

STOCKS MANAGEMENT - A MANAGERIAL APPROACH

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***Abstract:** Stocks are essential for sales and sales are essential for obtaining profit. The inefficient management of stocks can lead to the ownership of surplus stocks, which in turn leads to a low rate of return on invested capital. There for, in this paper we try to present a few essential elements regarding the effective management of stocks for the financial management of enterprises operating in the current environment characterized by continuous change, innovation and uncertainty.*

***Keywords:** stock, cost, capital cost, efficiency, optimal stock*

1. Introduction

Stocks are essential for sales and sales are essential for obtaining profit. Usually the inventory control does not fall in the financial department managers direct tasks. In the directly productive units, the production department staff is in charge of stock control and in the retail selling units the control is achieved by acquisition agents. However, the manager of the finance department should be concerned about stock levels, as it has, among other things, the responsibility of following all the factors that influence the overall profitability of the company; since, in general, inventories amounting to 10-15% of total asset value, a lack of inventory control will negatively impact the company's profitability. The inefficient management of stocks can lead to ownership of surplus stocks, which in turn leads to a low rate of return on invested capital. Stock management also has effects on the numeral conversion cycle, the stock conversion cash cycle being the average time required to transform raw materials into finished products and then selling these last. The higher amount held in stocks gets bigger, the longer the period of conversion of stocks, resulting in a longer numeral conversion cycle and an important need for external funds.

2. Overview of stock management

Stocks held by a firm can be grouped into three categories:

- ✓ **Raw materials** - their levels are determined by what is expected regarding the volume of production, seasonality of production, the possibility to call at any time on the sources

of supply with raw materials and the efficiency with which the supply and production is organized;

- ✓ **The unfinished production** - its level being influenced by the period of time required for the full production process (time elapsed between the time of introduction of raw material in the production process and the finished product completion time). The rate of rotation of unfinished production can be increased if the production period decreases especially by improving the engineering techniques, so that the manufacturing process can become faster;
- ✓ **Finished goods** –the level of this type of stock is influenced by the volume of production and sales.

The amount of stocks depends on the sales figures, but at the same time, it must be purchased before the sales take place. Managers should maintain an optimum level of stocks, also taking into account the benefits of low investment in stocks and any costs arising from these minimum stocks.

To obtain an optimal point, managers must establish three quantitative targets and they must be based on answers to the following questions:

- (1) What should the stocks level be?
- (2) What is the amount of stock to be ordered (produced) at some point "in time"?
- (3) When is time to order (produce) new stock?

The **main factors** for the required investments in stocks are:

- The expected level of sales;
- The duration of the production process determined by its technical characteristics;
- Durability compared to the perishability of finished products;
- The ease of supply or the ease of replacing stocks;
- Consequences that occur when you do not have available at one time particular types of stocks.

These factors vary greatly from one economic branch to another. For example, the stocks from milk-producing companies are far more lower than the stocks of companies manufacturing machines because, in the case of the last company, the production process is long and laborious.

In the case of a store that sells vegetables and fruits the level of stocks will be lower due to the high degree of perishability of goods, while in the case of a store that sells home appliances products the stock size will be increased because the goods are durable.

3. Determination of stock investment

To determine the optimal level of stocks the **working stock** should be sized according to the production and sales, this stock must meet the requirements at a time. At this you add the safety stock, a stock required in situations where predictions are exceeded (demand is higher than expected). The level of **safety stock** is determined taking into account the additional costs for the holding stocks which must be compared with the costs of the lost sales due to the lack of required or needed stock components. **The total level of stocks** is the sum of the working stock and safety stock, this level varies according to the time when the recording is done, meaning before or after the delivery of the ordered stock.

When making a loan, you are buying raw materials for production is often cheaper to buy in large quantities, than to buy in small quantities, weekly or daily because otherwise you will incur substantial administrative costs (also referred to as cost control), or the risk of not having sufficient raw material can appear in a day when the demand is higher than predicted or there is a delay in the daily delivery of raw materials; this could result in the losses of sales in the present and due to the deterioration company image, to losses of sales in the future. However, the purchase or production of large amounts of goods more than necessary increases the cost (**costs of storage or holding**) and the company's exposure to risk and to stay with obsolete or damaged stocks if the demand for the product falls or risks exposure to unfavorably price fluctuations. In addition to all these types of costs also appears a specifically related cost to blocking the financial funds in investments stocks – is the cost of lost earnings that could generate money invested in stocks – called **blocking cost** or **opportunity cost** of funds. The higher the interest rates, the higher the costs of blocked funds. When the interest rates are high, there is significant pressure for reducing the inventory value. To determine the optimal or desired level of stocks there must be a balance between the incurred costs when there are large stocks – opportunity and storage costs – and the cost incurred when stocks are low – command cost.

But before proceeding to determine the optimal level of stocks there should be an analysis of some of the decisions made on stocks that a manufacturing firm has. For exemplification we used data from the balance sheet of S.C. Cuț Company SRL which manufactures and sells women's clothing. It is assumed that the S.C. Cuț Company S.R.L. starts at a value of stocks of 15,000 million lei, financed from the share capital. The initial balance sheet is as follows (in million lei):

Assets		Liabilities	
Raw material	600	Share capital	3500
Unfinished production	700		
Finished goods	2200		
Total assets	3500	Total liabilities	3500

In this situation, as a result of an analysis made on the demand for the holiday season products, the company expects an increase on the seasonal sales of 5.500 million lei and will order additional stocks of raw materials, financing the purchase through a bank loan:

Assets		Liabilities	
Raw material	600	Share capital	3500
Unfinished production	700	Bank loan	5500
Finished goods	7700		
Total assets	9000	Total liabilities	9000

If all goes as estimated sales will be made, stocks will turn into cash, the bank debt will be honored and the company will make a profit. The balance sheet after this favorable season might look as follows:

Assets		Liabilities	
Raw material	600	Share capital	3500
Unfinished production	700	Accumulated profits	500
Finished goods	2200		
Current account	500	Bank loan	0
Total assets	4000	Total liabilities	4000

The company is now in a very liquid position and is ready to start a new season. In the situation, when the season would not be favorable, and sales were weak, the balance sheet in early autumn would look like this:

Assets		Liabilities	
Raw material	600	Share capital	3500
Unfinished production	700	Bank loan	3600
Finished goods	5800		
Total assets	7100	Total liabilities	6300

If the bank insists that the debt to be honored and wants cash, not goods the company must find a solution for a debt reduction. Lets assume that the company is forced to cut prices to sell and generate cash to pay off the debt to the bank. The result will be:

Assets		Liabilities	
Raw material	600	Share capital	(100)
Unfinished production	700	Bank loan	3600
Finished goods	2200		
Total assets	3500	Total liabilities	3500

Now the company is in bankruptcy. The Bank receives 3,500 million and records a loss of 100 million lei. The shareholders must bear the losses, and the company cannot continue business.

A proper management of stocks requires close coordination between the departments of finance, production, supply and sales. The sales department has information about the market and customers, recent trends on purchase and beginning from that and given to the influence factors, predictions can be made about the sales figures, resulting in the stock requirements. Depending on the production capacity and the usage of the stock requirements determined in the sales department, the production manager makes the production planning and determines the necessary raw materials. Based on the necessary raw materials the purchasing department sends orders to suppliers.

4. Stock costs

The objective of stock management is to provide the needed stocks to achieve production quotas at a minimum cost. The inventory costs vary from company to company, from product to product and over time. The following table shows estimates for a directly productive medium company:

Stocks costs	
Estimated annual costs (%)	
I. Costs of holding stocks ('carrying costs')	
Cost of blocked capital	12,0%
Storage and handling costs	0,5%
Insurance costs	0,5%
Property Taxes	1,0%
Depreciation and obsolescence	12,0%
Total	26,0%
II. Costs related to ordering and receiving of stocks	
Cost of the order, including the organization of production	Varies
Shipping and handling costs	2,5%
III. Costs related to the lack of stocks ('stockout costs')	
Loss of sales	Varies
Loss of customer confidence	Varies
Disturbances of the production process	Varies

Note: These costs vary from company to company, from product to product and over time. The figures presented are estimates for a directly productive medium company. Where the costs vary so much that it is impossible to choose relevant figures, we simply specified "varies".

• Costs related to stocks holding

They grow in direct proportion to the average quantity of stocks held, and this average depends on the frequency with which an order is made.

$$\text{Stocks average} = A = \frac{Q}{2} = \frac{S/N}{2}$$

Where:

- Q- ordered quantity
- S- product units
- N- number of anual orders

The average value of stocks (The average investment in stocks) = P*A

Where:

- P- purchase price per unit of stock

The need for investment in stocks can be reduced by more frequent orders, but must take into account the cost of control, which in the case of frequent orders will be higher.

Example:

It is assumed that the S.C. Cuț Company S.R.L. estimates for the coming year achieving a sales volume of S = 3,600 units of product, and that the sales will be evenly distributed throughout the period. In this case, stocks will decrease smoothly and gradually between the times of two consecutive orders. The purchase price per physical unit of stock is P = 1.200.000 lei. There is no availability early in the year and there will be no remaining stock at the end of the year.

Possible strategy applied for stocks: S.C. Cuț Company S.R.L. makes an order Q = 3,600 units from the very beginning of the year. Considering that the number of orders is N = 1, the average stock will have the following value:

$$A = \frac{Q}{2} = \frac{S/N}{2} = \frac{3.600/1}{2} = 1.800\text{units}$$

The initial stock will be 3,600 units and during the year the company will gradually reduce the value of the stock.

The average value of stocks will be:

$$P \cdot A = 1.200.000\text{lei} \cdot 1.800\text{units} = 2.160 \text{ million lei}$$

Similarly, S.C. Cuț Company S.R.L. could make two orders for stocks in a year and the average stock will be:

$$A = \frac{Q}{2} = \frac{S/N}{2} = \frac{3.600/2}{2} = 900\text{units}$$

The average value of stocks will be:

$$P \cdot A = 1.200.000\text{lei} \cdot 900\text{units} = 1.080 \text{ million lei.}$$

Conclusion:

It can be observed that by making more frequent orders, the average stocks held drops and with it the required investment in stocks drops.

• Capital costs

The cost of capital significantly influences the total cost of ownership. Total cost of ownership (TCO) is equal to:

$$TCO = (C) \cdot (P) \cdot (A),$$

Meaning the total percentage cost multiplied by stock investment.

Total percentage cost is determined as follows:

$$C = \frac{(t\% \cdot \text{Investing in stocks} + \text{storage cost} + \text{insurance costs} + \text{depreciation and obsolescence costs})}{\text{average stock investments}}$$

Where:

t%- Capital costs

Example:

It is assumed that S.C. Cuț Company S.R.L. uses 14% of the capital cost. Considering that N = 1, the investment in stock is 2.160 million, to hold the stock in which the company invested, the company will have to bear a cost of capital of 302.4 million lei. It is also assumed that:

TCO = 93 million lei (for spaces, utilities, safety);

Assurance costs = 30,6 mil. Lei;

Depreciation and obsolescence costs = 114 mil. Lei

The total costs incurred by the firm for an average stock holding of 2,160 million will be:

$$302,4 + 93 + 30,6 + 114 = 540 \text{ mil. lei}$$

The percentage cost will be:

$$C = 540/2160 = 0,25\% \text{ holding costs from average stock value}$$

or

$$TCO = (C)(P)(A) = (0,25)(1.200.000\text{lei})(1.800\text{unități}) = 540 \text{ mil. lei}$$

In the case when $N = 2$, $CTD = 270 \text{ mil. lei}$

Conclusion: the more the order frequency is higher the total cost of ownership will continue to decline due to lower average stock.

• Ordering costs

Unlike stocks holding costs which are variable and increase proportionally with the average stocks, the ordering costs of are fix (each order has the same cost). For example, the costs of placing and receiving an order, telephone calls, production, reception of the goods and delivery time for these orders by administrative personnel are fixed irrespective of the amount ordered, so this part of the total cost of inventory is a fixed cost unit of placing and receiving of orders, multiplied by the number of orders made.

This aspect should be taken into account when deciding what number of orders will be made, because you must find a balance between the investment in stocks by reducing the common orders and total order costs (TOC).

$$TOC = F * N$$

Where:

F - control unit fixed cost

N - number of orders

In the case of S.C. Cuț Company S.R.L. it is assumed that $F = 3.75 \text{ mil. lei}$, $S = 3.600$, $Q = 3.600$, the total order costs will be:

$$TOC = F * N = (F)(S/Q) = 3,75 * (3.600/3.600) = 3,75 \text{ mil.}$$

If the company would have made 9 orders $TOC = 3,75 \text{ mil} * 9 \text{ orders} = 33,75 \text{ mil. lei}$.

• **Total stock costs**

Total stock costs (TSC), result from the follow ecuation:

$$TSC=TCO+CTC= (C)(P)(A) + (F)(N)$$

or

$$TSC=(C)(P)(Q/2) + (F)(S/Q)$$

If S.C. Cuț Company S.R.L. orders 200 units 18 times per year the total cost of stocks will be:

$$TSC = 60mil + 67,5mil = 127,5 mil lei$$

or

$$TSC= (0,25) (1.200.000)(200) + 3,75 mil* 3600/200 = 127,5mil. Lei$$

5. The optimal ordered quantity from the perspective of the economic ordered quantity model

In order to determine the optimal order we must take into account the fact that certain costs increase with the growth of stocks – total ownership cost, while other costs decrease with the increase of stocks (this involves less frequent orders) – total ordering costs. The evolution of the two types of costs is illustrated in the following figure. By summing the ownership curve cost with the ordering cost curve results the total cost curve. The minimum point on the total cost curve is the **optimum quantity ordered** (fig. nr. 1).

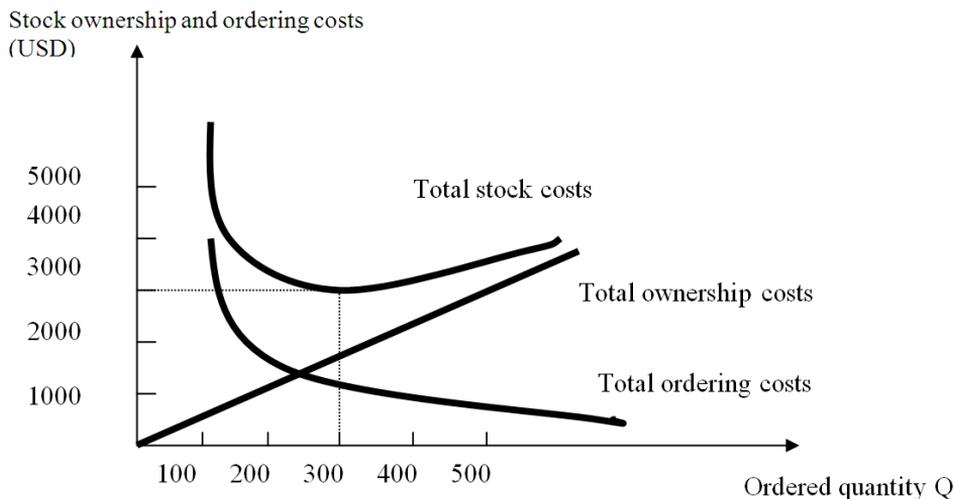


Fig. nr. 1. The optimum quantity ordered

The investment in stocks depends on the frequency of orders. If a company orders smaller quantities every day the average stock will be much lower than if the firm makes a single large order per year. After this, as shown in the figure, some costs supported by the firm increases with the increase of stocks. Orders for large quantities means higher average stock, interests for the blocked funds invested in stocks, the cost of insurance or obsolescence - these vary in direct proportion with the growth in stocks. At the same time, the control costs decrease with the increase of stocks which means less frequent orders and the possession of a larger quantity of stocks - because the cost of sending the order, the organization of production, handling and transport varies inversely with the number of stock orders made.

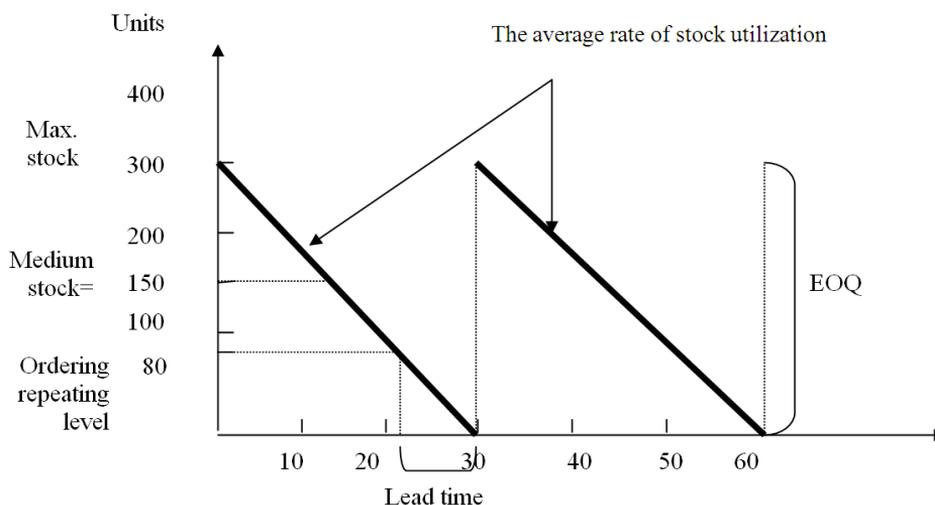


Fig. nr. 2. Stock situation when there is no safety shock

The calculation formula for the optimum ordered quantity in the economic ordering quantity model approach (“economic ordering quantity model-EQQ”) is the following:

$$EQQ = \sqrt{\frac{2 * (F) * (S)}{(C) * (P)}}$$

Where:

- EQQ- the optimum order quantity for each order
- F- fixed costs for sending and recording of an order
- S- annual sales figure in product units
- C- holding costs expressed as percentage of the value of stocks
- P- purchasing price that the company has to pay per unit of stock

The model is based on several assumptions:

1. The annual sales figure can be predicted accurately
2. Sales are evenly distributed throughout the year
3. Orders are fulfilled without any delay
4. F, C and P are fixed value, independent of the processes used to order stocks.

The time for repeating the orders

This graphic represents the stock situation when there is no safety stock.

The moment when to perform a new order is given by a certain level of stock, this level being:

$$\text{The stock level when repeating the order} = \text{Time to order} * \text{The average rate of stock utilization}$$

The time to order represents the period of necessary time from the moment you set the order until the moment you receive the ordered stocks, and *the average rate of stock utilization* represents the number or stock units necessary for the normal conduction of activities.

The stock need which must be available when you must renew the order is called *the repeated (renewed) stock levels order*; whenever the stock level reaches this value a new order will be made.

Transit goods - if you need to make a new order before the previous one is received the situation of *stocks of goods in transit* will appear. Transit goods are those that have been ordered but have not yet been received. A stock of goods will be in transit when the time between an order and a delivery is longer than the time between two successive orders. The solution lies in resolving the situation by deducting the stocks of goods in transit when calculating the stock level for reordering. Thus when repeating the order the stock level is calculated as follows:

$$\text{The stock level when repeating the order} = (\text{Time to order} * \text{The average rate of stock utilization}) - \text{Goods in transit}$$

Safety stocks

When one of the assumptions on which the economic ordered quantity model is based is not always valid, the need to set up a safety stock appears, which is added to the average stock to cover possible

variations in the level of demand, production or shipping stocks towards the firm.

In order to establish the safety stock levels we must take into account the following factors, factors that increases the safety stock:

1. The annual sales figures forecast cannot be accurately
2. Costs resulting from a "stock out" would be great (sales losses, loss of customer confidence);
3. Likelihood of delays in delivery of orders is higher.

The optimum safety stock decreases with increasing holding costs. The concept of safety stock is shown in the figure below (fig. nr. 3).

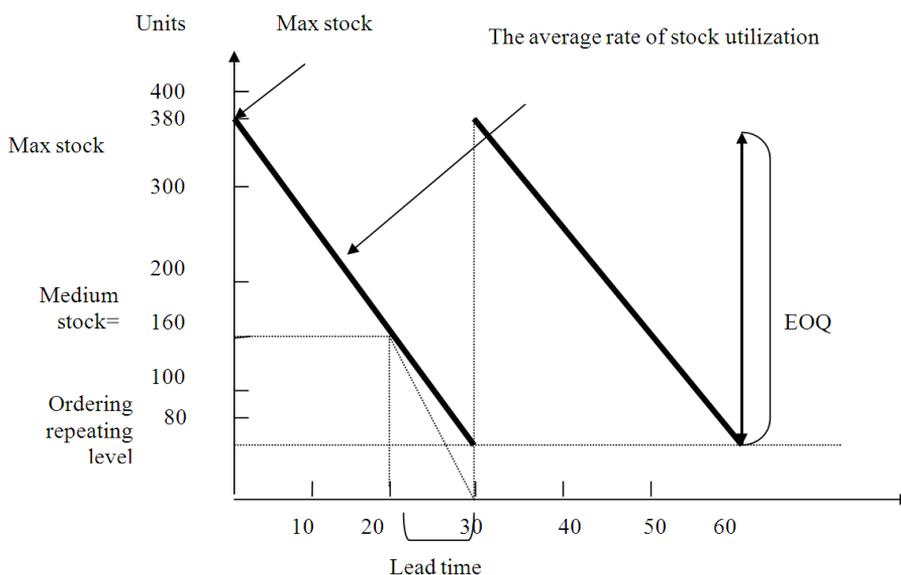


Fig. nr. 3. The situation of stocks resulted by including a safety stock

6. Conclusions

The quantity ordered or the optimal economic order quantity is useful for the stability which must controlled and the average stock level, where the pace of sales figures or the utilization rate is fairly estimated and the purchase prices and order costs are fixed. However, the rate of utilization can change in time and the purchase prices and ordering costs depend on the existent agreements between the seller and the buyer. Thus, a good inventory management system must react quickly to changes in these conditions. One of the systems used to monitor the stock usage rates and amend accordingly the optimal model order is the ABC system, according to which the firm analyzes each stock in terms of cost, frequency of use, severity of a "rupture stock" delivery time and other criteria. Types that are expensive, being

commonly used have a longer delivery time are placed in category A, those that are less important are placed in category B, and those are the least important are part of the category C. The management team controls frequently (monthly) rates of recent use, the stock situation and delivery times for all types falling under the category A, class B types are controlled and adjusted less frequently (quarterly) and the category C are checked and adjusted annually. Thus the resources available for the stocks control group are concentrated where they are most needed. An efficient management of stocks will result in a relatively high stock rotation rate, at holding negligible quantities of stocks of obsolete or damaged stocks, and very rare cases of stopping the production or loss of sales due to the lack of stock. All these will contribute in turn to obtain a big profit, a high rate of rotation of assets, a high rate of return on investment, and a better price of the company's shares on the market.

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