652,96%
2022	2182839	19,49%	799,75%



**Figure 9. Commercial debts at S.C.D.A Simnic**

Stocks at a firm represent the tangible goods, work in progress, and finished goods that the firm holds for the purpose of sale or use in the process of manufacturing or providing services. These are considered current assets and are part of the operating cycle of the business.

At S.C.D.A. Simnic, an average of 5.899.809 was recorded in the analysed period with a standard deviation of 2.472.931. The maximum value of 12.059.047 was recorded in 2022, due to the international situation and imports from Ukraine, which determined the drop in grain prices and implicitly keeping them in stock while waiting for a better price. The minimum value of 3.041.091 was recorded in 2012. The coefficient of variation has a value of 41.9%, suggesting that the data have a significant variation compared to the average, but are not very extreme, the average being somewhat significant. For forecasting, a polynomial function of the second degree was chosen and the expression resulted

$$f(x) = 50872x^2 - 344121x + 4000000$$

and we obtain the forecast value  $f(16) = 11.517.296$  for the year 2023, registering an increasing trend (Table 10, Figure 10).

**Table 10. Growth rates for stocks**

Year	Stocks	Growth rate with chain base	Growth rate with fixed base
2008	4029509		
2009	3774969	-6,31%	-6,31%
2010	3383462	-10,37%	-16,03%
2011	4271843	26,25%	6,01%
2012	3041091	-28,81%	-24,52%
2013	5229917	71,97%	29,79%
2014	6039412	15,47%	49,87%
2015	5202260	-13,86%	29,10%
2016	6290105	20,91%	56,10%
2017	5993575	-4,71%	48,74%
2018	5163241	-13,85%	28,13%
2019	5848300	13,26%	45,13%
2020	8557415	46,32%	112,36%
2021	9612992	12,33%	138,56%
2022	12059047	25,44%	199,26%



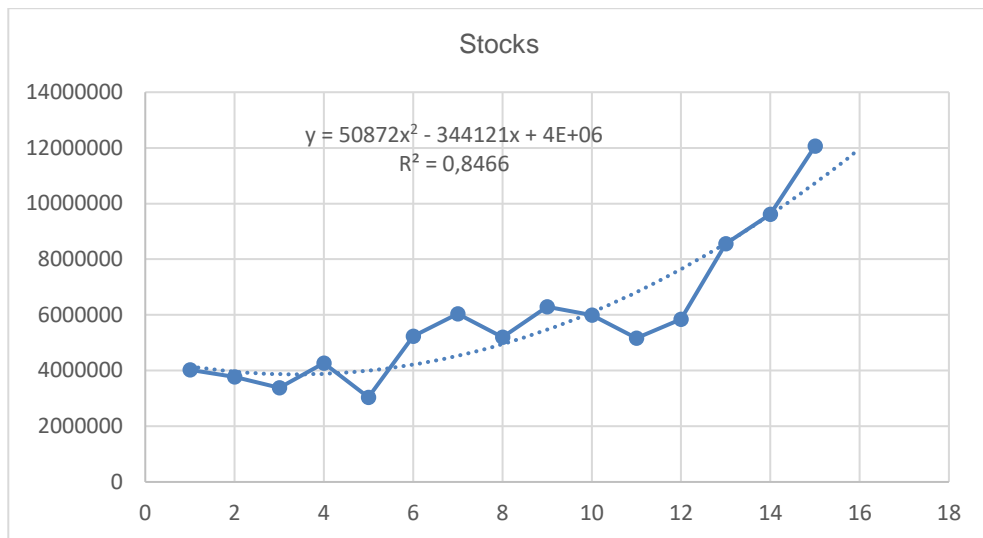


Figure 10. Stocks at S.C.D.A Simnic

Commercial receivables are the amounts of money that a business has to collect from customers or other entities following the sale of its goods or services. They represent trade receivables that customers have against the firm and are established when goods or services are provided before they are paid for.

For the period 2008-2022, an average of 552,751 was recorded with a maximum of 1,535,683 in 2009 and a minimum value of 66,867 in 2020. The coefficient of variation is 75.6%, resulting in a non-representative average. A decreasing trend can be observed in general, but with an increasing trend in the last two years (Table 11, Figure 11). For forecasting, we used a polynomial function of the second degree, resulting in the expression

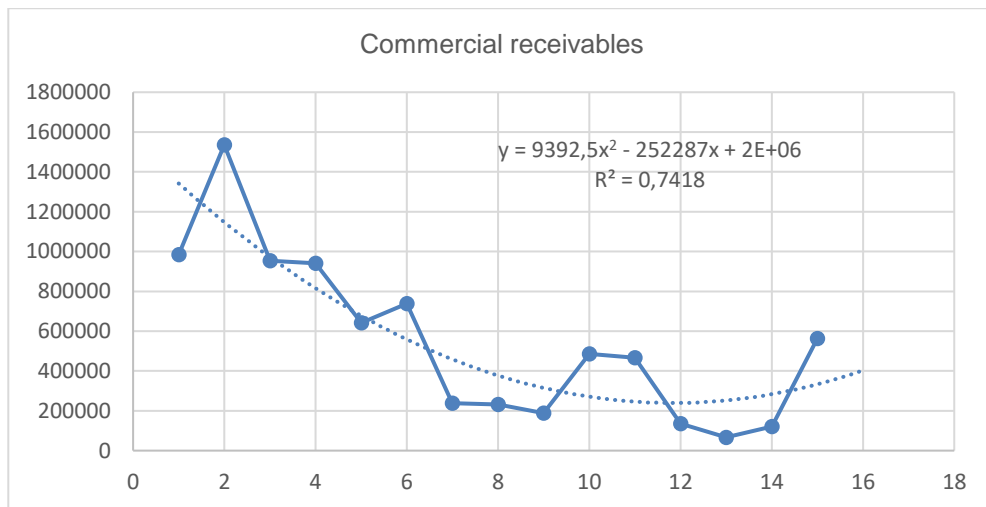
$$f(x) = 9392,5x^2 - 252287x + 2000000$$

from which results the forecast  $f(16) = 367,888$  for the year 2023.

Table 11. Growth rates for commercial receivables

Year	Commercial receivables	Growth rate with chain base	Growth rate with fixed base
2008	984041		
2009	1535683	56,05%	56,05%
2010	953649	-37,90%	-3,08%
2011	940393	-1,39%	-4,43%
2012	641780	-31,75%	-34,78%
2013	737515	14,91%	-25,05%
2014	238918	-67,60%	-75,72%
2015	231874	-2,94%	-76,43%
2016	188004	-18,91%	-80,89%
2017	485141	158,04%	-50,69%
2018	466639	-3,81%	-52,57%

2019	135636	-70,93%	-86,21%
2020	66867	-50,70%	-93,20%
2021	121454	81,63%	-87,65%
2022	563674	364,10%	-42,71%



**Figure 11. Commercial receivables at S.C.D.A Simnic**

Equity in a firm is the sum of the net worth of assets owned by the firm, after deducting all debts and liabilities. It is an important component of the financial structure of a business and reflects the owners' investment in the firm. Equity reflects the owners' investment in the business and is the result of the difference between the firm's assets and liabilities. It is an indicator of the solvency and financial stability of the company, and can be used to assess the degree of risk and financial sustainability of the business.

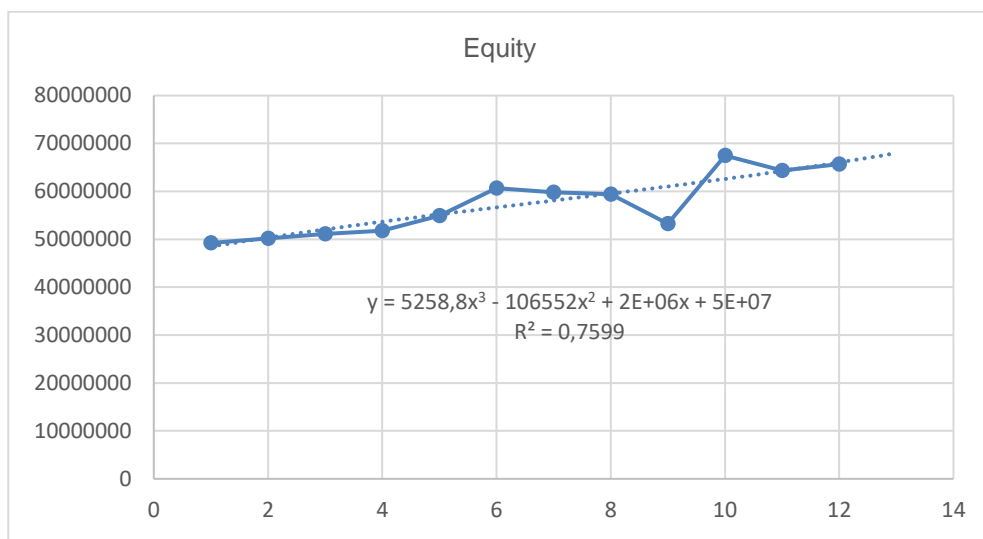
At S.C.D.A. Simnic, an average of 48.016.811 was calculated in the period 2008-2022, with a standard deviation of 20.091.725, having a maximum of 67.472.142 in 2022, but also a minimum value of 10.433.419 in 2008. The coefficient of variation has the value of 21.8%, which overall shows a homogeneous series, with a representative mean. Moreover, in 2011 there was an increase in equity to the value of 49.234.786, i.e. an increase of 349% compared to the previous year, due to the retrocession of land, compared to 2010 with a value of 10.964.813. Consequently, for the forecast we will use the data from the period 2011-2022 (12 years) and a polynomial function of the third degree, resulting:

$$f(x) = 5258,8x^3 - 106552x^2 + 2000000x + 50000000$$

The predicted value for the year 2023 is obtained from  $f(13) = 69.546.295,6$  with an increasing trend (Table 12, Figure 12).

**Table 12. Equity growth rates**

Year	Equity	Growth rate with chain base	Growth rate with fixed base
2008	10433419		
2009	10955658	5,00%	5,00%
2010	10964813	0,08%	5,09%
2011	49234786	349,02%	371,89%
2012	50163206	1,88%	380,79%
2013	51094368	1,85%	389,71%
2014	51778972	1,33%	396,28%
2015	54934948	6,09%	426,52%
2016	60668413	10,43%	481,48%
2017	59817479	-1,40%	473,32%
2018	59423085	-0,65%	473,32%
2019	53255630	-10,37%	410,43%
2020	67472142	26,69%	546,69%
2021	64355237	-4,61%	516,81%
2022	65700010	2,08%	529,70%



**Figure 12. Equity at S.C.D.A Simnic**

Capital employed in a firm is the amount of capital invested in the fixed assets and current assets of the business, which are used to generate income and support the company's operations. It is a measure of the financial resources engaged in the activities and operations of a firm. Capital employed reflects the level of investment and financing used to support a firm's activities and operations.

In the analysed period for S.C.D.A. Simnic, an average of 48.883.597 resulted, with a maximum of 67.472.142 in 2022, but also a minimum value of 10.681.006 in 2008. The coefficient of variation has a value of 41.6% which shows that the data have a significant variation to the mean, but they are not very extreme, the mean being able to be considered somewhat representative. Also, in 2011, there was an

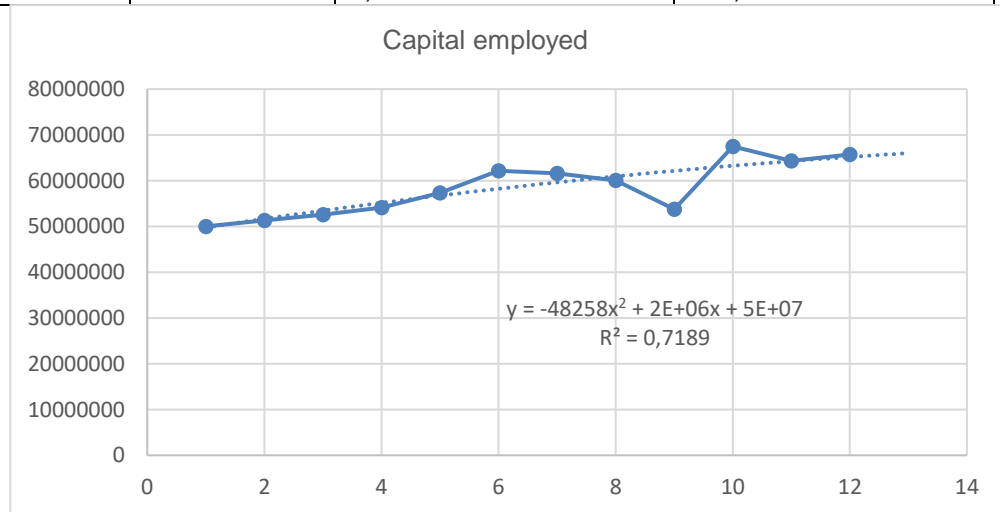
increase in the capital employed to the value of 50.009.867, due to the retrocession of land, compared to the year 2010 is an increasing of 353%. Thus, for the forecast we will use the data from the period 2011-2022 (12 years) and a polynomial function of the second degree, resulting:

$$f(x) = -48258x^2 + 2000000x + 50000000$$

which leads to a forecast for the year 2023 given by  $f(13) = 67.844.398$ , with an increasing trend (Table 13, Figure 13).

**Table 13. Growth rates for capital employed**

Year	Capital employed	Growth rate with chain base	Growth rate with fixed base
2008	10681006		
2009	11095323	3,87%	3,87%
2010	11035205	-0,54%	3,31%
2011	50009867	353,18%	368,21%
2012	51326957	2,63%	380,54%
2013	52549445	2,38%	391,98%
2014	54145737	3,03%	406,93%
2015	57307842	5,83%	436,53%
2016	62180464	8,50%	482,15%
2017	61567233	-0,98%	476,41%
2018	60058670	-2,45%	476,41%
2019	53768827	-10,47%	403,40%
2020	67472142	25,48%	531,70%
2021	64355237	-4,61%	502,52%
2022	65700010	2,08%	515,11%



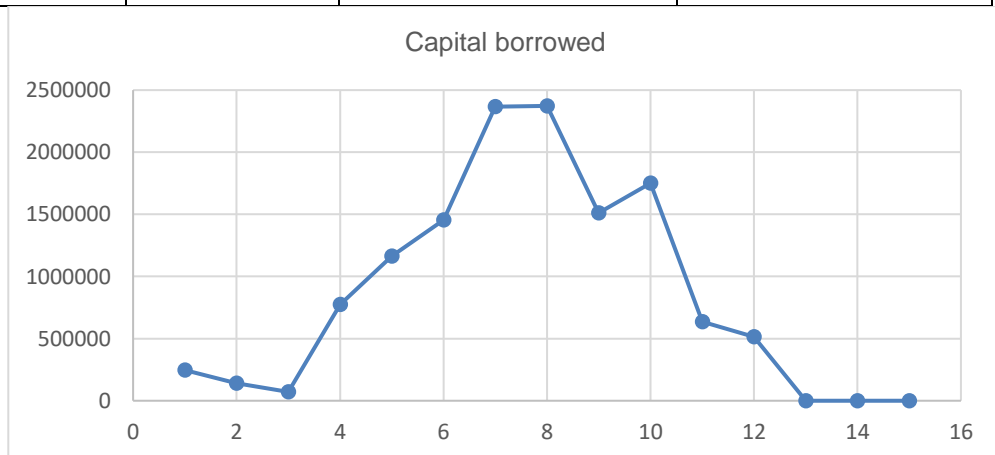
**Figure 13. Capital employed at S.C.D.A Simnic**

The capital borrowed from a firm is the amount of money or other financial resources that the firm has obtained through loans or credits from third parties, such as banks, financial institutions or other creditors. This capital represents long-term or short-term liabilities that the firm is obligated to repay in the future. It is important to carefully manage the capital borrowed from a business, given the associated interest costs and repayment obligations. Proper loan management can help to adequately finance business activities, support growth and ensure the firm's financial stability.

At S.C.D.A. Simnic, the borrowed capital had an increasing trend in the period 2010-2015 due to access to loans for investments. The second distinct period is 2015-2020 with a downward trend, the loans being fully repaid in 2020.

**Table 14. Growth rates for borrowed capital**

Year	Borrowed capital	Growth rate with chain base	Growth rate with fixed base
2008	247587		
2009	139665	-43,58%	-43,58%
2010	70392	-49,59%	-71,56%
2011	775081	1001,09%	213,05%
2012	1163751	50,14%	370,03%
2013	1455077	25,03%	487,70%
2014	2366765	62,65%	855,93%
2015	2372894	0,25%	858,40%
2016	1512051	-36,27%	510,71%
2017	1749754	15,72%	606,72%
2018	635585	-63,67%	156,71%
2019	513197	-19,25%	107,27%
2020	0	-100%	-100
2021	0		
2022	0		



**Figure 14. Capital borrowed to S.C.D.A Simnic**

Salary expenses represent the employer's costs associated with paying wages and compensation to employees for work performed within the firm. These expenses include not only basic salaries, but also other components of remuneration, such as bonuses, bonuses, benefits in kind, social and health insurance contributions, pensions and other benefits.

It is important to note that staff salary expenses may vary depending on the company's compensation and benefits policy, salary levels, type of employment contracts and other factors specific to each organization.

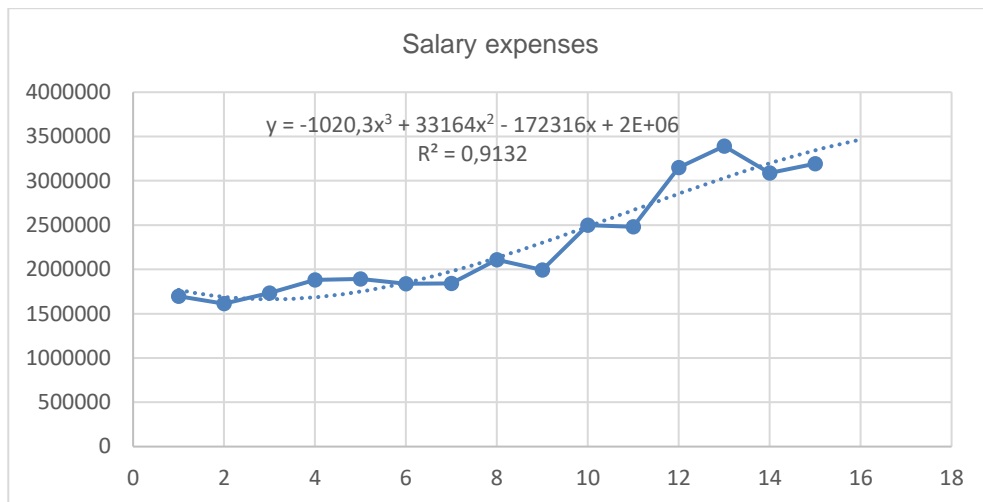
At S.C.D.A. Simnic, an average of 2.293.061 lei in salary expenses was recorded, with a standard deviation of 624.207, the maximum value being in 2020 of 3.391.160 and the minimum in 2009 of 1.612.840. The coefficient of variation has a value of 27,2%, which means that the mean is representative. For forecasting we use a polynomial function of the third degree, the trend being increasing and it results:

$$f(X) = -1020,3x^3 + 33164x^2 - 172316x + 2000000$$

and the forecast for the year 2023 given by  $f(16) = 3.555.819,8$ .

**Table 15. Rates of growth for salary expenses**

Year	Salary expenses	Growth rate with chain base	Growth rate with fixed base
2008	1695543		
2009	1612840	-4,87%	-4,87%
2010	1734062	7,51%	2,27%
2011	1879756	8,40%	10,86%
2012	1891141	0,60%	11,53%
2013	1837394	-2,84%	8,36%
2014	1843135	0,31%	8,70%
2015	2107801	14,35%	24,31%
2016	1993750	-5,41%	17,58%
2017	2499380	25,36%	47,40%
2018	2480962	-0,73%	46,32%
2019	3148726	26,91%	85,70%
2020	3391160	7,69%	100,00%
2021	3088041	-8,93%	82,12%
2022	3192229	3,37%	88,27%



**Figure 15. Salary expenses at S.C.D.A Simnic**

#### **4.2 Analysis of correlations between indicators**

The correlation matrix (Table 17) reflects the correlation relationships between the mentioned financial indicators. The values in the matrix represent the correlation coefficients between pairs of financial indicators, with a value between -1 and 1. The analysis of the correlation matrix results in the following:

Total income has a positive correlation with turnover of 0.69, which is not very high, meaning that other incomes, apart from those generated from the main activity, have annual variations. There was also a moderate positive correlation with total assets of 0.65. They indicate a direct relationship between these indicators, where an increase in turnover and total assets is associated with an increase in total income. There is a significant positive correlation (0.9) with total expenses, which indicates that an increase in total income also generated an increase in total expenses. We have a negative correlation (-0.69) with trade receivables which suggests that an increase in the amount of money that S.C.D.A. Simnic has to collect from customers when goods or services are provided before they are paid, naturally generates a decrease in total revenue. There is a small positive correlation of the total income with the profit of only 0.39, explained by the fact that with high incomes there were also high expenses, a part being directed towards the repayment of loans.

Turnover has a high positive correlation (0.81) with the level of stocks, which means that an increase in stocks, generated by high productions per hectare for cereals, also generates an increase in turnover (for example, seed wheat kept in stock for sale). As in the case of total income, there is a positive correlation with total assets (0.53) and a negative correlation (-0.56) with trade receivables. Thus, an increase in receivables generates a decrease in turnover.

Total expenses, in addition to those recorded previously, have a high positive correlation (0.82) with current debts and commercial debts (0.79), which suggests that an increase in these debts also implies an increase in expenses. Also, there is a negative correlation (-0.78) with trade receivables, which means that an increase

in unpaid amounts from clients generates a decrease in total expenses, as there is no money for them, which is not necessarily a positive fact.

Regarding the profit, it is found that it has a weak correlation with most of the indicators, with the exception of total revenues, but here too it is quite low (0.39). This indicates that there is no strong relationship between profit and the other analysed indicators.

Total assets have a strong natural correlation with fixed assets, equity and employed capital of 0.99, due to the direct link between them.

Current liabilities and commercial liabilities have a strong normal correlation between them (0.99), resulting from the close connection between these indicators.

Regarding stocks, in addition to those found previously, a positive correlation can also be observed with current liabilities (0.74), commercial liabilities (0.75) and total expenses (0.8). This suggests that there is a direct relationship between stocks, debts and expenses, an increase in stocks generating an increase in debts and expenses.

Commercial receivables, in addition to those found previously, have a strong negative correlation with total assets (-0.8). This indicates that an increase in receivables generates a decrease in total assets. Own capital and employed capital have a strong natural correlation between them (0.99), due to the close relationship between these two categories of capital.

Finally, salary expenses show a strong correlation with total expenses (0.9), current liabilities (0.82) and turnover (0.8).

## 5. Conclusions

From what was presented in the previous section, some conclusions can be drawn regarding the studied financial indicators. It is found that total revenues, turnover, expenses, assets, liabilities, and equity had a mostly upward trend in the period 2008-2022. The only analysed indicator with a decreasing trend is that of commercial receivables, but these also tend to increase in the last three years. The borrowed capital recorded an increasing trend in the period 2010-2015, due to the access to bank loans for investments, only to have a decreasing trend due to the repayment of the loans until 2020, when they were paid. The indicator that does not have a clear trend is the profit, due to its reinvestment, repayment of loans, but also to the fluctuating price from one year to the next of the agricultural products sold by S.C.D.A Simnic. Also, an increase in assets was found in 2011, which was due to the retrocession of agricultural land to S.C.D.A Simnic. In 2015, a maximum of total revenues and profit was found, which is also explained by the access to non-refundable European funds in the amount of 11 million lei. For all the analysed financial indicators, forecasts for the year 2023 were also presented, using adjustment functions of the data series from the period 2008-2022, but also growth rates with a chain basis and with a fixed basis in the analysis of time series. Finally, an analysis is made of the correlations between the financial indicators analysed based on the correlation matrix. Consequently, the forecasts of financial indicators and their correlations provide a vision of the company's financial future and can support informed decision-making and strategic planning. They can help managers identify opportunities and risks, optimize the use of resources, and achieve better financial results for the firm.



**REFERENCES**

- Anghelache, C., Anghel, M.G., 2014. *Modelare economică. Concepte, teorie și studii de caz*, Editura Economică, București.
- Anghelache, C., Anghel, M.G., 2022. Data series analysis for forecasting, *Romanian Statistical Review – Supplement*, nr. 5, 11-18.
- Anghelache, C., Anghel M.G., Iacob S.V., 2020. Principalele aspecte privind utilizarea indicatorilor statistici în analize economice, *Romanian Statistical Review – Supplement*, nr. 7, 164-173.
- Anghelache, C., Anghel M.G., Samson T., Stoica R., 2017. Metode si tehnici de elaborare a previziunilor, *Romanian Statistical Review – Supplement*, nr. 4, 15-25.
- Anghelache, C., Capanu, I., 2000. *Indicatori economici pentru analiza micro și macroeconomică*, Editura Economică, București.
- Anghelache, C., Radu I. Stoica R., 2020. Utilizarea seriilor dinamice de fluxuri in analiza performantei economico-financiare a unei societăți comerciale, *Romanian Statistical Review – Supplement*, nr.2, 99-109.
- Bardsen, G. Eitheim, Ø., Jansen, E., and Nymoen R., 2007. *The Econometrics of Macroeconomic Modelling*, Oxford University Press, ISI Newsletter, Volume 31, Number 2 (92).
- Boshnakov, G.N., Iqelan, B.M., 2009. Generation of Time Series with Given Spectral Properties. *Journal of Time Series Analysis*, 30 (3), 349-368. <https://doi.org/10.1111/j.1467-9892.2009.00617.x>
- Davidson, R., Mackinnon, J.G., 2004. *Econometric theory and methods*, Oxford University Press, New York.
- Georgescu, V., 2005. *Statistica descriptiva si inferentiala*, Editura Universitaria.
- Gheorghiu, Al., 2012. *Analiza economico-financiară la nivel microeconomic*, Editura Economică, București.
- Iacob, S.V., 2019. *Utilizarea metodelor statistico-econometrice și econofizice în analize economice*, Editura Economică, București.
- Lazăr, M., Lazăr, C., 2012. *Analiză statistico-economică*, Editura Economică, București.
- Pesavento, E., Rossi, B., 2006. Small-sample Confidence Interevals for Multivariate Impulse Response Functions at Long Horizons. *Journal of Applied Econometrics*, 21 (8), 1135–1155. <https://doi.org/10.1002/jae.894>
- Reis, R., 2009. The Time-Series Properties of Aggregate Consumption: Implications for the Costs of Fluctuations. *Journal of the European Economic Association*, 7 (4), 722-753. <https://doi.org/10.1162/JEEA.2009.7.4.722>
- Spătaru, L., 2011. *Analiza economico-financiară, instrument al managementului întreprinderilor*, ediția a doua, Editura Economică, București.

Annexes:

**Table 16. Descriptive statistics of indicators at S.C.D.A. Simnic**

	Mean	Median	Standard Deviation	Coefficient of variation	Minimum value	Maximum value
Total income	11336834,07	10594708	2368573,598	20,8%	7584149	15346011
Turnover	8595885,133	8382542	2280353,995	26,5%	4797954	12561548
Total expenses	10585419,93	10949014	2166878,663	20,4%	7223260	14021626
Net profit	673347,333	761228	1025004,037	152%	-1028248	3155975
Total assets	50168121,67	54951800	20907493,5	41,6%	11107205	70373168
Fixed assets	40500088,8	46691913	19732345,7	48,7%	3739055	60207160
Current assets	9468032,867	9170028	1858383,706	19,6%	7241291	14369633
Current liabilities	1267697	765709	867043,593	68,3%	379759	2648621
Commercial liabilities	944779,8667	585060	782895,115	82,8%	105545	2216873
Stocks	5899809,2	5229917	2472931,302	41,9%	3041091	12059047
Commercial receivables	552751,2	485141	418150,722	75,6%	66867	1535683
Equity	48016811,07	53255630	20091725,35	21,8%	10433419	67472142
Employed capital	48883597,67	54145737	20342344,58	41,6%	10681006	67472142
Borrowed capital	866786,6	635585	850872,274	98,16%	0	2372894
Salary expenses	2293061,333	1993750	624207,940	27,2%	1612840	3391160

