

**Assistant professor Grzegorz MICHALSKI, PhD**  
**Wroclaw University of Economics,**  
**Department of Corporate Finance and**  
**Value Management**  
**PL53345 Wroclaw, Poland**  
**E-mail: michalskig@ue.wroc.pl**

## **INVENTORY MANAGEMENT OPTIMIZATION AS PART OF OPERATIONAL RISK MANAGEMENT**

***Abstract:** The basic financial purpose of an enterprise is maximization of its value. Inventory management should also contribute to realization of this fundamental aim. The enterprise value maximization strategy is executed with a focus on risk and uncertainty. This article presents the consequences for the recipients firm that can result from operating risk that is related to delivery risk generated by the suppliers. The present article offers a method that uses portfolio management theory to chose the suppliers.*

***Keywords:** Corporate liquidity, firm value, delivery risk.*

**JEL Classifications: G39, G32, G11, M11, D81**

### **1. Introduction**

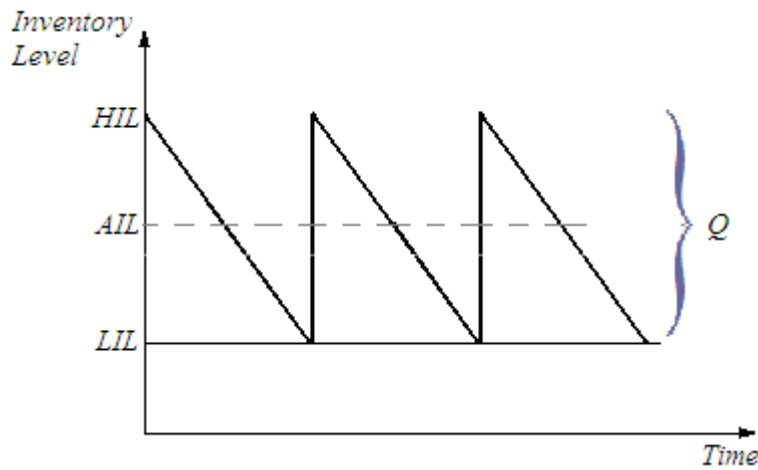
Current assets i.e. the sum of inventories, accounts receivable, short-term investment (cash and equivalents) and short term accruals [Mueller 1953; Graber 1948; Khoury 1999; Cote 1999] are for the firm collateral/protection against risk [Merton 1999, p. 506; [Ramniceanu 2007](#), Lofthouse 2005; p. 27-28; Parrino 2008, p. 224-233, Poteshman 2005, p. 21-60] and at the same time a investment [Levy 1999, p. 6; Reilly 1992, p. 6; Fabozzi 1999, p. 214]. Current assets level is a result of kind of production organisation [Baumol 1952, Beck 2005, Beranek 1963, Emery 1988, Gallinger 1986, Holmstrom 2001, Kim 1998, Kim 1978, Lyn 1996, Tobin 1958, Stone 1972, Miller 1966, Miller 1996, Myers 1998, Opler 1999]. As a result of it, the firm maintain adequate level of inventories and it is linked rather with operational management than with financial decisions [Peterson 1979, p. 67-69; Orlicky 1975, p.17-19; Plossl 1985, p. 421-424, [Fulga 2008](#), [Shah 2008](#), [Shah 2007](#)]. At the same time current assets are the result of active policy of gaining and holding the firm clients. [Bougheas 2009]. The firm offer should be suited to demand and character of the firm clients. The inventory levels are also a result of this policy.

The basic financial purpose of an enterprise is maximization of its value [[Morard 2009](#)]. Inventory management should also contribute to realization of this fundamental aim. Many of the current asset management models that are found in financial management literature assume book profit maximization as the basic financial purpose. These book profit-based models could be lacking in what relates

to another aim (i.e., maximization of enterprise value). The enterprise value maximization strategy is executed with a focus on risk and uncertainty. This article presents the consequences for the recipients firm that can result from operating risk that is related to delivery risk generated by the suppliers. The present article offers a method that uses portfolio management theory to chose the suppliers.

When entrepreneur chooses the tradesman, should concentrate his attention, not only at basic knowledge about the contracting party individual shape parameters (i.e. the tradesman financial situation), but also on information from inventory management models.

The Economic Order Quantity model of inventory management is used to mark the optimum size of delivery and to choose the cheapest deliverer [Coculescu 2007]. Both of these choices should guarantee minimization of total costs of investments in inventories.



**Figure 1. Economic Order Quantity Model**

where: *LIL* - Low Inventory Level (Precautionary Inventory Level); *AIL* – Average Inventory Level; *HIL* – High Inventory Level; *Q* – Order Quantity ( $Q = HIL - LIL$ ).

In Fig 1. it is shown the way the EOQ (and VBEOQ) model works. *Q* could be calculated as:

$$EOQ = Q_{opt} = \sqrt{\frac{2 \times P \times K_z}{C_a \times v}} = \sqrt{\frac{2 \times P \times K_z}{K_u}}, \quad (1)$$

where: *EOQ* – target (optimal) order quantity (*economic order quantity*), *P* – yearly demand for optimized inventories, *K<sub>z</sub>* – creating inventories costs (fixed cost of one order), *K<sub>u</sub>* – operating costs of maintaining inventories (without costs of maintaining safety/precautionary inventories *LIL*), *C<sub>a</sub>* – percentage rate of operating costs of maintaining inventories (with financial/alternative costs of capital and without costs of maintaining safety/precautionary inventories *LIL*), *v* – unit price (cost) of ordered inventories.

The percentage share of retaining the reserves comes from the fact that the costs of retaining the reserves increase proportionally to the level of reserves in the enterprise. Its share is a sum of the following costs: alternative (resulting from the possibility of their potential use somewhere else but without cost of capital financing firm), storage, logistics and internal transport within the factory of the reserves, insurance, decay.

$$TCI = \frac{P}{Q} \times K_z + \left( \frac{Q}{2} + z_b \right) \times v \times C_a, \quad (2)$$

where:  $TCI$  – total reserves costs,  $Q$  – magnitude of the part of delivery,  $z_b$  – the level of safety margin.

From the point of view of maximizing the enterprise value a part of delivery can be determined based on the formula for VBEOQ:

$$VBEOQ = \sqrt{\frac{2 \times (1-T) \times K_z \times P}{v \times (k + C \times (1-T))}} \quad (3)$$

where:  $k$  – alternative cost (equal to the enterprise financing capital [Dragota 2008, Triandafil 2008]),  $VBEOQ$  – optimal magnitude of single order from the point of view of maximizing the enterprise value,  $C$  – percentage rate of operating costs of maintaining inventories (without financial/alternative costs of capital and without costs of maintaining safety/precautionary inventories  $LIL$ ).

$$TCI = \frac{P}{Q} \times K_z + \left( \frac{Q}{2} + z_b \right) \times v \times C, \quad (4)$$

And:

$$VBEOQ_{* \#} = \sqrt{\frac{2 \times [(1-T) \times K_z^{\#} + K_z^*] \times P}{v \times (k + C^* + C^{\#} \times (1-T))}} \quad (5)$$

where:  $K_z^{\#}$  – tax-deductible creating inventories costs (fixed cost of one order),  $K_z^*$  – non-tax-deductible creating inventories costs (fixed cost of one order),  $C^{\#}$  – percentage rate of tax-deductible operating costs of maintaining inventories (without financial/alternative costs of capital and without costs of maintaining safety/precautionary inventories  $LIL$ ),  $C^*$  – percentage rate of non-tax-deductible operating costs of maintaining inventories (without financial/alternative costs of capital and without costs of maintaining safety/precautionary inventories  $LIL$ ).

And:

$$TCI = \frac{P}{Q} \times K_z^{\#} + \frac{P}{Q} \times K_z^* + \left( \frac{Q}{2} + z_b \right) \times v \times C^{\#} + \left( \frac{Q}{2} + z_b \right) \times v \times C^* \quad (6)$$

The problem, we are going to deal with in this paper is to select a counterpart amongst the suppliers in a situation where the parameters we know carry the risk resulting from deliveries out of schedule.

**Example 1.** Enterprise X producing special fireproof curtains uses raw material D-18. The annual demand for this raw material is 8000 m<sup>3</sup>. There are two suppliers (A and B) on the market offering similar delivery terms. The price of the material for both of them is 3000\$ for m<sup>3</sup>, the lead-time is 20 days, the cost of

inventory retaining is 38%, the cost of enterprise financing capital is 30%, effective tax rate is 19%, the costs of ordering is 200\$ and the cost of lack of reserves is 5000 000\$. The analysis of recommendation given by the companies showed that both suppliers were not equally reliable. Supplier A was nearly perfect, supplier B often did not deliver on time, he happened to show up 4 days before the agreed date, but equally often used to come 8 days later.

Based on the gathered data it was estimated the standard deviation of the delivery time in case of supplier A was 4 days, and for supplier B 6 days. In order to evaluate who is more reliable it is necessary to determine the safety margin for supplier A and then for supplier B. The next step is to check the impact of suppliers risk on the enterprise value. We assume that the enterprise in order to estimate the optimal order magnitude uses the *VBEOQ*. model

$$VBEOQ_A = VBEOQ_B = \sqrt{\frac{2 \times (1 - 0.19) \times 200 \times 8000}{3000 \times (0.3 + 0.38 \times (1 - 0.19))}} = 37.7 \text{ m}^3$$

Differences in reliability of deliveries have a great impact on different levels of safety margins required for suppliers A and B. For this purpose the following formula is used [Piotrowska 1997, 57]:

$$Z_b = \sqrt{-2 \times s^2 \times \ln \frac{C \times Q \times s \times v \times \sqrt{2\Pi}}{P \times K_{bz}}} \quad (7)$$

where:  $s$  – standard deviation for reserves usage,  $K_{bz}$  – cost of lack of inventory reserves.

In order to use the formula it is necessary to exchange the deviation of delivery time to deviation of raw material use. It is known average daily use is  $8000/360 = 22.2 \text{ m}^3$ . Therefore 4 days deviation for delivery date is equal to deviation of use equal to  $88.8 \text{ m}^3$ . Therefore, for such a situation the safety margin will be equal to:

$$Z_A = \sqrt{-2 \times 88.8^2 \times \ln \frac{0.38 \times 37.7 \times 88.8 \times 3000 \times \sqrt{2 \times 3.1416}}{8000 \times 5000 \text{ 000}}} = 362.63 \text{ m}^3.$$

In this case, the level of resources tied in the reserves is:

$$ZAP_A = 3000 \times \left( \frac{37.7}{2} + 362.63 \right) = 1144 \text{ 440 \$},$$

Next case reflects a situation in which the entrepreneur uses the services from company B. So the standard deviation will be  $6 \times (8000/360) = 133.3 \text{ m}^3$ .

Therefore reserves safety margin will be:

$$Z_B = \sqrt{-2 \times 133.3^2 \times \ln \frac{0.38 \times 37.7 \times 133.3 \times 3000 \times \sqrt{2 \times 3.1416}}{8000 \times 5000 \text{ 000}}} = 531 \text{ m}^3.$$

In this case the level of resources tied in the reserves is:

$$ZAP_B = 3000 \times \left( \frac{37.7}{2} + 531 \right) = 1649\,550 \$,$$

Comparing this magnitude to the level of reserves in situation where one would have used supplier A it is obvious that the increase of money resources tied in the reserves will be:

$$\Delta ZAP_{A \rightarrow B} = 1649\,550 - 1144\,440 = 505\,110 \$.$$

The last stage is to compare what impact the risk generated by the counterparts – suppliers has on the value of the enterprise. Therefore we estimate the level of total costs of reserves:

$$TCI_A = \frac{8000}{37.7} \times 200 + \left( \frac{37.7}{2} + 362.63 \right) \times 3000 \times 0.38 = 477\,328 \$,$$

$$TCI_B = \frac{8000}{37.7} \times 200 + \left( \frac{37.7}{2} + 531 \right) \times 3000 \times 0.38 = 669\,269 \$,$$

$$\Delta TCI_{A \rightarrow B} = 669\,269 - 477\,328 = 191\,941 \$.$$

Obtained results will be used for estimation of fluctuations in the enterprise value:

$$\Delta V_{A \rightarrow B} = -505\,110 + \frac{(-191\,941) \times (1 - 0.19)}{0.3} = -1023\,351 \$.$$

It is apparent that it is better to select counterpart – supplier A because selection of supplier B may result in destruction of enterprise value.

## 2. Suppliers' portfolio

Usually the enterprise's suppliers have materials and stock from the same source. It happens though, that their sources of supply are different and therefore the risk of deliveries related to individual suppliers is different. If such a thing occurs, it may be possible to use elements taken from the portfolio theory for supplier's evaluation. Sometimes the counterparts, who although may have virtues who exclude them from being suppliers of services in the beginning (like supplier B in example B), it may be possible that having considered the risk of the buyer it may turn out that on the contrary they decrease or stabilize the risk level.

Portfolio is a set of assets (for example in a non accountant sense: suppliers). The theory of portfolio management is based on the rate of advantages drawn from buying from particular supplier, informing about the relation of advantage generated by such a purchase to the outlay related to such a purchase [Ratiu-Suciu 2007].

The measure allowing the measurement of risk connected to costs from particular buyer may be defined as this variation:

$$V = \sum_{i=1}^m p_i \times (R_i - R)^2 \tag{8}$$

$$s = \sqrt{V} = \sqrt{\sum_{i=1}^m p_i \times (R_i - R)^2}$$

where:  $p_i$  – probability of occurrence of the given situation estimated from historical data.

In connection to the information about what potential advantages might be brought by giving a loan to a particular buyer, it is possible to estimate the variation coefficient: :

$$c = \frac{s}{R} \tag{9}$$

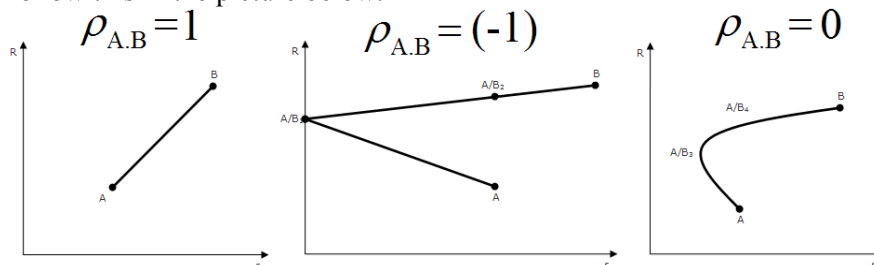
The next element is a correlation of benefits from purchase from particular supplier with benefits from this purchase from other suppliers. The correlation coefficient is usually the measure of such a correlation:

$$\rho_{1,2} = \frac{\sum_{i=1}^m p_i \times (R_{1i} - R_1) \times (R_{2i} - R_2)}{s_1 \times s_2} \tag{10}$$

where:  $\rho_{1,2}$  - correlation coefficient of benefits from purchase from the first and second supplier;  $R_1$  – expected rate of benefits from purchasing from first supplier;  $R_2$  – o expected rate of benefits from purchasing from the second supplier;  $s_1$  – standard deviation for the first supplier  $s_2$  – standard deviation for the second supplier;  $R_{1i}$  – possible rates of benefits from the purchases from the first supplier;  $R_{2i}$  – possible rates of benefits from the purchases from the second supplier;  $p_i$  – probability of occurrence of possible rates of benefits from supplies.

### 3. Portfolio of two suppliers (groups of suppliers).

**Example 2.** The enterprise uses two suppliers. On of them operates in sector A, the other represents sector B. The use of portfolio idea is useful when the correlation between the benefits from purchases from these suppliers is negative. We can follow this in the picture below.



**Figure 2. Relation between benefit and risk for portfolio of two suppliers at different correlation coefficients (equal to 1, (-1) or 0).**

**Case 1.** The correlation coefficient between benefits from purchases from supplier A and B equals to 1. The picture shows that at positive correlation near to 1 there is no possibility to seek advantages resulting from diversification.

**Case 2.** Correlation coefficient equal to  $-1$ . Ideal negative correlation. All possible portfolios at correlation coefficient equal to  $-1$  are contained on the broken line A-A/B<sub>1</sub>-A/B<sub>2</sub>-B. Points “A” and “B” represent single-components portfolios (eg. Using only supplier A). As we see, when we move away from point “A” and increase the share of deliveries performed by “B” the risk S decreases and benefits R increases. This happens until point A/B<sub>1</sub>. If this share is exceeded the risk of portfolio will increase together with the increase of income. As we see it is no substantiated to have only supplier A in the portfolio because at identical risk portfolio A/B<sub>2</sub> offers greater benefits.

**Case 3.** Correlation coefficient equals 0. It is a situation in which the benefits from supplier A and supplier B are not connected to each other. In this situation only partial risk reduction is possible. Reasonable entrepreneur should not select any of the portfolios of dues lying on A-A/B<sub>3</sub> arc, because it always possible to find more advantageous complement on A/B<sub>3</sub> – A/B<sub>4</sub> arc which at the same risk s yields higher benefits R.

#### 4. Using the elements of portfolio theory for selection of suppliers

Skilful construction of portfolio of two (groups) of suppliers may lead to a considerable reduction of risk. Inclusion of second component into single-component portfolio (which like in example 1 so far consisted of only one better supplier A and accepting deliveries from less risky supplier) nearly always leads to reduction of risk, sometimes even at simultaneous increase of benefit rate of portfolio.

**Example 3.** (Continuation of the previous example) After assessment of supplier A and B, the entrepreneur noticed that the delays connected to services provided by suppliers A and B are negatively correlated with each other, because their sources of supply are different when troubles with deliveries from first source can be expected, the other source does not pose a risk of such difficulties. Thanks to that we can expect a decrease of risk of non forward deliveries. Both suppliers acquire the material D-18 based on different technologies. Therefore one can expect that the impact of deliveries risk on the receiver can be decreased due suing the service of both suppliers, because the correlation of distribution of forward deliveries of suppliers A and B is negative and is equal to  $-0.56$ . The orders will be placed in quantities and frequency resulting from VBEOQ model. The orders will be realized by both suppliers: A and B equal shares of  $18,85 \text{ m}^3$ . In order to estimate new level of safety margin it is necessary to use the equation determining the total standard deviation:

$$s_T = \sqrt{s_A^2 + s_B^2 + 2 \times s_A \times s_B \times \rho_{A\&B}} \quad (11)$$

where:  $s_T$  – total standard deviation,  $s_A$  – standard deviation of the first distribution,  $s_B$  – standard deviation of the second distribution,  $\rho_{A\&B}$  – correlation coefficient between the first and second distribution.

Assuming that one-day deviation is equal to deviation of use equal to 11,1 m<sup>3</sup>; the safety margin is::

$$s_T = \sqrt{44.4^2 + 66.6^2 + 2 \times 44.4 \times 66.6 \times (-0.56)} = 55.6$$

$$Z_{A\&B} = \sqrt{-2 \times 55.6^2 \times \ln \frac{0.38 \times 37.7 \times 55.6 \times 3000 \times \sqrt{2} \times 3.1416}{8000 \times 5000 \ 000}} = 233.3 \text{ m}^3.$$

In this case the level of money resources tied in the reserves will be:

$$ZAP_{A\&B} = 3000 \times \left( \frac{37.7}{2} + 233.3 \right) = 756 \ 450 \ \$,$$

Comparing this magnitude to the level of reserves in a situation where we would have used supplier A only it is obvious that the increase of money tied in the reserves will be equal to:

$$\Delta ZAP_{A \rightarrow A\&B} = 756 \ 450 - 1144 \ 440 = (-387 \ 990) \ \$.$$

The last stage is to compare what impact the risk generated by the counterparts-suppliers has on the enterprise value. Therefore we estimate the total level of costs of reserves:

$$TCI_{A\&B} = \frac{8000}{37.7} \times 200 + \left( \frac{37.7}{2} + 233.3 \right) \times 3000 \times 0.38 = 329 \ 891 \ \$,$$

$$\Delta TCI_{A \rightarrow A\&B} = 329 \ 891 - 477 \ 328 = (-147 \ 437) \ \$.$$

Obtained results are used for estimation of changes of the enterprise value.

$$\Delta V_{A \rightarrow A\&B} = +387 \ 990 + \frac{(147 \ 437) \times (1 - 0.19)}{0.3} = 786 \ 070 \ \$.$$

As we see in particular conditions it is possible to get benefits from using both suppliers (better A and worse B). Such a choice may result in increase of enterprise value.

## REFERENCES

- [1] Baumol, W.J. (1952), *The Transactions Demand for Cash: An Inventory Theoretic Approach*, Quarterly Journal of Economics, nr 66, Nov. p. 545-556;
- [2] Beck, S.E., Stockman, D.R. (2005), *Money as Real Options in a Cash-in-Advance Economy*, Economics Letters, vol. 87, p. 337-345;
- [3] Beranek, W. (1963), *Analysis for Financial Decisions*, R.D.IRWIN, Homewood;
- [4] Bougheas, S., Mateut, S., Mizen, P. (2009), *Corporate Trade Credit and Inventories: New Evidence of a Trade-off from Accounts Payable and Receivable*, Journal of Banking & Finance, vol. 33, no. 2, p. 300-307;
- [5] Coculescu, C. (2007), *Comparative Evaluation of Parametric Optimization Methods*, Economic Computation and Economic Cybernetics Studies and Research, no. 1-2, ASE Publishing House, Bucharest;
- [6] Cote, J.M., Latham, C.K. (1999), *The Merchandising Ratio: A Comprehensive Measure of Working Capital Strategy*, Issues in Accounting Education, vol. 14, no. 2, May, p. 255-267;



- [7] Dragota, I.M., Dragota, V., Obreja Brasoveanu, L., Semenescu, A. (2008), *Capital Structure Determinants: A Sectorial Analysis for the Romanian Listed Companies*, Economic Computation and Economic Cybernetics Studies and Research, no. 1-2, ASE Publishing House, Bucharest;
- [8] Emery, G.W. (1988), *Positive Theories of Trade Credit, Advances in Working Capital Management*, JAI Press, vol. 1, p. 115-130;
- [9] Fabozzi, F.J. (1999), *Investment Management*, Prentice Hall, Upper Saddle River;
- [10] Fulga, C., Serban, F. (2008), *Multi-item Inventory Model with Constant Rate of Deterioration and Assurance Stock*, Economic Computation and Economic Cybernetics Studies and Research, no. 3-4, ASE Publishing House;
- [11] Gallinger, G., Ifflander, A. J. (1986), *Monitoring Accounts Receivable Using Variance Analysis*, Financial Management, Zima, 69-76;
- [12] Graber P.J. (1948), *Assets*, Accounting Review, vol. 23, no. 1, Jan. p. 12-16;
- [13] Holmstrom, B., Tirole, J. (2001), *LAPM: A Liquidity-based Asset Pricing Model*, Journal of Finance, vol. 56, p. 1837-1867 {WP6673, National Bureau of Economic Research, Cambridge, 1998};
- [14] Kalberg, J. G., Parkinson, K. L. (1993), *Corporate Liquidity: Management and Measurement*, IRWIN, Homewood;
- [15] Houry, N.T., Smith, K.V., MacKay, P.I. (1999), *Comparing Working Capital Practices in Canada, the United States and Australia*, Revue Canadienne des Sciences de l'Administration, vol. 16, no. 1, March, p. 53-57;
- [16] Kim, C.S., Mauer, D. C., Sherman, A. E. (1998), *The Determinants of Corporate Liquidity: Theory and Evidence*, Journal of Financial and Quantitative Analysis, vol. 33, no. 3;
- [17] Kim, Y. H., Atkins, J. C. (1978), *Evaluating Investments in Accounts Receivable: A Wealth Maximizing Framework*, Journal of Finance, vol. 33, no. 2, p. 403-412;
- [18] Levy, H., Gunthorpe, D. (1999), *Introduction to Investments*, South-Western College Publishing, Cincinnati;
- [19] Lofthouse, S. (2005), *Investment Management*, Wiley, Chichester;
- [20] Lyn, E. O., Papaioannou, G. J. (1996), *Liquidity and the Financing Policy of the Firm: An Empirical Test, Advances in Capital Management*, Londyn, vol. 3, p. 65-83.
- [21] Merton, R.C., Perold, A.F. (1999), *Theory of Risk Capital in Financial Firms*, w: D.H. Chew, *The New Corporate Finance. Where Theory Meets Practice*, McGraw-Hill, Boston;
- [22] Miller, M.H., Orr, D. (1966), *A Model of the Demand for Money by Firms*, Quarterly Journal of Economics, no. 80, p. 413-435;
- [23] Miller T. W., Stone, B. K. (1996), *The Value of Short-Term Cash Flow Forecasting Systems, Advances in Working Capital Management*, JAI Press Inc., Londyn, vol. 3, p. 3-63;
- [24] Morard, B., Balu, F.O.(2009), *Developing a Practical Model for Calculating the Economic Value Added*, Economic Computation and Economic Cybernetics Studies and Research, no. 3, ASE Publishing House, Bucharest;
- [25] Mueller, F.W. (1953), *Corporate Working Capital and Liquidity*, The Journal of Business of the University of Chicago, vol. 26, no. 3, Jul. p. 157-172;

- [26]Myers S. C., Rajan, R. G. (1998), *The Paradox of Liquidity*, Quarterly Journal of Economics 113, no. 3, Cambridge, p. 733-771;
- [27]Opler,T., Stulz, R., Williamson, R. (1999), *The Determinants and Implications of Corporate Cash Holdings*, Journal of Financial Economics, vol. 52, no.1, p.3-46;
- [28]Orlicky, J. (1975), *Material Requirements Planning*, McGraw-Hill, New York;
- [29]Parrino, R., Kidwell, D.S. (2008), *Fundamentals of Corporate Finance*, Wiley, New York;
- [30]Peterson, R., Silver, E.A. (1979), *Decision Systems for Inventory Management and Production Planning*, Wiley, New York;
- [31]Piotrowska, M. (1997), *Short-term Financial Decisions*, WUE, Wroclaw;
- [32]Plossl , G.W. (1985), *Production and Inventory Control, Principles and Techniques*, Prentice Hall, Englewood Cliffs;
- [33]Poteshman , A., Parrino, R., Weisbach, M. (2005), *Measuring Investment Distortions when Risk-Averse Managers Decide Whether to Undertake Risky Project*, Financial Management, vol. 34, Spring, p. 21-60;
- [34]Ratiu-Suciu C. (2007), *Decision-Making Models Under Uncertainty Conditions in Case of the Portfolio-Selection Problem and Flexible Planning*, Economic Computation and Economic Cybernetics Studies and Research, no. 3-4;
- [35]Ramniceanu, I., Marinescu, D., Marin, D. (2007), *Measuring the Risk Aversion*, Economic Computation and Economic Cybernetics Studies and Research, no. 3-4, ASE Publishing House, Bucharest;
- [36]Reilly, F.K. (1992), *Investments*, The Dryden Press, Fort Worth;
- [37]Ratiu-Suciu, C. (2007), *Decision-Making Models Under Uncertainty Conditions in Case of the Portfolio-Selection Problem and Flexible Planning*, Economic Computation and Economic Cybernetics Studies and Research, no.3-4;
- [38]Stone, B. K. (1972), *The Use of Forecasts and Smoothing in Control - Limit Models for Cash Management*, Financial Management, p. 72-84;
- [39]Tobin, J. (1958), *Liquidity Preference as Behavior Toward Risk*, Review of Economic Studies, 1958 r. nr 25, p. 65-86.
- [40]Triandafil C.M., Brezeanu, P., Huidumac, C. (2008), *Leverage Versus Profitability: Case Study for IT Commercial Companies*, Economic Computation and Economic Cybernetics Studies and Research, no. 1-2, ASE Publishing House, Bucharest.