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# Implementation of a Variable Costing Method to Calculate the Profitability of a Production Investment for a Textile and Clothing Start-Up

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Jaroslaw Wojciechowski[1], Renata Lisowska[2]

***Abstract:***

***Purpose:*** *Production profitability is a key parameter determining the efficiency of the production part of the organization, i.e., how much and what resources it uses to generate income, which in this case is production. The aim of this publication is to show an author's method of using variable costing as a tool for assessing the profitability of a manufacturing investment for a textile and clothing start-up in pre-production planning. The lack of publicly available solutions for calculating the profitability of production is the reason for starting the research.*
***Design/Methodology/Approach:*** *The methodology is to use the leverage of the pre-profit factor on the sum of fixed assets and fixed costs for the first year of operation to calculate the amount of profit and determine the corresponding amount for production materials and production volume for a fixed actual unit production cost of two textile products and the selling price of each product.*
***Findings:*** *In the profitability of production, the fact that costs are appropriately included in the unit cost of production, as well as the previously mentioned items such as fixed costs, wages of the team or the amount we have to spend on renting commercial or production space, plays a particularly important role in whether the investment pays off.*
***Practical implications:*** *In this article, the author presents a model calculated in Excel to calculate the profitability of producing two products in a strategy of one basic and one luxury.*
***Originality/Value:*** *Original work on the practical application of variable costing method in pre-production planning.*

***Keywords:*** *Profitability, production, unit costs, iteration method, preProfit factor, clothing, textile products.*

***JEL codes:*** *D24, C10, A10.*

***Paper type:*** *Research article.*

[1]*Assist. Prof., Faculty of Material Technologies and Textile Design, Lodz University of Technology, Institute of Textiles, Poland, jaroslaw.wojciechowski@p.lodz.pl;*
[2] *Prof., Faculty of Management, Department of Entrepreneurship and Industrial Policy, University of Lodz, Poland, renata.lisowska@uni.lodz.pl;*

## 1. Introduction

The planning and launching of one's own business is preceded by an entrepreneurial process[3], followed by the business idea, the definition of the business object and the business model, i.e. the configuration of interrelated components that form an integral whole, by means of which the enterprise selects the strategy options that can create value and then uses the organizational architecture to create and retain value[4].

In addition to the business concept, it is also important to analyze the effectiveness of the planned business venture, which can have different dimensions depending on the needs. It can become an analysis to determine the factors creating the financial result using specific yardsticks and indicators or a techno-economic analysis of the core business, i.e., its product mix, cost structure, labor productivity[5].

The efficiency of the planned business undertaking should be based on the principle of rational action, i.e. obtaining the maximum effect for a given input or minimizing the input for a given effect.

The main dimensions of efficiency are: a) economic efficiency - understood as the relationship between results and inputs expressed through e.g. profitability, productivity, efficiency, b) operational efficiency, the essence of which is obtaining ways to reduce consumption of means of production per unit of product, c) market efficiency - determining market success includes the product and its features, customer relations, d) dynamic efficiency - measures the rate at which the company develops new products, creates or acquires technologies and competences and skills[6].

Performance information is provided through profitability analysis. One example of such analysis is the determination of the break-even point for production, which

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[3]*Compare: Shane, S., 2003. A General Theory of Entrepreneurship. The Individual-Opportunity Nexus, Edward Elgar Publishing.; Cheltenham; J.A. Timmons, J. Spinelli 2004. New Venture Creation: Entrepreneurship For the 21st Century, McGraw-Hill/Irwin, Boston.; Gartner, W. 1985. A Conceptual Framework for Describing the Phenomenon of New Venture Creation, Academy of Management Review 10(4).*

[4]*Compare: Smith, W., Binns, A., Tushman, M. 2010. Complex Business Models: Managing Strategic Paradoxes Simultaneously. Long Range Planning, Vol. 43; Shafer, S.M., Smith, H.J., Linder, J.C. 2005. The Power Of Business Models, Business Horizons, (48).; Osterwalder, A., Pigneur, Y., Tucci, Ch. L. 2005. Clarifying Business Models: Origins, Present, and Future of the Concept, Communications of Association for Information Systems, Vol. 14.*

[5]*Brzęczek J., 2018. Rentowność produkcji, [in:] Lenik, P. (ed.), Zarządzanie organizacjami, PWSZ Krosno. 255 – 285.*

[6]*Filip, P. 2011. Rentowność i efektywność działania przedsiębiorstwa, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, no. 182, Wrocław, 152.*

makes it possible to assess performance and forecast the financial impact of the production and decisions made. The break-even point is the volume of production and sales that allows costs to be covered but does not yet generate a profit.

The break-even point is expressed in terms of volume, meaning such a level of production that fully covers the company's costs, and in terms of value, meaning such a value of sales that fully covers the company's costs[7].

The break-even point for production can be retrospective in nature and result from an analysis of the costs incurred, the consumption of resources and their utilization, and prospective in nature, enabling decisions to be made with different time horizons. It can also be set for multi-assortment production.

Full cost accounting, which is mainly used to calculate the unit cost of a product, can also be used to assess the profitability of production. It is based on costs already incurred and can be used to determine profitability, valuing inventories of finished products and semi-finished products produced and not yet sold.

However, this method has several disadvantages, which include that it distorts the valuation of the same products and services according to the degree of utilization of the production potential and does not reflect the actual cost processes and the causal relationships between the production process and costs[8].

Therefore, for the day-to-day management of a company in the short term, variable costing is much better. It is based on the separation of costs into fixed and variable costs. A feature of variable costing is that not only the costs of direct production, but also the costs of auxiliary departments are aggregated according to their nature of variability[9].

The strength of variable costing is that it provides information on which decisions regarding the regulation of production volumes, stock levels, the setting of the break-even point and the price floor can be based. Among the advantages of variable costing, the elimination of the impact of stock variation on the financial result and the activation of fixed costs in unsold production are also indicated.

Therefore, variable costing is widely used in various areas of a company's operations, e.g. cost level planning, break-even analysis, price floor determination and product costing and inventory valuation. The costing model used determines

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[7]*Walińska, E., Gad, J. 2016. Rachunkowość małych i średnich przedsiębiorstw, [w:] R. Lisowska, J. Ropęga (eds.) Przedsiębiorczość i zarzadzanie w małej i średniej firmie. Teoria i praktyka. Wydawnictwo Uniwersytetu Łódzkiego, Łódź, 166-167.*
[8]*Ibid, 156.*
[9]*Brzęczek J., 2018. Rentowność produkcji, [in:] Lenik, P. (ed.), Zarządzanie organizacjami, PWSZ Krosno. 255 – 285.*

the level of the financial result.

The financial result will be identical using the full costing model and the variable costing model only if sales in each period equal production (there will be identical inventories of finished goods at the beginning and end of the analyzed period). Profit, on sales (Z) when applying the variable costing method can be calculated according to the following formula:

$$Z = \sum_{i=1}^{n} x_i p_i - \left(\sum_{i=1}^{m} z_i x_i + \sum_{j=1}^{k} s_j\right) \quad (1)$$

***Source:***[10]

Where:
pi - selling price of the i-th product (in the general case may be a function of quantity)
xi - quantity of output in natural or contractual units
zi - unit variable cost of the i-th product
n - number (assortment) of products, goods or services
m - quantity of company resources
Sj - sum of fixed costs.

The methods presented are static in nature and their results are subject to errors due to the assumptions made, so the aim of this article is to develop an author's method of using variable costing as a tool for assessing the profitability of a manufacturing investment for a textile and clothing start-up.

## 2. Research Methodology

The lack of publicly available practical solutions for calculating production profitability is the main reason for initiating research according to the following methodology:

a) identification of the sales price of similar products available on the market based on competition analysis
b) identification of fixed assets as initial costs of starting a business that must be spent on the start-up
c) identification of fixed costs
d) calculation of the amount for materials (variable costs). Leverage on the preProfit factor. Calculation algorithm.
e) calculation of the unit cost of producing products A and B
f) identification of production volume
g) identification of profitability of textile production

[10]*Ibid;*

## 3. Research Results and Discussion

Practical application of the variable costing method to calculate the profitability of a manufacturing investment is shown below.

The example concerns a textile and clothing start-up commencing its production activities. The aim of this venture is to achieve a profit of circa above 100,000 PLN in the first year of operation from the production of two textile products of differentiated quality (product 1 - standard, product 2 - high quality).

a) The prices of the products were estimated on the basis of an analysis of the average price of about 5 competing products and the average price proposed by the survey respondents (Table 1). The final price of product 1 is 100 PLN and product 2 is 250 PLN.

***Table 1.*** *Estimated selling price of products 1 and 2 in PLN*

| **Operations** | **Product 1** | **Product 2** |
|---|---|---|
| Average price - competition analysis | 115.00 | 295.00 |
| Average price - market analysis - survey | 125.00 | 330.00 |
| Average price | 120.00 | 312.50 |
| Average price reduced by 20% (to make the price competitive on the market) | 100.00 | 250.00 |
| **Selling price** | **100.00** | **250.00** |

***Source:*** *Author's calculations.*

b) The planned start-up will be managed by two owners - graduates of the Faculty of Textiles at the Technical University of Lodz (Łódź), who will also be the only employees of the company in the first year. In assessing the effectiveness of this venture, the analysis began by planning the initial costs, which included fixed assets (Table 2) on a 5-year basis.

***Table 2.*** *Planned fixed assets*

| | **Year 1** | **Year 2** | **Year 3** | **Year 4** | **Year 5** |
|---|---|---|---|---|---|
| Computer 1 | 5 000.00 | | | | |
| Multifunction device | 4 500.00 | | | | |
| Furniture set | 10 000.00 | | | | |
| 4-thread overlock | 3 700.00 | | | | |
| Underwear buttonmaker | 5 000.00 | | | | |
| Underwear hole punching machine | 8 500.00 | | | | |
| Ploter | 26 500.00 | | | | |
| System CAD | 11 600.00 | | | | |
| Lockstitch machines | 4 000.00 | | | | |
| Computer 2 | | 4 000.00 | | | |
| Lockstitch machines | | 4 000.00 | | | |

| | | | | | |
|---|---|---|---|---|---|
| 5-thread overlock | | 3 900.00 | | | |
| Scaner | | 4 000.00 | | | |
| Bolt lock | | | 10 000.00 | | |
| 4-thread overlock | | | 3 700.00 | | |
| Furniture set 2 | | | 8 000.00 | | |
| Car | | | | | 15 000.00 |
| Industrial iron | 3 500.00 | 3 500.00 | 3 500.00 | 3 500.00 | 3 500.00 |
| **Total** | **82 300.00** | **19 400.00** | **25 200.00** | **3 500.00** | **18 500.00** |

***Source:*** *Author's calculations.*

c) In the next step, the remaining material and energy costs in the office associated with the planned activities were estimated on a 5-year basis (Table 3). Fixed costs are assumed to increase by approximately 4% per year.

***Table 3.*** *Materials and energy costs in the office*

| **Operations** | *Year 1* | *Year 2* | *Year 3* | *Year 4* | *Year 5* |
|---|---|---|---|---|---|
| Electric energy costs in the office | 2 400.00 | 2 496.00 | 2 595.84 | 2 699.67 | 2 807.66 |
| Water consumption costs | 600.00 | 624.00 | 648.96 | 674.92 | 701.92 |
| Office supplies costs | 2 900.00 | 3 016.00 | 3 136.64 | 3 262.11 | 3 392.59 |
| Fuel costs for the car | | | | | 5 000.00 |
| Costs of cleaning products | 1 000.00 | 1 040.00 | 1 081.60 | 1 124.86 | 1 169.86 |
| **Selling price** | **6 900.00** | **7 176.00** | **7 463.04** | **7 761.56** | **13 072.02** |

***Source:*** *Author's calculations.*

The salaries including surcharges of the two owners were then estimated at PLN 115,785.60 in the first year, PLN 120,417.02 in the second year, PLN 125,233.70 in the third year, PLN 130,243.05 in the fourth year and PLN 135,452.78 in the fifth year, as well as other fixed costs (Table 4) and costs related to the purchase of services (Table 5).

***Table 4.*** *Other fixed costs*

| **Other fixed costs** | | | | | |
|---|---|---|---|---|---|
| promotional costs (signboard, leaflets) | 1 050.00 | 1 092.00 | 1 135.68 | 1 181.11 | 1 228.35 |
| costs of telecommunications services | 200.00 | 208.00 | 216.32 | 224.97 | 233.97 |
| legal costs | 600.00 | 624.00 | 648.96 | 674.92 | 701.92 |
| costs of business trips - fairs | 5 000.00 | 5 200.00 | 5 408.00 | 5 624.32 | 5 849.29 |
| cost of heating the building | 6 000.00 | 6 240.00 | 6 489.60 | 6 749.18 | 7 019.15 |
| training costs | 3 500.00 | 3 640.00 | 3 785.60 | 3 937.02 | 4 094.50 |
| costs of work and protective clothing | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | |
|---|---|---|---|---|---|
| costs of maintaining the store's website (domain fee, administrator fee, etc.) | 6 200.00 | 6 448.00 | 6 705.92 | 6 974.16 | 7 253.12 |
| operating costs of machines and devices | 4 000.00 | 4 160.00 | 4 326.40 | 4 499.46 | 4 679.43 |
| prototype costs | 1 443.24 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Total** | **27 993.24** | **27 612.00** | **28 716.48** | **29 865.14** | **31 059.74** |

***Source:*** *Author's calculations.*

***Table 5.*** *Purchase of services*

| **Operations** | *Year 1* | *Year 2* | *Year 3* | *Year 4* | *Year 5* |
|---|---|---|---|---|---|
| premises for rent 150 sq. m. | 18 000.00 | 18 720.00 | 19 468.80 | 20 247.55 | 21 057.45 |
| postal and courier services | 1 440.00 | 1 497.60 | 1 557.50 | 1 619.80 | 1 684.60 |
| accounting office costs | 6 000.00 | 6 240.00 | 6 489.60 | 6 749.18 | 7 019.15 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **Selling price** | **18 000.00** | **18 720.00** | **19 468.80** | **20 247.55** | **21 057.45** |

***Source:*** *Author's calculations.*

In summary, the amount of fixed costs for the planned textile and clothing start-up in the first year of operation is 259,862.08 PLN.

d) The value of fixed assets and fixed costs in the first year of operation will be the basis for the pre-profit factor and the amount for materials will be calculated according to the formula:

$$\text{preProfit} = \frac{M + P}{P} \tag{2}$$

where

$$\text{preProfit} > 1; \text{preProfit} < \infty \tag{3}$$

M-amount for materials
P- initial expenditure costs (fixed assets) and fixed costs for first year. After conversion, the starting amount for materials M is:

$$M = (\text{preProfit} * P) - P \tag{4}$$

The amount for materials M (Variable costs) is calculated using the above-defined preProfit coefficient, which operates proportionally on initial expenses (fixed assets) and fixed costs what is showed in Table 6. When expenses, e.g., salaries,

increase, the amount spent on production materials increases through the preProfit factor. It is a predicate of profit.

Conservatively, this works like this: to produce more in order to cover and earn on the increased initial and fixed costs of the first period of production. The amount for materials is the same in a 5-year plan and is shown in Table 7 based on calculation in the first year. Ultimately included in the costs in the profit and loss statement shown in Table 12.

Calculating the amount M for materials involves adjusting the preProfit factor so that the profit on the income and loss statement is circa on planned level, for the fixed assets and selling price of each product set earlier. In this example it was three times changed (1.3; 1.75; 1.8) until the profit was satisfactionary.

***Table 6.*** *Calculation of the amount for materials using the preProfit factor*

| **T (preProfit factor)** | |
|---|---|
| preProfit | 1.80 |
| Total sum for whole first year (the amount of fixed costs* preProfit factor) | 467 751.75 |
| amount for production materials M (Variable costs) | 207 889.67 |

***Source:*** *Author's calculations.*

***Table 7.*** *Calculated amount for production in the 5-year plan*

| **Variable costs** | | | | | |
|---|---|---|---|---|---|
| | *Year 1* | *Year 2* | *Year 3* | *Year 4* | *Year 5* |
| Materials for production (calculated on the basis of fixed costs according to **preProfit** factor), including: Quantity of purchased material, raw materials, semi-finished products, goods for production; | 207 889.67 | 207 889.67 | 207 889.67 | 207 889.67 | 207 889.67 |
| **Total** | **207 889.67** | **207 889.67** | **207 889.67** | **207 889.67** | **207 889.67** |

***Source:*** *Author's calculations.*

e) Planning of the unit cost of products 1 and 2. The owners of the future textile company determine the cost estimate, i.e. the unit production cost of products 1 and 2. They try to plan for bulk purchase and convert the materials into running meters needed to sew the textile products resulting from their expertise for the designs of the two textile products. Table 8 show the unit costs of product 1 and 2 respectively.

***Table 8.*** *Unit costs of product 1 and 2*

| No. | Products/operations | unit of measure | amount | unit cost | cost |
|---|---|---|---|---|---|
| **1.** | **Product 1** | | | | |
| | **Labour** | man-hour | 2 | 0 | 0,00 PLN |
| | **making Hem** | | | 0 | |
| | **Main materials (fabric, knitwear, etc.)** | | | | |
| | Fabric | meters | 1.3 | 23.00 PLN | 29.90 PLN |
| | **Tailoring accessories (fabric, knitwear, etc.)** | | | | |
| | Glue insert | meters | 0.4 | 4.00 PLN | 1.60 PLN |
| | Tailoring accessories | | | | |
| | Buttons | pieces | 6 | 0.20 PLN | 1.20 PLN |
| | Threads | kilo meters | 0.5 | 4.00 PLN | 2.00 PLN |
| | | | | | |
| | **Unit cost of electricity for machines** | 1kW | 1 | 0.70 PLN | 0.70 PLN |
| | **Total** | | | | 35.40 PLN |
| **2.** | **Product 1** | | | | |
| | **Labour** | man-hour | **2** | **0** | 0.00 PLN |
| | | | | | |
| | **Main materials (fabric, knitwear, etc.)** | | | | |
| | Fabric | meters | 1.21 | 80.20 PLN | 97.04 PLN |
| | **Tailoring accessories (fabric, knitwear, etc.)** | | | | |
| | Glue insert | meters | 0.3 | 4.00 PLN | 1.20 PLN |
| | Tailoring accessories | | | | |
| | Buttons | pieces | 1 | 1.20 PLN | 1.20 PLN |
| | Threads | kilo meters | 0.5 | 4.00 PLN | 2.00 PLN |
| | ZIP | pieces | 1 | 5.00 PLN | 5.00 PLN |
| | **Unit cost of electricity for machines** | **1kW** | **2** | 0.70 PLN | 1.40 PLN |
| | **Total** | | | | 107.84 PLN |

***Source:*** *Author's calculations.*

f) Identification of production volumes. The preProfit factor (profit predictor) establishes an amount for materials, this amount allows to be divided by the percentage division into product 1 and 2 respectively (in table 9 a division of 5% to 95% for product 1 and 2) and calculates the number of pieces of product 1 and 2 knowing the pre-planned unit production cost as:

$$\mathrm{AOP1} = \frac{\text{amount per product 1}}{\text{unit costs of product 1}} \tag{5}$$

where

AOP1 is the number of units of product 1 and respectively AOP2 is the number of units of product two.

***Table 9.*** *Calculated number of units of product A and B according to the distribution of the material quota for the production of product A and B, 95% and 5% respectively*

| **Production volume** | | |
|---|---|---|
| Amount per product | Division percentage of the amount for materials for product 1 and 2 | |
| amount per product 1 | 5% | 10,394.48 PLN |
| amount per product 2 | 95% | 197,495.18 PLN |
| **Unit cost of production** | | |
| unit costs of product 1 UC1 | 35 PLN | |
| unit costs of product 2 UC2 | 108 PLN | |
| **Volume, number of a given product** | | |
| amount of product 1 AOP1 | 293 | pieces |
| amount of product 1 AOP2 | 1831 | pieces |

***Source:*** *Author's calculations.*

g) Identification of the profitability of textile production

Revenue for the first year is calculated as:

$$\text{revenue for product 1} = \text{Selling price of product 1} * \text{amount of product 1 AOP1} \quad (6)$$

Similarly, revenue for the second product:

$$\text{revenue for product 2} = \text{Selling price of product 2} * \text{amount of product 2 AOP2} \quad (7)$$

Revenues for subsequent years are calculated with a 3% percentage increase in revenues year on year. The formula below shows the calculation of revenues for the second year.

$$\text{revenue for second year} = \text{revenue for first year} + \text{revenue for first year} * 3\% \quad (8)$$

***Table 10.*** *Income from planned sales*

| **Revenue**<br>**Sale of products and services** | | | | | |
|---|---|---|---|---|---|
| | *Year 1* | *Year 2* | *Year 3* | *Year 4* | *Year 5* |
| Product 1 - e.g. shirt | 29 300.00 | 30 179.00 | 31 084.37 | 32 016.90 | 32 977.41 |

| | | | | | |
|---|---|---|---|---|---|
| Product 2 - e.g. shirt superior | 457 750.00 | 471 482.50 | 485 626.98 | 500 195.78 | 515 201.66 |
| | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| **suma** | **487 050.00** | **501 661.50** | **516 711.35** | **532 212.69** | **548 179.07** |

***Source:*** *Author's calculations.*

Having the unit costs as well as the selling price, let us calculate the margin and mark-up what is showed in Table 11.

***Table 11.*** *Calculated profit percentage margin and profit percentage mark-up for the product 1 and 2*

| Product | Unit Cost | Price planned market | markup | margin |
|---|---|---|---|---|
| 1 | 35.40 PLN | 100.00 PLN | 182% | 65% |
| 2 | 107.84 PLN | 250.00 PLN | 132% | 57% |

***Source:*** *Author's calculations.*

The profit markup is calculated using the following formula:

$$profit\ markup\ (narzut) = \frac{selling\ price - UC}{UC} \tag{9}$$

where
UC – unit cost of production
Profit margin is calculated as:

$$profit\ margin\ (marża) = \frac{selling\ price - UC}{selling\ price} \tag{10}$$

The whole is summarized in the income statement in Table 12. The planned profit for the first year meets the expectations of the company's owners and is at the level of the target of no less than 100,000.00 PLN after deduction of costs and tax.

***Table 12*** *Profit and loss statement with "Materials and energy + costs for materials"*

| ***Profit and Loss Account*** **FORECAST** | | | | | |
|---|---|---|---|---|---|
| | *Year 1* | *Year 2* | *Year 3* | *Year 4* | *Year 5* |
| A. Total revenues, including: | 527 050.00 | 501 661.50 | 516 711.35 | 532 212.69 | 548 179.07 |
| Sale of products and services | 487 050.00 | 501 661.50 | 516 711.35 | 532 212.69 | 548 179.07 |
| Sale of materials and goods | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |

| | | | | | |
|---|---|---|---|---|---|
| Other income (e.g. commissions) | 40 000.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| B. Total costs: | 407 599.72 | 416 323.50 | 427 930.01 | 435 487.17 | 451 346.63 |
| Amortization | 16 460.00 | 19 640.00 | 23 980.00 | 23 980.00 | 26 980.00 |
| Materials and energy + costs for materials | 214 789.67 | 215 065.67 | 215 352.71 | 215 651.23 | 220 961.69 |
| Remuneration and derivatives | 115 785.60 | 120 417.02 | 125 233.70 | 130 243.05 | 135 452.78 |
| Purchase of services | 25 440.00 | 26 457.60 | 27 515.90 | 28 616.54 | 29 761.20 |
| Financial costs (e.g. interest) | 7 131.21 | 7 131.21 | 7 131.21 | 7 131.21 | 7 131.21 |
| other costs | 27 993.24 | 27 612.00 | 28 716.48 | 29 865.14 | 31 059.74 |
| **C. Gross income (loss) (A-B)** | **119 450.28** | **85 338.00** | **88 781.34** | **96 725.51** | **96 832.44** |
| **D. Income tax** | **14 334.03** | **10 240.56** | **10 653.76** | **11 607.06** | **11 619.89** |
| **E. Net profit (C-D)** | **105 116.24** | **75 097.44** | **78 127.58** | **85 118.45** | **85 212.55** |

***Source:*** *Author's calculations.*

## 4. Conclusions, Proposals, Recommendations

The presented implementation of variable costing method to calculate the profitability of a production investment allows the profit of a production plan to be calculated for two products. The method is based on variable costing method with leverage of preProfit factor on fixed assets and fixed costs.

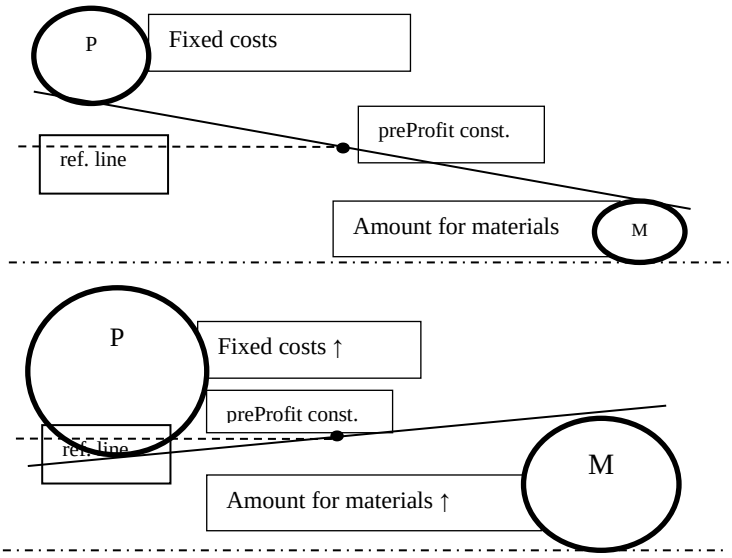
The calculated costs for production materials are correlated with fixed assets at the beginning of the investment and fixed costs for the first year and linked with the leverage of the preProfit factor. By changing the unit production cost or the preProfit factor or the selling price, the profit for the first year can be determined.

The method is iterative, as the preProfit factor needs to be adjusted to arrive at a satisfactory return on investment (profit and loss account position). On the other hand, not only the limit on increasing the preProfit factor is the amount of money needed to finance such an investment but also time to manufacture the planned products in year man-power abilities. This method could be used in multi-asset production.

Visualization of the leverage of the const preProfit factor to calculate the amount for materials with an increase in fixed costs is shown in Figure 1. In the Figure 1 we see an increase in the size of the circle corresponding to an increase in fixed costs with a const pre-profit factor. The pre-profit lever immediately increases the

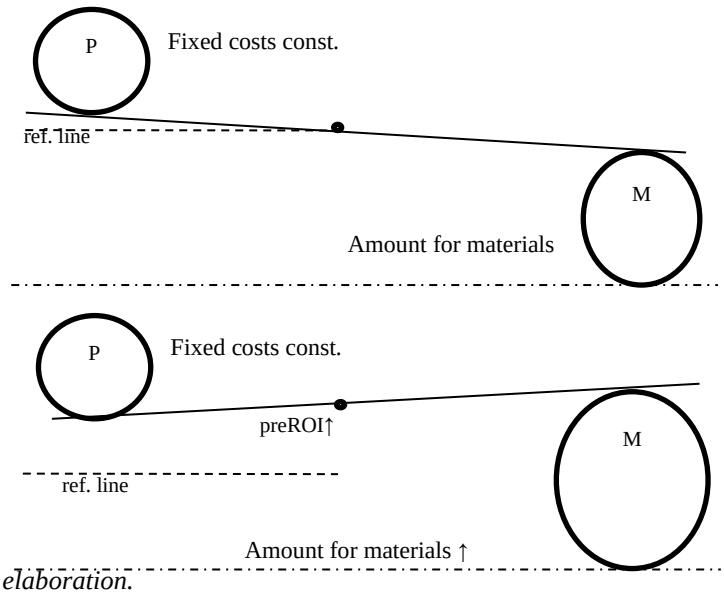
amount for materials. The dashed line is the reference line to the value of the preProfit factor.

***Figure 1. I**ncrease in fixed costs P with a const preProfit factor*




***Source:** Author's elaboration.*

***Figure 2. I**ncrease of the preProfit factor with const fixed costs P (fixed assets)*




***Source:** Author's elaboration.*

Visualization of the leverage of the increase of preProfit factor to calculate the amount for materials with const fixed costs is shown in Figure 2. In Figure 2 we

see an increase in the size of the circle corresponding to an increase amount for materials with a const in fixed costs. The preProfit lever immediately increases the amount for materials. The dashed line is the reference line to the initial value of the preProfit factor.

The future work is to optimize the calculations to achieve the precise assumed profit with one go while allowing the selling price, unit cost function to vary within the assumed range using for example Solver.

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