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Uniwersytetu Ekonomicznego we Wrocławiu

RESEARCH PAPERS

of Wrocław University of Economics

263

Quantitative Methods in Accounting and Finance



edited by

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Publishing House of Wrocław University of Economics
Wrocław 2012

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This publication is available at www.ibuk.pl, www.ebscohost.com,
and in The Central and Eastern European Online Library www.ceeol.com
as well as in the annotated bibliography of economic issues of BazEkon
http://kangur.uek.krakow.pl/bazy_ae/bazekon/nowy/index.php

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Wrocław 2012

ISSN 1899-3192

ISBN 978-83-7695-274-1

The original version: printed

Printing: Printing House TOTEM

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TWO APPROACHES TO EXTERNAL FINANCING NEEDS ESTIMATION IN FINANCIAL PLANNING

Summary: The paper deals with two basic approaches to external financing needs estimation in a company. The article puts emphasis on the comparison of the alternative methods. In the first part of the article, the traditional method based on the projected financial statement was described. The most important steps of the procedure were elaborated on and the ratio analysis was taken into account. The second part of the paper explains a simplified approach based on the additional funds needed formula. The basic assumption of this formula was depicted with the assumption that additional funds needed constitute a difference between the increase in assets and the increase in short-term liabilities as well as retained earnings. Finally, the two approaches were explained and compared by means of a case study and both advantages and disadvantages of the methods were described.

Key words: financial planning, *pro forma* financial statement, sources of financing.

1. Introduction

There are various uses of financial planning in practice. First, managers deal with financial planning in order to assess if company's anticipated financial performance is consistent with the general objectives of a company desired by its owners. Second, financial planning is used to conduct sensitivity analyses and evaluate the impact of the changes in a corporate strategy on a future financial position. Third, financial planning is also important from the point of view of value-based management, because it allows assessing various scenarios and checking whether they contribute to value creation. Finally, financial planning may be applied for the purposes of future company's financing needs estimation.

The paper puts emphasis on the last application of financial planning. Thus, the goal of the paper is to describe two approaches to financing needs estimation in a company by means of the financial planning. The article explains how to apply in practice the projected financial statement approach and the additional funds needed formula. The thesis of the paper is that both approaches are consistent

with each other and can be used in order to assess financing needs to support the future growth of a company.

2. The projected financial statement approach

The logic behind financial planning approaches is that the changes in assets and liabilities depend on the changes in sales. If sales increase, a company has to increase investments in assets in order to support the increased sales level. Taking into account the general balance sheet equation, total liabilities and equity must also increase, so it is possible to estimate additional financing sources of a company.

The projected financial statement approach is aimed to forecast a complete financial statement, including an income statement and a balance sheet. The basic assumption of this method is that different assets grow at different rates as sales increases. In a similar manner liabilities may be projected. Additional funds needed is a difference between the assets required to support an increase in sales and the sources of financing derived from a projected balance sheet.

The process of financing needs estimation according to the projected financial statement approach may be described in four steps [Brigham, Daves 2010, pp. 301–311]:

- 1) historical ratios analysis,
- 2) income statement forecasting,
- 3) balance sheet forecasting,
- 4) determining additional funds.

The first phase is to analyze the historical ratios that will be used in projections. Most of the ratios are calculated as the percentages of sales. Usually for the purposes of financial planning this is enough to calculate the following assets and liabilities expressed as the percentages of sales:

- fixed assets,
- inventories,
- accounts receivables,
- short-term investments including cash,
- short-term debt including account payable.

Moreover, the cost of goods sold as well as selling and general administrative expenses are also computed in relation to sales.

The second step is to forecast income statement. The starting point is a sales forecast and on this basis remaining items are projected. The procedure is depicted in Table 1.

Sales forecasting is a result of managerial assumptions and budgeting techniques in a company. The cost of goods sold is treated as a variable expense (excluding depreciation) as well as selling and general administrative expenses and may be computed as a percentage of sales. A depreciation forecast takes into account the value of property, plant and equipment at the beginning of a year. There are three ways to forecast interest expenses. First, it is possible to base interest expense

on debt at the end of a year. Unfortunately, it may over-estimate interest expense and causes problem of financial feedback. Second, interest expense may be computed on the basis of debt at beginning of year will. As a result this method may under-estimate interest expense, but allows avoiding the problem of circularity. Finally, interest expenses may be calculated on average when one takes into account both beginning and ending debt will. It is the most accurate estimation, but still has the problem of circularity [Brigham, Daves 2010, pp. 303–305].

Table 1. Income statement forecasting

Specification	Actual data	Forecast basis	Forecast
Sales	1000.0	10% increase (sales forecast)	1100.0
Cost of goods sold (without depreciation)	600.0	Percentage of sales (60%)	660.0
Depreciation	80	Depreciation policy	85
Selling and general administrative expenses	200.0	Percentage of sales (20%)	220.0
EBIT	120.0	–	135.0
Interest expenses	30.0	Interest rate times debt	32.0
EBT	90.0	–	103.0
Corporate income taxes (20%)	18.0	–	20.6
Net income	72.0	–	82.4

Source: author's own work.

The next step is to project the balance sheet. On the one hand, all assets are forecasted by adopting the percentage of sales approach; on the other, sources of financing should be specified. The sources include short-term liabilities, existing long-term debt and equity and the addition to retained earnings. In order to forecast the addition to retained earnings, corporate policy in respect of dividend payout ratio and net income from the projected income statement are taken into account.

The last step is to determine the value of funds needed to support an increase in sales. This additional amount of money would be the difference between total assets and specified sources of financing a company. If the difference is positive, it means that a company must search for additional sources of financing to balance assets and claims. If the difference is negative, then a financial plan assumes that in the future a company will have more liabilities and equity than needed to support required assets.¹

3. Additional funds needed formula

The additional funds needed formula is a simplified approach to forecasting company's needs for sources of financing in the future. Unlike the projected financial statement approach, it assumes that all assets grow in a direct proportion to sales. The

¹ See further elaboration on forecasting financial statement in Daves, Ehrhardt, Shrieves [2004].

rationale behind the formula is that for a company to develop, it has to purchase new assets to support an increase in sales, but an increase in assets may be financed in three ways. The possibilities of financing this increase is depicted in Figure 1.

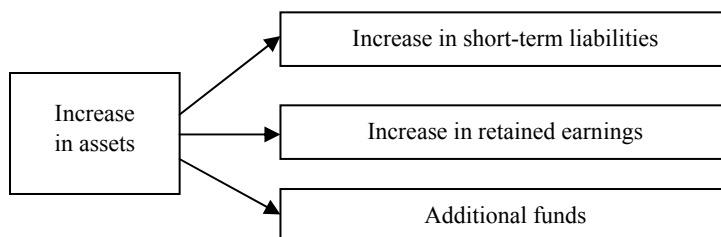


Figure 1. Sources of financing an increase in assets

Source: author's own work.

The first source is the increase in short-term liabilities, because the increase in assets must equal the increase in total claims. Thus, the increase in accounts payable and accruals may help pay for the forecasted increase in operating assets. A company expects to increase net income as a result of new sales. Therefore, the portion of this income will be retained in a company and can be used to buy new assets. Any remaining increase in assets should be financed by additional sources of financing. Taking into account these relations, it is possible to write a formula for additional financing (compare in Brigham, Daves [2010, p. 297]):

$$\begin{aligned} \text{Additional funds} = & \\ & \text{Required increase in asset} \\ - & \text{Increase in short-term liabilities} \\ - & \text{Increase in retained earnings} \end{aligned}$$

In order to determine additional funds needed, the increase in assets, the increase in short-term liabilities and the increase in retained earnings must be calculated together with financial ratios taken into consideration.

Required increase in assets may be depicted as a product of multiplication of the capital intensity ratio and increase in sales in the following way:

$$\Delta A_t = CI_t \times \Delta S, \quad (1)$$

where: ΔA_t – required increase in assets in period t ,
 CI_t – the capital intensity ratio in period t ,
 ΔS – increase in sales.

The capital intensity ratio is a reciprocal to the asset turnover ratio and can be expressed as a total value of assets over sales.

$$CI_t = \frac{A_t}{S_t}, \quad (2)$$

where: A_t – capital requirements (total assets) in period t ,

S_t – sales revenue in period t .

The capital intensity ratio represents the amount of assets required per 1 PLN of sales. The higher the capital intensity ratio, the greater company's requirements for assets for a given increase in sales. As a result, companies with a higher ratio need more external financing. In other words, the ratio is the required percentage of required assets to sales.

The required increase in short-term liabilities may be calculated by multiplying a projected increase in sales and liabilities to sales ratio:

$$\Delta L_t = L / S_t \times \Delta S, \quad (3)$$

where: ΔL_t – increase in short-term liabilities in period t ,

L/S_t – liabilities to the sales ratio in period t .

Liabilities to the sales ratio may be derived in a similar way as the capital intensity ratio, by dividing total short-term liabilities and total sales revenues:

$$L / S_t = \frac{L_t}{S_t}, \quad (4)$$

where: L_t – short-term liabilities in period t ,

The liabilities to the sales ratio represent accounts payable and accruals that increase as a percentage of sales. This is the amount of financing generated in a company per 1 PLN increase in sales.

The last component that must be taken into account is an increase in retained earnings. This amount may be computed by multiplying additional profit earned due to new sales and the retention ratio. Additional profit can be obtained as a product of multiplication of return on the sales ratio and projected sales. Return on sales is the relationship between net income and sales and can be expressed in the following way:

$$ROS_t = \frac{NI_t}{S_t}, \quad (5)$$

where: ROS_t – the rate of return on sales in period t ,

NI_t – net income in period t ,

S_t – revenues from sales in period t .

Required increase in retained earnings may be depicted in the following way:

$$\Delta RE_t = ROS_t \times S_t \times RR, \quad (6)$$

where: ΔRE_t – sales in a forecasted period,
 S_t – sales in a forecasted period,
 RR – the retention ratio.

The higher return on sales, the larger the net income to support an increase in assets and consequently the lower need for external financing. The retention ratio is the percentage of net income that is retained in a company to support its development. The retention ratio is the opposite to the payout ratio, which represents the percentage of income distributed to shareholders as dividends.

Taking into account the interrelationships among capital, the intensity ratio, the retention ratio and the profit margin, it is possible to reflect the impact of all the discussed factors on additional funds:

$$AF = \Delta A_t - \Delta L_t - \Delta RE_t = CI_t \times \Delta S - L / S_t \times \Delta S - ROS_t \times S_t \times RR. \quad (7)$$

Formula (7) indicates that there are five basic factors affecting additional funds needed:

- 1) sales,
- 2) dividend policy,
- 3) operating profitability,
- 4) capital requirements,
- 5) short-term liabilities payment policy.

If sales revenues increase, a company requires more assets, and as a result more sources of financing. If a company reduces the payout ratio, then more earnings would be retained, and this would decrease company's need for external financing. If the operating profitability increases, then net income increases, and as a result retained earnings will increase, and finally the amount of additional funds need will be reduced. The higher firm's capital requirements, reflected by means of the intensity ratio, the more new financing will be needed to support additional sales. Finally, if the payables deferral period decreases, a company reduces short-term liabilities due to the fact that it pays its financial obligations sooner and, as a consequence, additional funds needed to support a sales increase.

Providing the constant growth rate, market value added of a company increases if return on sales, i.e. operating profitability, increases and, on the other hand, if capital requirements and the weighted average cost of capital decrease.²

4. Case study

The objective of this case study is to explain the estimation process of the additional external funds needed to support the development of a company by means of two approaches discussed previously. Table 2 and Table 3 present a balance sheet and an income statement, respectively for 2011.

² See further elaboration on capital requirements in Nita [2011, pp. 97–106].

Table 2. Balance sheet for 2011

Specification	Thousand PLN
Assets	
A. Fixed assets	1260
B. Current assets	1680
Inventories	690
Accounts receivable	870
Short-term investments	120
Total assets	2940
Liabilities and equity	
A. Equity	1940
Common stock	1180
Retained earnings	760
B. Liabilities and reserves for liabilities	1000
Long-term debt	573
Short-term debt (accounts payable)	427
Total liabilities and equity	2940

Source: author's own work.

Table 3. Income statement for 2011

Specification	Thousand PLN
Sales	7000
Cost of goods sold (variable costs)	4410
Selling and general administrative expenses (fixed costs)	2240
EBIT	350
Interest expenses	53
EBT	298
Corporate income taxes (20%)	60
Net income	238

Source: author's own work.

According to the first approach based on the projected income statement, there is a need to make a set of assumptions in respect of basic financial ratios. It is assumed that the company is going to growth at 10% in the forthcoming year. As a result revenues from sales are going to be 7.7 million PLN. The cost of goods sold as well as selling and general administrative expenses are forecasted with the ratios from the prior period taken into account. As an example, the cost of goods makes 63% of the total sales in 2011 and it is assumed that this ratio will be maintained in 2012. As a result, the cost of goods sold is estimated to be 4851 thousand PLN in 2012. The income statement *pro forma* for 2012 is shown in Table 4.

Table 5 presents the balance sheet forecast for 2012. Fixed assets, current assets and accounts payable were expressed as percentage of sales. Common stock and

long-term debt were carried over from 2012 to 2012. Retained earnings were calculated as a sum of retained earnings from a prior period (760 thousand PLN) and addition to retained earnings in 2012, which was calculated as the retention ratio (65%) multiplied by net income earned in 2012 ($0.65 \times 253 = 164.45$ thousand PLN). Taking into account these computations, one could prepare a forecast for 2012.

Table 4. Income statement forecast 2012

Specification	2011 Actual	2012 Forecast
Sales	7000.0	7700.0
Cost of goods sold (variable costs)	4 410.0	4 851.0
Selling and general administrative expenses (fixed costs)	2240.0	2464.0
EBIT	350.0	385.0
Interest expenses	52.5	68.8
EBT	297.5	316.2
Corporate income taxes (20%)	59.5	63.2
Net income	238.0	253.0

Source: author's own work.

Table 5. Balance sheet forecast for 2012 without additional financing

Specification	2011 Actual	Percentage of sales	2012 Forecast
Assets			
A. Fixed assets	1260.0	18.00	1386.0
B. Current assets	1680.0		1848.0
Inventories	690.0	9.86	759.0
Accounts receivable	870.0	12.43	957.0
Short-term investments	120.0	1.71	132.0
Total assets	2940.0		3234.0
Liabilities and equity			
A. Equity	1940.0		2104.4
Common stock	1180.0		1180.0
Retained earnings	760.0		924.4
B. Liabilities and reserves for liabilities	1000.0		1042.7
Long-term debt	573.0		573.0
Short-term debt (accounts payable)	427.0	6.10	469.7
Total liabilities and equity	2940.0		3147.1

Source: author's own work.

Additional funds needed to support company's growth are the difference between the total amount of money tied up in assets and specified sources of financing. In this case additional funds can be estimated in the following way:

$$AFN = 3\,234\,000 - 3\,147\,144 = 86\,856 \text{ PLN.}$$

In order to equal assets with liabilities and equity, it is necessary to define how additional funds will be generated. On the assumption that it is possible to raise external long-term debt by 86 865 PLN, total assets as well as total claims equal 3234 thousand PLN.

The second approach is to apply the simplified formula (7) to assess additional funds needed. In this case capital intensity ratio is 0.42, which means that a company requires 0.42 PLN tied up in assets per one PLN of sales. Liabilities to sales ratio amounts 6.1%, which means that per 1 PLN increase in sales accounts payable and accruals is by 0.061 PLN. Finally, the profit margin and the retention ratio were calculated to be 3.4% and 65%, respectively. Taking into account these ratios, one can estimate the additional funds needed:

$$\begin{aligned} AF &= 0.42 \times 700 - 0.061 \times 700 - 0.034 \times 7700 \times 0.65 = \\ &= 294 - 42.7 - 170.17 = 81130. \end{aligned}$$

It turns out from the formula that the increase in assets amounts 294 thousand PLN, the increase in short-term liabilities – 42.7 and the increase in retained earnings –170.17. Finally, additional funds to support an increase in sales are 81.13 thousand PLN.

5. Conclusions

On the basis of the above considerations and the presented case study, it has been shown that the difference in additional funds needed obtained under two approaches is not significant. The projected income statement method yields 86 965 PLN, whereas the method based on AFN formula gives 81 130 PLN. Projected financial statement approach is more detailed and allows different assets and liabilities to grow at different rates. In other words, this method is more flexible. The method based on formula (7) assumes that all assets grow at the same rate. The formula approach may be applied for the companies whose ratios are all expected to remain constant. It is a very good approach especially for quickly obtaining the estimation of external financing requirements. The projected income statement method forecasts the entire balance sheet and thus is more realistic, while the AFN formula-based method allows projecting only the net increase in assets.

The difference in the obtained results is due to the fact that the formula method assumes that the profit margin remains constant in a forecasted period, whereas the projected financial statement approach assumes that the profit margin may vary. Thus, the projected financial statement is more reliable and accurate, and can be applied if items in a financial statement do not increase in a direct proportion to sales. The formula-based approach may be used to obtain a very quick estimation of additional funds needed to support sales.

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DWA PODEJŚCIA DO SZACOWANIA ZAPOTRZEBOWANIA NA ZEWNĘTRZNE ŹRÓDŁA FINANSOWANIA ZA POMOCĄ PLANOWANIA FINANSOWEGO

Streszczenie: Opracowanie dotyczy dwóch podejść do szacowania zapotrzebowania spółki na dodatkowe źródła finansowania zewnętrznego w ujęciu planowania finansowego. Artykuł kładzie nacisk na porównanie obu podejść. W pierwszej części zaprezentowano tradycyjną metodę opartą na sporządzaniu sprawozdania finansowego *pro forma*. Przedstawiono podstawowe etapy tego podejścia z uwzględnieniem analizy wskaźnikowej. W drugiej części opracowania wyjaśniono podejście uproszczone, oparte na syntetycznej formule, która zakłada, że dodatkowe środki stanowią wielkość rezydualną pozostałą po pokryciu przyrostu aktywów przez wzrost zobowiązań krótkoterminowych i zysków zatrzymanych. Na zakończenie wyjaśniono i porównano oba podejścia za pomocą krótkiego studium przypadku a także poddano dyskusji podstawowe zalety i wady obu metod.

Słowa kluczowe: planowanie finansowe, sprawozdanie finansowe *pro forma*, źródła finansowania.