SALES FORECASTING IN THE CONTEXT OF SEASONAL ACTIVITIES AND COMPANY SUSTAINABLE GROWTH

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Abstract
The paper presents the use of the "time series model" to forecast the quarterly and yearly sales for a company with business seasonality. These sales forecasts will represent the fundamental basis for estimating the external financing, using the percentage to sales method. Sales growth rates are afterwards analysed in the context of ensuring a sustainable and self-financed growth.
We focus on establishing the forecasted financial structure of the external financial requirements both in the context of using the reinvested profit complemented with credit, maintaining the debt rate constant, and in the context of total internal funding of the company economic growth, from reinvested profit.

Keywords: sales forecasting, quantitative forecasting methods, qualitative forecasting methods, additional capital requirements, sustainable growth.

JEL Classification: C53, D24, M11

Introduction

When planning the operating costs and the capital requirements, we must start from the sales forecast. In a linear or non-linear correlation, the size of the turnover will influence the planned operating costs as well as the additional capital requirements - even if the additional capital requirements are self-sustained, based on the retained profit.

Sales forecasting can be accomplished:

- By estimating the size of the national market for the company, and then forecasting the market share that the company can capture;
- By directly forecasting the company's sales, independently from the evolution of macro and mezo-economic indicators.

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Sales forecasts can be short-term (1-3 months), medium-term (1-3 years) and long-term (more than three years). When choosing a timeframe, we must consider the nature of the industry where the company operates. For example, in markets like fashion business, electronics, or software, the plans are usually drawn on shorter terms, based on consumer behavior and preferences. In other markets, such as commodities and constructions, the planning is drawn on longer terms, and must consider economic trends, government policies and environmental factors.

In any company, an accurate sales forecast influences decisions regarding inventories, production, costs, capital and human resource requirements, research and development, marketing, and most importantly, the development of the cash flow.

The article is structured as follows: in the first part we briefly present the literature review regarding the methods and techniques used in sales forecasts. The methodology and the results regarding the sales forecasting are highlighted in the next parts. In the following section we determine the required capital structure. Scenarios regarding the sustainable growth and self-financed growth are presented. The paper ends with the research conclusions.

1. Methods and techniques for sales forecasts

Sales forecast represents the focus of specialized **marketing** studies regarding the economic environment, market's absorption potential, the competitive environment etc. Both qualitative and quantitative estimation methods are available. The qualitative methods focus on subjective factors, while the quantitative methods use objective data referring to the evolution of micro- and macro-economic indicators.

When using time-series methods in forecasts, we can choose among several models; the most commonly used are:

- Based on the observed (past) sales trends, and eventually adjusted by different linear and non-linear functions (linear, exponential, power, parabolic);
- Based on the observed historical rate of growth, "g";
- Based on regression analysis between the sales figure and one or more independent variables: x_1 = national industrial production, x_2 = the company's own production capacity, x_3 = the company's distribution network, x_4 = the market segment and the elasticity of its (solvable) demand, x_5 = marketing expenses etc.;
- Based on hypotheses regarding the success of new products and technologies, the competition's moves, as well as trends and changes in the business and regulatory environment within the company's sector etc.

A brilliant presentation on issues related to sales forecasting is accomplished by Jobber and Lancaster (2009) in the 16th chapter "Sales forecasting and budgeting" of their book. This inspired us to develop the methodological approach - respectively quantitative methods - that we present in this paper. The authors underline the importance of sales forecasting in the planning of marketing activities and they develop qualitative and quantitative

forecasting techniques, which they illustrate with clarifying examples. Following from the sales forecast is the marketing budget, in connection with budgets for production, administration and treasury, including a forecast of the profits.

Wacker and Lummus (2002) explore the efficiency of sales forecasts for strategic asset allocation. They identify forecasting limitations, which help improve the understanding and interpretation of a forecast's results. These limitations are called *forecast paradoxes*, and they are derived from the economic reality. As such, managers make their most important decisions based on imperfect forecasts, while decisions for resource budgeting are based on the least accurate forecasts. Finally, the managers with the most elaborated forecasts also show the biggest errors. By acknowledging these errors, managers should focus on understanding the role played by forecasts in strategic decision-making.

Biggs and Campion (1982) contribute to the same topic of detecting and understanding errors in forecasts. They track these errors with the intention of minimizing their effects before they impact the managerial decision. The authors also identify other pieces of research focused on the minimization of forecasting errors by using complex techniques. The paper concludes that it might be better to correct the errors rather than to use increasingly complex models.

Papageorgiou et al. (2001) underline the importance of sales forecasts for the planning of supply chains. The paper exposes many factors which must be considered so that the sales forecast can contribute to the successful long-term planning of the supply chain. These factors include the usage of long-term scenarios (up to 52 periods in the future), the large data sets and calculations which often surpass human forecasting capacity, and the constant introduction of new items to be supplied (for which no previous sales data exists) as well as items which must be withdrawn from the supply chains. The authors apply the Holt-Winters method as well as neuronal networks (multi-layer feed-forward) to the sales data of two German companies.

2. Research methodology

In our paper we will focus on quantitative methods, applied to time series in the context of seasonal fluctuations.

Our forecast is based on time series attempts to use past data in order to project the time sequence into the future. There are two distinct approaches of forecasting with time series: averaging and trend analysis. The trend analysis is appropriate to forecast if the data show a steady increase or decrease over time. If data extend far back in time or are subject to frequent unpredictable change over several periods, it is appropriate to use moving averages which incorporates only the most recent data samples. Hence, the forecast is more "up-to-date" than a simple average of the same data would be. The limitations in sale forecasting are related with relevant factors acting in the context of seasonal activity such as significant changes in economic and business environment; significant change in the product content, format, style, design, recipe; important changes in consumer revenues or preferences.

Our sales forecast used quarterly data from a pharmaceutical company listed on the Bucharest Stock Exchange. The timeframe ranges from the first quarter (Q1) of 2005 up to the third quarter (Q3) of 2014. Our research does not aim to pass judgment on the

company's management, and therefore we will not mention the company's real name. The data set was extracted from the Thompson Reuters Eikon database. The data for the last quarters of 2014 was used for extending forecasts for 2015, in order to check the accuracy of our results.

We have chosen the company that met the criteria necessary to our research, namely, availability of public data for a long period of time and availability of quarterly financial data. In our study, we did not aim to analyze the company' performance or its management; rather, we attempted to illustrate the sales forecasting techniques and the impact of the forecast on the financial statements, ultimately affecting the financing decision. We will illustrate three scenarios as a result of the sales forecast, showing how a variation in the forecasted growth rate influences the structure of the additional required capital. Thus, we attempted to account for the seasonality of the sales in the first stage of the forecast, and further on we focus our analysis on the required capital structure.

Our forecasting method is an adaptation of a time series technique proposed by Jobber and Lancaster (2009). This technique captures the seasonality of the data and allows for its extrapolation.

3. The results regarding the sales forecasts

We begin by presenting a forecast of the sales. The starting point is the quarterly evolution of the sales, as depicted in figure no. 1.

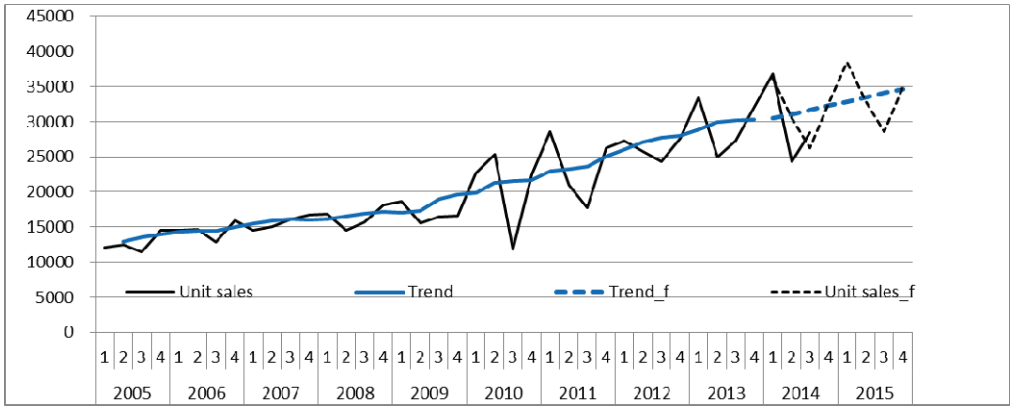

Figure no. 1: Quarterly sales data and trends (dotted lines show forecasted values)

Source: own calculations based on data extracted from Thomson Reuters Eikon

The data shows seasonality in all years, with larger sales in the fourth and first quarters, and smaller sales during the second and the third. Compared to five other companies in the same industry listed on the Bucharest Stock Exchange, during Q1 2011 - Q3 2014 our company shows similar seasonality, but delayed by approximately one quarter. We conclude that our company exhibits atypical seasonality. (Figure no. 2)

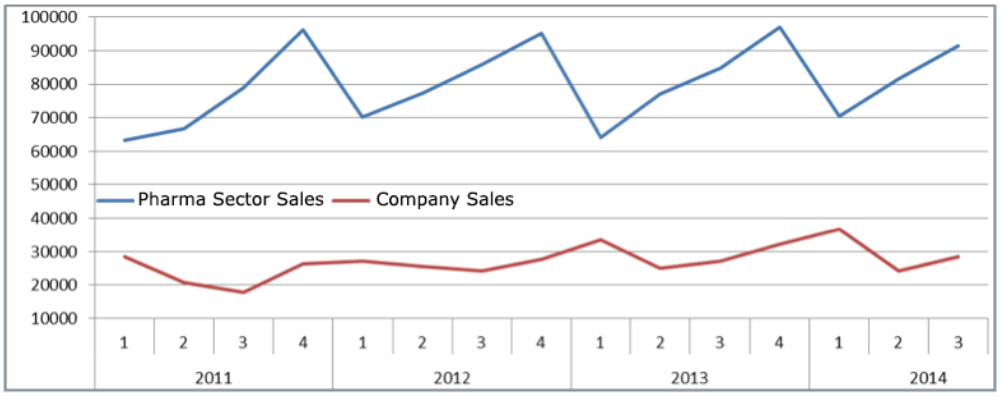

Figure no. 2: Quarterly sales of our company compared to other 5 pharmaceutical companies

Source: own calculations based on data extracted from Thomson Reuters Eikon and KTD (2015)

In our research, we first aimed to detect the temporary trends, and then calculate the deviations of the sales figures from the detected trends. We used the moving average technique for four quarters. In order to level the evolution of the data series we successively added two moving averages, which we further divided by eight quarters (out of the two moving averages) to obtain the trend. (Table no. 1)

Table no. 1: Quarterly deviations from the trend and correcting the deviations so that they sum up to zero

- Values in thousands of RON-

Yr./Quarter	1	2	3	4		
2005			-1479	1038		
2006	557	348	-1677	1400		
2007	-473	-440	193	629		
2008	877	-1636	-854	1264		
2009	1602	-1460	-884	-2474		
2010	3009	5446	-9463	1018		
2011	6882	-1999	-5464	2342		
2012	1857	1493	-4167	65		
2013	5648	-3941	-2633	1921		
2014	6538				Σ ab/Yr	Σ ab/4
Sum/Qrt.	23933	-461	-22610	2872	3734	933
– Σ ab/4	22999	-1395	-23544	1939	0	0

The deviations from the trend were then grouped in every quarter, to obtain the total deviation for every semester (under the hypothesis that the sum of these deviations must be zero). Because the seasonality was more pronounced starting with Q4 2009, we chose that period as the starting point in summing the deviations. (Table no. 2)

Table no. 2: Monthly deviations from the trend

- Values in thousands of RON-

Quarter	1	2	3	4	Σ ab/Yr.
μ ab/Qrt.	4600	-279	-4709	388	0

The average quarterly deviations presented in Table no. 2 were obtained by dividing the sum of the quarterly deviations by 5 observations of seasonality. These deviations will be used in our forecast to correct the extrapolated sales trend during the forecasted period. The extrapolated trend starts with the last effective trend data point, to which we constantly add the average quarterly deviation, the closest to zero, in absolute value (+388, in our case). (Table no. 3).

Table no. 3: **Forecast of quarterly sales data for the next year**

- Values in thousands of RON-

Yr.	Quarter	Trend	Deviation	Forecast
2014	1	30223	5653	35876
	2	30610	-602	30009
	3	30998	-5439	25559
	4	31386	388	31774
2015	1	31774	5653	37427
	2	32161	-602	31560
	3	32549	-5439	27110
	4	32937	388	33325

Table no. 3 illustrates that the historical seasonality has also replicated for the year 2015, a period for which we look to forecast the costs, capitals and the company's sustainable growth. Thus we estimate that the sales for 2015 will increase 10% over 2014 (129.421/117.669 = 110%).

This first forecast can be validated using additional techniques to simulate the possible estimated changes in key factors affecting sales, such as: national pharmaceutical production, the company's market share, unit price, variable costs etc.

Three simulation techniques are available:

- Sensitivity analysis to estimate the sales, given that factors such as market share and price would increase or drop by an amount estimated by experts;
- Scenario analysis, in which the most optimistic scenario is evaluated against the most pessimistic scenario;
- Monte Carlo simulation, where the average of the future sales is determined by associating each key factor (market, market share, unit price etc.) with variations determined by random numbers (with an average of zero and standard deviation of 1); these random numbers are computer generated according to a predetermined frequency distribution.

In Figure no. 3 we show the frequency distribution of possible sales figures using a Monte Carlo simulation with 10,000 iterations. The forecasted average sales is 129.469 RON

(with probability 12.3%), the standard deviation is 3220 RON, and the minimum and maximum figures are 104.000 RON and 130.000 RON, respectively.

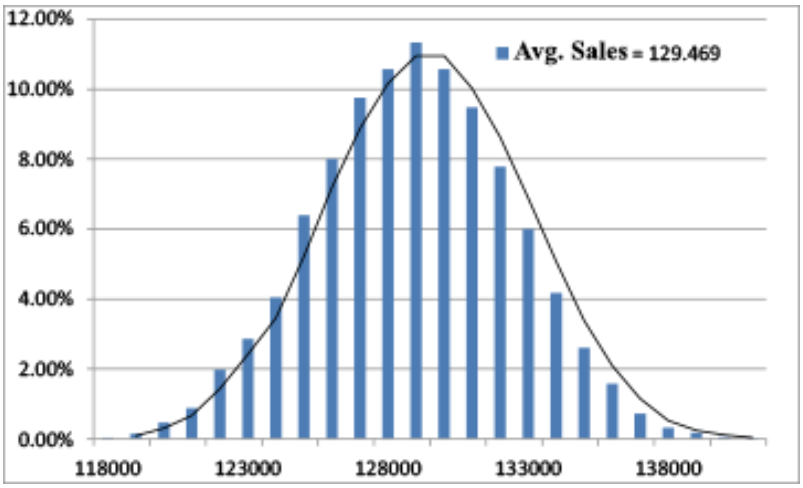

Figure no. 3: Monte Carlo simulation for sales, thousand RON (10,000 iterations)

The Monte Carlo simulation shows an increase of 10% of sales during 2015, similar with the other forecasting methods. Once we validate a forecast for the sales, the next step in financial planning is to issue a pro-forma[1] balance sheet and income statement for the forecasted period. These documents will let us estimate profit margins (gross profit, EBITDA, EBIT, net profit) and the capital requirements which will be generated and required by this sales growth rate g of 10%. By taking in account the existing capital, we can identify the supplementary capital requirements needed to acquire current and fixed assets, as well as any other additional assets.

4. Planning for additional capital requirements

Planning for the total necessary capital using capital rotation is achieved through the **sales percentage** technique, as follows:

- Asset turnover (C_{rot}):

$$C_{rot} = \frac{\text{Revenues (from income statement)}}{\text{Total Assets (from balance sheet)}} = \frac{117,669}{169,137} = 0.6957 \quad (1)$$

[1] „Pro forma" is a Latin expression, which can be translated as „*an issue of from*". When used in the context of financial planning, this expression denotes the balance sheet and income statement forecasted for the next year, based on hypotheses regarding the evolution of sales, costs and capitals considering the company's performance and business environment. The expression is also used for unaudited financial statements, to give an early (and usually optimistic) opinion of what the next financial results might look like.

or

- Number of days of asset(Dur_{rot}):

$$Dur_{rot} = 360 \cdot \frac{Assets}{Revenues} = 360 \cdot \frac{169,137}{117,669} = 517 \text{ days} \quad (2)$$

Assets 2014	169,137	
Asset turnover	**0.6957**	rotations
Number of days of asset	**16,892**	days

We assume that the capital rotation (expressed as ratio or duration) represents a normal value in the base year, and therefore representative for the company's activity. So we will use it for the period we are planning. The ratio $Sales_{2014}/Assets_{2014}$ or Duration = 360 · $Assets_{2014}/Sales_{2014}$ at the end of the past year (and assumed as constant during the next year) will determine the necessary capital proportional with the forecasted sales:

$$Nec.Capital = \frac{Turnover_{planned}}{C_{rot}} = \frac{129.421}{0,6957} = 186.029 \text{ thousand RON} \quad (3)$$

or

$$Nec.Capital = \frac{Turnover_{planned} \cdot Dur_{rot}}{360} = \frac{129.421 \cdot 517}{360} = 186.029 \text{ thousand RON} \quad (4)$$

Necessary capital (cf. Turnover)	186,029
Necessary capital (cf. Duration)	186,029
Necessary Supplementary Capital	16,892

Compared to the capitals (own and borrowed) already invested in assets at the end of the current year, in the next (planned) year we forecast the necessary supplementary capital (NSC):

NSC = Planned necessary capital – Existing capital at the end of 2014 (5).

Since the assets at the end of 2014 were 169,137 thousand RON, the total necessary capital (186,029 thousand RON) required for a turnover of 129,421 thousand RON is greater by 16,892 thousand RON. This represents the supplementary necessary capital, which should be financed from new sources (own and/or credit).

5. Sustainable and self-financed growth

In the context of managerial finance, **sustainable growth** is determined by the capacity to co-finance a company's growth by re-investing a part of the net profit. Thus, it is first

understood that the fiscal year must end with profit. Secondly, the decision to distribute the profit must include, along with dividends, the auto-financing of growth from the net profit.

The decision regarding the distribution of the net profit belongs to the shareholders. They will not agree to re-invest the net profit (partially or whole) unless the re-investment of the profit in the company's own projects is more attractive than any other opportunity on the financial market. In other words, the return on assets (ROA) must be superior to the cost of capital k: ROA > k. Otherwise, the shareholders will be motivated to decide that the profits must be entirely distributed as dividends, which can be invested on the financial market with greater returns compared to re-investing in the company.

5.1. Sustainable growth

Sustainable growth is also defined as the growth of capital financed from a company's re-invested profits and borrowed capital, such that the debt ratio remains unchanged.

The growth rate 'g' is determined by the performance of a company's own equity (ROE – return on equity – which must be superior to the opportunity cost k) and the percentage of re-invested profit (b):

$$g = ROE \cdot b, \quad \text{with } ROE = \frac{\text{Net Profit}}{\text{Equity}} \text{ and } b = \frac{\text{Net Profit reinv.}}{\text{Net Profit}} = \text{Retention rate} \qquad (6)$$

Finally, by multiplying the two expressions, the growth rate g is equal to the ratio between the reinvested profit and equity:

$$g_{continuous} = \frac{NetProfit_{reinvestit}}{Equity} = \frac{7,163}{85,637} = 8.365\%$$

Thus calculated, the growth rate g is a **continuous time** rate, and it is an approximation of the sustainable growth rate.

The **sustainable** growth rate g is calculated more precisely using the formula:

$$g = \frac{p \cdot b \cdot (1+L)}{T - p \cdot b \cdot (1+L)} \qquad (7)$$

where:

p = Net Profit/Turnover;

b = Net $Profit_{reinvest}$/Net Profit; L = DTL(*interest bearing debts*)/Equity

T = AE(*Fixed assets + Net working capital*)/Turnover (Ross et al., 1999).

$$g = \frac{ROE \cdot b}{1 - ROE \cdot b} = \frac{g_{continuous}}{1 - g_{continuous}} = \frac{8,365}{100 - 8,365} = 9.128\% \qquad (8)$$

Unfortunately, the usage of the growth rate g is based on two assumptions (both quite restrictive for the company's economic reality):

- The company keeps constantly growing by the rate g for an indefinite period of time, with the same rate g as in the base year;

- All the items in the balance sheet and income statement will keep growing by the same rate g, including the fixed assets from the balance sheet and fixed costs from the income statement.

It follows from the second hypothesis that the growth rate g will be under-dimensioned.

If we accept these hypotheses, the planned sales will be larger compared to the current year, by the growth rate g:

Planned sales increased by g = 117,669 × 1.09128 = 128,410 thousand RON (9).

Using the data from Table no. 4, we find the values for assets and costs in a similar way. Consequently, the net profit will grow by the same rate: g = 23,451/21,490 – 1 = 9.128%.

We find the supplementary necessary capital by increasing the total capital from the current year by rate g:

NSC, with g = 169,137 × 9.128% = 15.439 thousand RON (10).

Table no. 4: Current data from the company's statements and forecasted values (thousand RON)

Details	Current Year	Growth rate g	
		Sustain. Cont.	Sustainable.
		8.365%	9.128%
Sales	117669	127512	128410
Fixed Assets	87300	94602	95269
Current Assets	81837	88682	89307
Total Assets	169137	183284	184576
Variable Costs	55427	60063	60486
Fixed Costs	23965	25970	26153
Amortization	7737	8384	8444
EBIT	30540	33095	33328
Interest	4957	5372	5410
Taxes 16%	4093	4436	4467
Net Profit	21490	23287	23451
Dividends d = 0.667	14326	15525	15634
Reinv. Profit b = 0.333	7163	7762	7817
NSC		14148	15439
Self-finance		7163	7817
New debt		6984	7622
Additional Equity		0	0
Debt ratio	49.4%	49.4%	49.4%
Equity	85637	92800	93454
Debt	83500	90484	91122
TOTAL Assets	169137	183284	184576
g =	8.365%	8.365%	9.128%

The necessary capital (in Table no. 4) will be covered, firstly, by self-financing from the net profit realized in the base year, multiplied by the growth factor g:

$$Equity_{(self\text{-}fin.)} = Net\ Profit_{current\ year} \bullet b \bullet (1 + g) = 21{,}490 \cdot 1/3 \cdot 1.09128 = 7{,}817 \text{ thousand RON} \quad (11)$$

The company will cover the difference by taking more debt:

$$DTL_{new} = NSC - Equity_{(self\text{-}fin.)} = 15.439 - 7.817 = 7.622 \text{ thousand RON} \quad (12)$$

This sustainable growth rate g = 9.128% will be based on both self-financing and new debt. By using the sustainable rate g we conserve the same debt ratio from the previous year (49,4%):

$$\frac{Debt}{Assets} = \frac{Debt + New\ debt}{Assets + Nec.\ Suppl.\ Capital} = \frac{83500}{169{,}137} = \frac{83{,}500 + 7{,}622}{169{,}37 + 15{,}439} = 49.4\% = const. \quad (13)$$

5.2. Growth rate higher than the sustainable growth

If the **effective growth rate** ($g_{effective}$ = 11%) is more „ambitious" than the sustainable rate (9.128%), the company can draw on its shareholders to put up additional capital, in order to maintain the debt rate constant. If the company has a target debt rate (49.4%, for example) which ensures opened access to funding granted by the bank, then, by raising shareholder's capital, the rate stays unchanged:

$$NSC, \text{ with } g_{effective} = (Assets + Net\ Working\ Capital) \bullet g_{effective} = 169{,}137 \cdot 11\% \approx$$

$$\approx 18{,}374 \text{ thousand RON} \quad (14)$$

The necessary capital (NSC, with $g_{effective}$) will be covered, firstly, by means of self-financing from the current year's net profit:

$$Equity_{(self\text{-}finance)} = Net\ Profit_{current\ year} \bullet b = 21{,}490 \cdot 1/3 = 7{,}163 \text{ thousand RON} \quad (15)$$

New debt (credit) will be requested in line with the optimum debt level:

$$Debt_{new} = NSC, \text{ with } g_{effective} \bullet Debt\ Rate_{optimal} = 18{,}374 \bullet 49.4\% = 9{,}071 \text{ thousand RON} \quad (16)$$

The shareholders will cover the difference:

$$Capital\ Increase = 18{,}374 - 7{,}163 - 9{,}071 = 2{,}140 \quad (17)$$

By increasing shareholder's capital in an adequate measure, we conserve the same debt rate from the current year (49.4%):

$$\frac{Debt}{Assets} = \frac{Debt + New\ debt}{Assets + NSC} = \frac{83{,}00}{169{,}137} = \frac{83{,}500 + 9{,}071}{169{,}137 + 18{,}374} = 49.4\% = const. \quad (18)$$

Details	Growth Rate g
	11%
Sales	**130452**
Fixed Assets	96784
Net Current Assets	90727
TOTAL Assets	**187511**
Variable Costs	**61448**
Fixed Costs	**26569**
Amortization	**8578**
EBIT	33858
Interest	**5496**
Taxe 16%	4538
Net Profit	23824
NSC	**18374**
Self-financing	7163
New Debt	9071
Additional Equity	2140
Debt Ratio	**49.4%**
Equity	94940
Debt	92571
TOTAL Assets	**187511**

Table no. 5: Forecasted values assuming an 11% effective growth rate

5.2. Self-financed growth

Self-financed growth is more restricted than sustainable growth. Under this assumption, the entire net profit will be used for self-financing (NSC' with g'), without any additional debt or capital increase. This scenario has two benefits: totally autonomous financing of new investments and an improvement of the debt ratio, increasing the company's debt capacity allowing it to capture new business opportunities in the future by drawing on more credit.

The size of growth rate g' is determined by the sustainable rate g and the ratio of shareholder capital in the total capital:

$$g' = g \cdot \frac{\text{Equity}}{\text{Assets}} \tag{19}$$

Finally, by multiplying the last two terms, the self-financed growth rate g' is equal to the rate between the re-invested profit and the total assets:

$$g' = \frac{\text{Net Profit}_{\text{reinvested}}}{\text{Assets}} = \frac{7{,}163}{169{,}137} = 4.235\% \tag{20}$$

Thus expressed, the growth rate g' is a **continuous time** rate and it approximates the true self-financed growth rate g'.

The **self-financed** rate g' is calculated more precisely using:

$$g' = \frac{g'_{\text{continuous}}}{1 - g'_{\text{continuous}}} = \frac{4.235}{100 - 4.235} = 4.422\% \tag{21}$$

Under this assumption for g', we calculate the necessary supplementary capital by applying g' to the total capital in the current year:

NSC', with g' = 169,137 · 4.422% = 7,480 thousand RON (22)

Table no. 6: Values assuming self-financed growth (thousand RON)

Details	Growth Rate g'	
	Cont. Self-finance	Self-finance
	4.235%	4.422%
Sales	**122652**	**122873**
Fixed Assets	90997	91161
Net Current Assets	85303	85456
TOTAL Assets	**176300**	**176617**
Variable Costs	**57774**	**57878**
Fixed Costs	**24980**	**25025**
Amortization	**8065**	**8079**
EBIT	31833	31891
Interest	**5167**	**5176**
Taxe 16%	4267	4274
Net Profit	22400	22440
NSC	**7163**	**7480**
Self-financing	4093	7480
New Debt	3070	0
Additional Equity	0	0
Debt Ratio	**49.1%**	**47.3%**
Equity	89730	93117
Debt	86570	83500
TOTAL Assets	**176300**	**176617**

The necessary supplementary capital in Table no. 6 (NSC', with g') `will be entirely covered by self-financing from the net profit increased by rate g':

$$\text{Equity}_{(\text{self-finance})} = \text{Net Profit}_{\text{current year}} \bullet b \bullet (1 + g'_{\text{discrete}}) = 21{,}490 \cdot 1/3 \cdot 1.04422 = 7.480 \text{ thousand RON} \quad (23)$$

Assuming this self-financed growth rate g' = 4.422%, the ratio of shareholder capital will grow, and the debt rate will improve:

$$\frac{\text{Debt}}{\text{Assets} + \text{NSC}'} = \frac{83{,}500}{169{,}137 + 7{,}480} = 47.3\% < 49.4\% \quad (24)$$

Conclusions

The correct estimation of necessary supplementary capital, as required by a company's expanding activities, is paramount for adequate financial management. In this regard, the sales forecast in the context of seasonal sales represents the foundation which sustains the calculation of the necessary supplementary capital. The relation between turnover and elements from the pro-forma balance sheet and income statement for the company used as a case study, have helped us to identify structural properties of the additional capital needed in order to ensure a sustainable growth of the company, both in the context of keeping unchanged the debt rate, and in the context of improving the debt rate through exclusive self-financing. The outlined scenarios reveal the influence of the forecasted sales on the capital structure, being very valuable for the financing decision in the frame of an adequate planning.

The paper illustrates the financial dimension of growth and how to connect the growth in sales with a sustainable structure of the needed extra capital. Our case study highlights the connection of the sustainable growth equation to the financing decisions. The scenarios we presented emphasize that a rapid growth puts pressure on the company capital and that the shareholders must know and must respond in a proactive way to these effects that can influence the existence and the future of the company.

However, it is necessary to highlight that time series techniques use past data to extrapolate the future, and thus have a limited ability to forecast market shocks. In the pharmaceutical industry, major disruptions can come from competitors introducing new formulas, or from regulators changing market rules; therefore, any calculated forecasts must be augmented considering the influence of all these operational changes.

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