

A SIMPLE CALCULATION METHOD FOR DEFINING CREDIT LIMITS OF ENTERPRISES

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TÚRÓCZI I.

ABSTRACT

When setting up and operating a business, one of the most important tasks of the entrepreneur is to secure steady solvency. In order to achieve this and to increase production they often rely on the involvement of external capital. From the point of profitability it is critical to evaluate how these elements of capital will influence expenses and profits. Some of these sources bear no costs making a favourable effect. However, there are other capital sources, which result in a significant increase of expenses. Capital gearing (leverage) also brings costs and expenses, which a business must be able to measure and evaluate.

We must know the reasonable options to choose and the limits of expensive capital involvement.

As part of my consultancy work, I have researched this issue and, relying on business literature, I have designed a calculation method which helps to define this limit. In this paper the reader is presented with this method and is encouraged to comment on its effectiveness.

KEY WORDS: borrowing, leverage, credit costs, credit ratio, financing

ÖSSZEFOGLALÓ

A vállalkozások alapításának és működtetésének egyik legfontosabb feladata a folyamatos fizetőképesség biztosítása. A gazdálkodók a termelés növelése érdekében gyakran vonnak be idegen tőkét a vállalkozásba. A jövedelmezőség szempontjából meghatározó, hogy ezek a tőke elemek hogyan hatnak a ráfordításokra, a nyereségre. A források egy része költségmentes, amely kedvező hatást gyakorol. Vannak azonban olyan külső tőkebevonási lehetőségek, amelyek jelentős ráfordítást idéznek elő. A tőkeáttétel kockázattal és költséggel jár, melyet a vállalkozásnak mérnie kell.

Tudni kell, hogy melyik lehetőséggel célszerű élni és, hogy a költséges tőke bevonásnak hol vannak a korlátai.

Munkám során ennek vizsgálatát végeztem el és szakirodalomra támaszkodva összeállítottam egy számítási módot, amely ennek a korlátnak a meghatározására szolgál. Rövid írásomban ezt szeretném bemutatni és kérni az olvasók véleményét módszeremről.

KULCSSZAVAK: hitel, tőkeáttétel, hitelköltség, hitelarány, finanszírozás

DETAILED ABSTRACT

When setting up and operating a business, one of the most important tasks of the entrepreneur is to secure steady solvency. In order to achieve this and to increase production, thereby increasing their income, businesses complement their own capital and involve external capital. This has a stimulating effect on operation and increases production. Some of these sources bear no costs, which makes them favourable from the point of profit. Another group, however, comes with capital costs, in case of borrowing, credit costs. The entrepreneur must be able to define the limit within which borrowing can improve profitability or make profit draining a still bearable burden. Business literature offers plenty of explanation on the aspects of borrowing, capital costs, leverage and the risks involved. My calculation formula designed to define the limits of borrowing derives from the well-known correlations and equations applied in them. My aim was to present an easily understandable calculation for people in business without a high level qualification in economics. The calculation scheme is as follows:

$$T \cdot \text{Profit draining effect of external capital} \leq \text{Modified Rate of Return on Assets (MEMR)}$$

The meaning of the factors in the equation is the following:

T: = Maximum ratio of cost-bearing external capital

Draining effect of external capital : =

$$\frac{\text{Credit costs reduced in proportion of average tax rate}}{\text{Average stock of cost bearing external capital}}$$

Modified rate of return on assets : =

$$\frac{\text{Profits after tax} + \text{Credit costs reduced in proportion of average tax rate}}{\text{Total capital}}$$

Businesses can stay profitable as long as the above disparity holds. In the case of equality the profits are 0, a reversed disparity signifies a loss-making venture.

In what follows the readers are presented with the detailed path that led to this calculation method and are encouraged to make their comments on it.

INTRODUCTION

When setting up and operating a business venture, one of the most important tasks is raising the necessary capital to secure continuous financing for the operation. In this rather complex issue, I will focus on financing, the types of financial sources and their respective effect on the profits to be earned. I will compare the different sources and introduce a calculation method aimed at assessing and examining the effects of external capital. By employing this calculation method we can establish what maximum percentage external sources can reach within the whole capital without threatening the financial stability of the business by causing a loss.

I consider it essential that the method of calculation must be simple so that entrepreneurs without preliminary training in economics should be able to apply it easily.

1. Sources of financing and their valuation

Economic management is greatly affected by the sources of financing as they also have an influence on the economic decisions and the profits made. Table 1 shows the different types of sources, the points to be considered and the corresponding valuation.

Table 1: Main types of financial sources of businesses and their valuation

Denomination	Repayment obligations	Costs	Influence on decisions
Own capital	+	+	+
Investor partner	+	+	-
State support	+	+	-
*Obligations in due time	-	+	+
Credit	-	-	-

* Contractual obligations in due time without costs
 + : positive valuation, meaning that the condition is favourable (e.g. no costs are involved),
 - : negative valuation, meaning that the condition is not favourable (e.g. costs are involved).
 Source: [1]

The most positive assessment can be formed about the own capital as it is non-repayable and goes without costs. The same applies for investments of business partners. It may be a drawback, however, when the partner wants to have a say in decisions and, unless he is a professional investor, it can lead to disorders in operation. In general, state support is considered favourable but before applying for it, it is advisable to study carefully the terms and conditions of its granting and also what effects will complying with them make on our management. As an example, we may refer to job creation investments where state support is linked to the continuous employment of a fixed number of workers. This condition can burden the venture and might turn it into a loss-making one. The effect of obligations in due time and without costs based on contractual relationship is very positive. Naturally, they must be paid but until the deadlines they can be used totally freely and without costs (e.g. obligations to suppliers, accounts

payable). They can be grouped in the elements of spontaneous financing. Credit is an additional source of financing which enhances operation and therefore has a positive effect on management. We should not underestimate its importance but must be very cautious when we want to use it in the way of financing our business. The main disadvantage of credit is that, because of its tied nature, it influences our decisions, it is repayable and drains part of our income. It lays a heavy burden on the business, which consists of two elements: the interest rate and the service charges. When calculating the debt service charges we will use the credit cost index. The financial institutions, following the regulations of a Government Decree, usually apply the total credit cost index (THM in Hungarian). Decree 4/1977 (III.5) (see[6]) also stipulates the calculation method for this index.

Businesses, however, are not very keen on employing this method as they find it too complicated and for them it is more important to know how much credit they can get and how much they have to pay back.

During my consultancy work I have noticed that managers are less interested in the percentage of credit costs projected for the whole year when they are picking up a loan for only a fraction of the year. For the entrepreneur, it is the total amount that is the most important. This cannot be accepted as it makes economic calculations inaccurate when comparing alternatives. Before making use of credits, we have to consider the costs of them as they are reducing the profits retained by the business.

In place of the calculation method provided in the Decree, we can employ a simpler equation, which lends itself easier to business managers. The cost of credit can be calculated as follows:

$$\text{Credit cost} = \left(\frac{\text{Capital} + \text{Interest}}{\text{Capital} - \text{Costs deducted at payment}} - 1 \right) \cdot 100$$

Source: Author's own equation

The index shows how much more (in percentage) we will have to pay back compared to the actual amount of the loan. A shortcoming of the equation is that it does not include the time factor, but an advantage is that it works out well and is easy to interpret.

2. Capital leverage and its effects

External capital also often features among the financial sources of a business. Capital gearing (leverage) usually occurs as a result of borrowing and can be calculated according to this equation:

$$L = \frac{\text{Total asset value}}{\text{Own capital}}$$

Source: [2], [3]

The index shows the ratio of the whole capital to the own capital. External capital always entails fixed costs as the lending bank stipulates its own incomes in the contract. It is easy to see that the existence of these fixed costs increases the risk of management and urges greater performance. It is also well known that the effect of borrowing on management is influenced by a number of factors; its ratio and the

average credit costs have a stimulating effect on the operation.

It is a basic economic principle that a business should borrow only if it is capable of meeting its costs. In order to fulfil this requirement the entrepreneur, at the planning stage, must do a calculation and determine the limit he/she must not exceed in capital transfer.

3. Limitations of borrowing for enterprises

In this chapter I will partly introduce a calculation method, which I have established on the basis of correlations between different financial indexes. This calculation helps the business to examine to what extent it can borrow to finance its operation. This is defined by the percentage credit can make up of all financial sources without the danger of draining all profits earned by the whole capital operated by the business and consequently bringing it into the red.

In order to complete the calculation we should consider a few indexes.

Some of the indexes I have borrowed from Béhm ([4]), another group is the result of my own research.

I. Equations borrowed from literature:

$$\text{a., Gains on own capital} := \frac{\text{Profits after tax}}{\text{Own capital}} \cdot 100$$

The index shows what percentage of profit the business was able to make in a given period (usually within a year) in proportion of its own capital.

$$\text{b., Gains on the total capital} = \frac{\text{Profits after tax}}{\text{The total capital}} \cdot 100$$

The index shows what percentage of profit the total (that is, owner's own and external) capital of the business was able to make in a given period (usually within a year).

II. Own equations:

$$\text{a., All profits earned} = \text{Profits after tax} + \text{Credit costs reduced in proportion to average tax rate}$$

The calculation of credit costs reduced in proportion to average tax rate bears significance because the profits earned through production must be divided

into two. One part is retained by the business the other part is drained by the creditors in the form of capital costs including interest and service charges. If we want to assess the profitability of the operation we have to calculate with the whole amount of profits earned after tax.

Why to use profits after and not before tax, one may ask. Profits after tax forms the centre of interest of any business and it is the more commonly used index in literature as well.

We must note, however, that the whole amount of profits earned can be positive even in the case when profits after tax retained by the entrepreneur after paying the credit costs are dragged into the red.

In case all the profits earned, or even more are drained by the financial institution providing the loan as costs of capital, a positive operational profit can turn negative profit before tax and consequently negative profit after tax. Negative profits gained on own capital may still lead to a positive profit earned on the whole capital. It is known in literature as the risk of capital transfer. ([5])

b., Draining effect of gains on external capital =

$$\frac{\text{Costs of capital reduced in proportion to average tax rate}}{\text{Average stock of cost - bearing external capital}} \cdot 100$$

Cost-bearing capital is defined as those external sources which may entail additional costs for the business. Credits also fall into this category because we have to pay an interest on them plus the service charges to the lending institution. Liabilities to suppliers paid in due time, however, do not belong here as we do not have to pay an interest on them.

The index shows the percentage of the credit the external capital operated by the business drains from the business on average in the form of capital costs (credit costs = interest + service charges).

c., Proportion of cost-bearing external capital in financing =

$$\frac{\text{Cost - bearing external capital}}{\text{Total assets}} \cdot 100$$

The index helps us to calculate the percentage ratio of the cost-bearing external capital to the whole amount of operating capital.

d., MEMR =

$$\frac{\text{Profits after tax} + \text{Credit costs reduced in proportion of average tax rate}}{\text{Total capital}} \cdot 100$$

MEMR = Modified rate of return on assets

Source: Author's own equation

The average value of total capital can be determined by a chronological average.

The rate of return on assets indicates what percentage of profits after tax the average value of assets operated, that is the total capital, is capable of earning on a yearly average. The numerator of the fraction includes the profits after tax and the credit costs reduced in proportion of the average tax rate as the profits gained by the whole operating capital. The index shows a realistic picture only if we consider the whole amount of profits.

In the following formula T stands for the maximum proportion of cost-bearing external capital. A business is capable of absorbing this until the following inequality holds.

$$T \text{ Profit draining effect of external capital} \leq \text{Modified Rate of Return on Assets (MEMR)}$$

Let us illustrate the theoretical relationships with a simple example.

Example:

Modified Rate of Return on Assets: 8%

Cost of External Capital: 20%

(interest + service charges)

Calculation:

$$T \cdot 0.2 < 0.08$$

$$T < 0.08 / 0.2$$

$$T < 0.4$$

$$T < 40 \%$$

Checking:

Let us consider the whole capital of the business as HUF 10,000,000

Modified Rate of Return on Assets: =0.08

Total profits after tax earned = HUF 800,000 (10,000,000 x 0.08)

Profit draining effect at 40 % rate of external capital

$$\text{HUF } 10,000,000 \times 0.40 \times 0.2 = \text{HUF } 800,000$$

Obviously, the profit drain is lower at a lower proportion and, higher at a higher proportion of external capital, respectively. The business in our example is advised to employ external capital to the ratio of 40% without making a loss. This calculation method, at least in the literature to my knowledge, has not been described yet, so it can be considered a new model.

After the model calculation, let us examine another calculation based on more detailed data. During the calculation I will introduce four different cases, with differing ratio of external capital calculated both at a steady increase of profitability proportionate to

capital and also at an unchanged level. I have also examined what happens if the profitability of the total capital is higher than the credit costs. By comparing them we can assess the effects of various levels of capital gearing and profitability. Table 2 below shows the data.

Figures assuming increasing profitability were marked version I (v-I), figures based on unchanged profitability were marked v-II. and the figures indicating average profitability exceeding credit costs were marked v-III. in the Table.

Table 2: Figures related to the capital structure and profitability of businesses

Denomination	Case 1	Case 2	Case 3	Case 4
Own capital (in thousand HUF)	18,000	18,000	18,000	18,000
Credit (in thousand HUF)	2,000	6,000	12,000	22,000
Profit draining effect of external capital %	22	22	22	22
Profitability in proportion to capital v -I %	8	9	10	11
Profitability in proportion to capital v-II	8	8	8	8
Profitability in proportion to capital v-III %	25	25	25	25
*Total profits I (in thousand HUF)	1,600	2,160	3,000	4,400
*Total profits II (in thousand HUF)	1,600	1,920	2,400	3,200
Total profits III. (in thousand HUF)	5,000	6,000	7,500	10,000
*Profits retained by the business v -I (in thousand HUF)	1,160	840	360	-440
*Profits retained by the business v -II (in thousand HUF)	1,160	600	-240	-1,640
Profits retained by the business v -III (in thousand HUF)	4,560	4,680	4,860	5,160
*Credit costs (in thousand HUF)	440	1,320	2,640	4,840

* Calculated figures

The figures in Table 2 show that although the credit was able to increase the productivity of the business - and its profitability in proportion to capital - it also reduced the profits retained by the business for the situation described in version i.. The obvious reason for this is that the profit of external capital fixed by contract and drained from the business is higher than the profitability of the total capital.

The business in question, with 10% profitability ratio to assets (Case 3, version I), is able to weather a credit ratio without loss according to the following calculation.

$$T \cdot 0.22 \leq 0.1$$

$$T \leq 0.45$$

The calculation proves that the acceptable credit ratio cannot be higher than 45%.

Assuming an unchanged profitability index (see version II), the situation seems less favourable, even between Case 2 and 3 we are losing the total profits earned because of the costs of external sources and the end result will be 0 or will show a loss.

The acceptable credit ratio in this case can be calculated as follows:

$$T \cdot 0.22 \leq 0.08$$

$$\leq 0.36$$

The result shown by the calculation is 36%, which is lower than it was in the previous years.

For the situation described by version III the profitability of the total capital is higher than the profit draining effect of external capital, giving a T value higher than 100 %.

CONCLUSION

Summing up we can establish that if external capital can increase the profitability of the total capital then it also improves the endurance of the business. This offers two options. In case the profitability of the total capital is higher than the credit costs, then the profit retained by the business - and featuring in

P&L as profit before tax - increases. In case the profitability of the total capital is lower than the credit costs, then the accounted profit decreases. From the business point of view, borrowing cannot be justified unless it increases profitability.

Calculations and practice both prove that the amount of credit and capital transfer are not only limited by the regulations of lending institutions. It is also in the very best interest of businesses to maintain the appropriate proportions. The described method of calculating the value T offers an easy way to compute the upper limit on the amount of capital to be borrowed by a business.

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