

Levels of Liquid Assets in Full Operating Cycle Firms: Polish Firms Case

Grzegorz Michalski, Jan Buleca, Monika Kaminska, Omar Mhemed, and Guenter Blendinger

Abstract—The aim of the study is to determine the rules governing the modern cash management in small and medium enterprises with a full operating cycle with particular emphasis on environmental conditions influencing enterprises. External factors resulting from the economic situation surrounding the company, interact with the operating cycle of the overall enterprise operational risk which is reflected in the level of cash held. At the core of the research hypothesis is the belief that the level of cash and cash management policies in the enterprise in an integrated manner with other elements resulting from the operating cycle contribute to moderating the risk of the enterprise and that it can be shown using empirical data from companies operating effectively in practice business. JEL: D01, D22, G17.

Index Terms—Cash levels, operating risk, full operating cycle, financial liquidity.

I. INTRODUCTION

Anderson [1] reassess the notion that high liquid asset holding by firms faced with weak investor protection is evidence of managerial rent extraction what is in one accord with results of CLFOC model presented in that paper. Anderson [1] shows that firms facing agency problems may establish tight controls over management through concentrated ownership what is similar to results of survey presented here in that paper. How to determine the rules governing the modern cash management in small and medium enterprises with a full operating cycle with particular emphasis on environmental conditions influencing enterprises? Having a full operating cycle is defined as a situation in which the small or medium enterprise has a stock of materials or raw materials, which then as a result of the technological process converts the finished products, offers them for sale through both cash sales and sales on the basis of the use of trade credit receivables [1]. Used in this definition, full operating cycle consists of the conversion of inventories (including the time required to collect the materials and / or raw materials, processing them, and the time required storage of finished products before transfer) and the full period of collection of receivables. Research hypothesis is the belief that the currently observed in many companies operating in industries using full operating cycle, assessed by

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investigators as "excessive" cash reserves, are dependent on factors that give to describe the relationship between risk and uncertainty and the expected and realized under conditions of risk and uncertainty in the value added generated by enterprises with a full operating cycle [2]. External factors resulting from the economic situation surrounding the company, interact with the operating cycle of the overall enterprise operational risk which is reflected in the level of cash held. At the core of the research hypothesis is the belief that the level of cash and cash management policies in the enterprise in an integrated manner with other elements resulting from the operating cycle contribute to moderating the risk of the enterprise and that it can be shown using empirical data from companies operating effectively in practice business [3].

II. CLFOC MODEL

Full operating cycle is a source of operational risk. Cash Levels in Full Operating Cycle firms (CLFOC) model is concentrated on firm value maximization. That CLFOC model derives from typical full operating cycle situation in firms and after inclusion data about costs and value created in next steps of typical full operating cycle business recommend optimal cash levels that answer on risk sensitivity [4]-[6]. CLFOC model base on firm value creation approach. We can present it as equation:

$$\begin{aligned} \Delta V = & -IP \times DCR \times (1 - m) + \\ & -ARP \times DCR \times (1 - m) - CSH \times DCR + \\ & +APP \times DCR \times (1 - m) + \\ & + \frac{DCR \times 360 \times (1 - m) \times (1 - T)}{CoC} + \\ & + \frac{(1-T) \times DCR \times (-CSH \times KG - IP \times KZ - ARP \times KN)}{CoC} \end{aligned} \quad (1)$$

where: ΔV – firm value creation (in money), IP – inventory period (in days), DCR – daily cash revenues (in money), m – value creation in one full operational cycle (in %), ARP – accounts receivable period (in days), CSH – cash buffer (in days), APP – accounts payable period (in days), T – tax rate (in %), CoC – cost of capital rate (in %), KG – cost of holding and managing cash levels (in %), KN – cost of managing and maintaining of accounts receivables (in %), KZ – cost of holding and managing inventories (in %).

Next we will calculate DCR derivative of the function ΔV and compare it with 0 to find level of cash that maximize firm value level (ΔV):

$$CSH = \frac{[360 \times (1 - m) - IP \times KZ - ARP \times KN] \times (1 - T)}{CoC + KG \times (1 - T)} + \frac{(1 - m) \times (APP - IP - ARP) \times CoC}{CoC + KG \times (1 - T)} \quad (2)$$

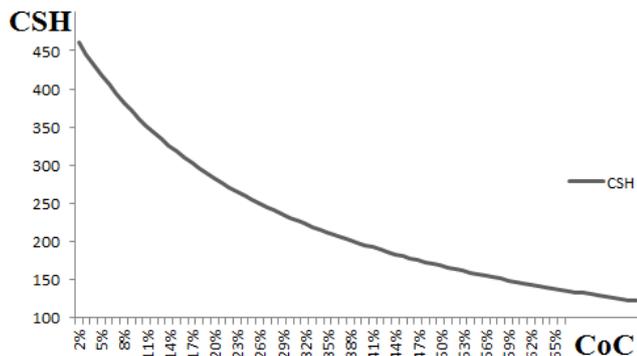


Fig. 1. Relation between cash levels (CSH) and cost of capital (CoC).

Example: Own calculations of relation CSH and CoC according to CLFOC model.

Source: Own study.

According to CLFOC model is possible to observe some relations between cash levels and cost of capital. As we can see at Fig. 1, with increasing cost of capital rate we should expect decreasing of cash levels CSH.

CLFOC model expects that firm value creation will be maximized when cash levels CSH decrease with increasing value creation portion in each operational cycle (m).

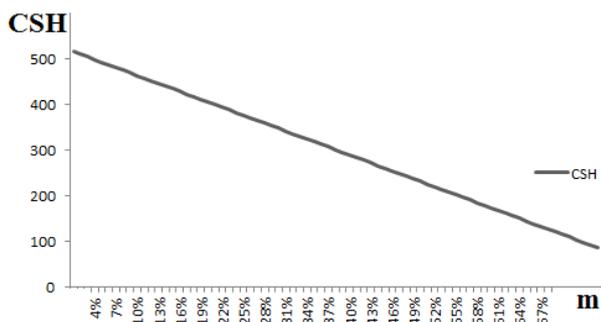


Fig. 2. Relation between cash levels (CSH) and value creation in one full operational cycle (m).

Example: Own calculations of relation CSH and m according to CLFOC model.

Source: Own study.

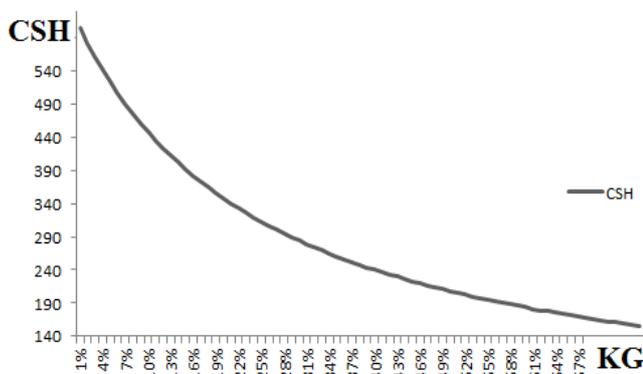


Fig. 3. Relation between cash levels (CSH) and cost of holding and managing cash levels (KG).

Example: Own calculations of relation CSH and KG according to CLFOC model.

Source: Own study.

According to CLFOC model we can observe relation

between cash levels and cost of holding and managing cash levels. As we can see at Fig. 3, with increasing cost of holding and managing cash levels we should expect decreasing of cash levels CSH.

CLFOC model expects that firm value creation will be maximized when cash levels CSH decrease with increasing tax rate (T) as is presented at Fig. 4.

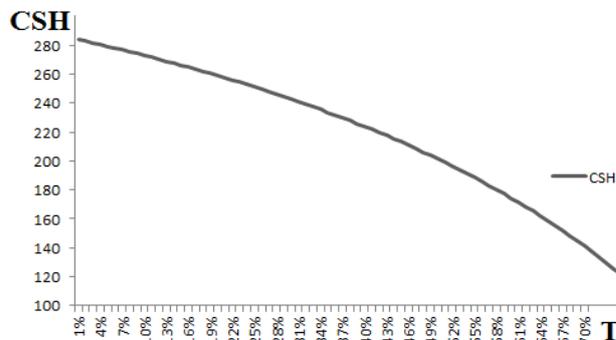


Fig. 4. Relation between cash levels (CSH) and tax rate (T).

Example: Own calculations of relation CSH and T according to CLFOC model.

Source: Own study.

III. EMPIRICAL DATA

In this study the CATI method was used [7]. 306 companies were surveyed. All of the surveyed companies are set on achieving an economic profit, there are no nonprofit companies among the surveyed companies. Micro and small businesses where the most open source of information, as the owners were willing to pick up the conversation and there is no link between the province and the variables tested [7]. The largest group of companies participating in the survey were medium enterprises, which accounted for 51% and the breakdown into micro, small, medium and large enterprises corresponded to the division based on the number of employees.

In the survey the group of respondents of companies employing between 6 and 25 employees and between 26 and 50 employees is the largest [7]. Decisions in the company are always undertaken by the owner himself, if he/she is the sole owner, or in the larger companies all owners - the whole board. In large companies to make decisions not all the owners are needed - answered so over half of the respondents. Over half of the polled companies have 1 owner [7]. Levels of cash in the company are maintained at 88% of the surveyed companies and 12% of companies indicated that they did not keep cash at all. The main reason for keeping cash is the risk of changing the costs of purchased materials and raw materials [7].

The most frequently cited item of current assets was an ongoing production and stock of raw materials for production and stock of finished goods [7]. Companies which determined their competitiveness as high and very high often pointed to the lack of opportunities for development and acquisition of customers for instance in the public sector. 42% of the surveyed companies rated their competitiveness as high.

In big companies the most popular answer was that the

competition is high or very high [7]. Research shows that 29% of surveyed companies do not deliver to the public sector services at all.

Companies that do not provide such supplies or services to the public sector most frequently responded that they are not making such orders and that they are not seeking such orders. Mostly micro-enterprises do not cooperate with the public sector. Both, in terms order execution and receiving the supplies from the public sector the proportions are very close [7]. In this case 31% do not receive supplies from the public sector. The bigger the company, the more they deliver to the public sector and receive more supplies. No mergers in companies over the past 5 years. The main form of sale is selling stationary with the response of 90% of the surveyed companies. Only 13% of companies are selling online. In micro and small businesses almost no web sales are made [7].

The use of the Internet for sale purposes is the largest in large enterprises. Among the companies selling through the Internet more than half declared that the vast majority of goods is stored in the enterprise. 43% of the goods are not ordered under the Just-In-Time customer order. The number of online executed orders in almost half of the respondents ranges from 51 to 250 orders [7].

40% of respondents declaring Internet sales estimate income from this channel between 31-50% of overall income [7].

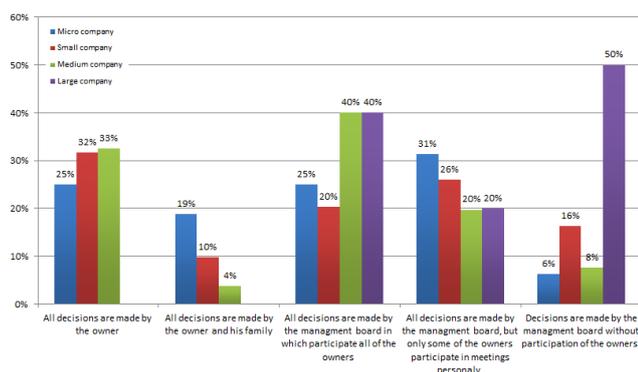


Fig. 5. Relationship between size of the firm and decision makers. Source: [7].

IV. CASH HOLDING POLICY

The analysis [7] shows that only 12% of respondents do not hold cash in the company at all. The analysis data do not add up to 100% because more than one answer could be selected [7]. The main reason for keeping cash in the company was the risk associated with changes in costs of purchased materials and raw materials: 55% of the responses. Another important reason is the need to secure cash for ongoing operations: 35% of responses. The third most frequently cited reason is the risk of contractor's lack of promptness (28%) [7].

There was found [7] that in small enterprises every fifth respondent indicated that they did not keep cash. The most frequently cited reasons in small businesses for keeping ready cash are: risk of change in costs of purchased materials and raw materials (45%), the need to secure cash for ongoing operations (38%), in micro enterprises cash is most likely to remain because of the risk of changing costs of purchased

materials and raw materials (50%) and because of the need to secure cash for the on-going operations (56%) [7].

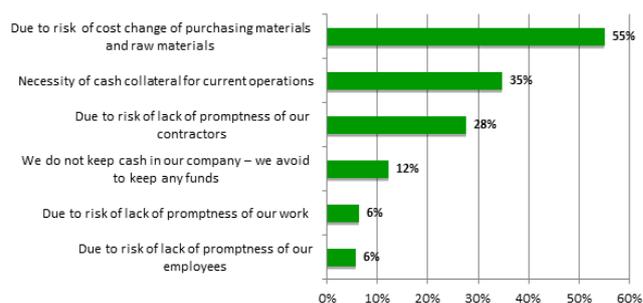


Fig. 6. Reasons for cash levels.

Source: [7].

V. WHY FIRMS HOLD CASH?

In medium enterprises, cash is maintained because of: risk of changing costs of purchased materials and raw materials (62%), the risk of lack of promptness of the contractors (38%), need to secure cash for ongoing operations (29%) [7].

In large companies cash is held due to: risk of change in costs of purchased materials and raw materials 70%, the risk of lack of promptness of the contractors (50%) [7].

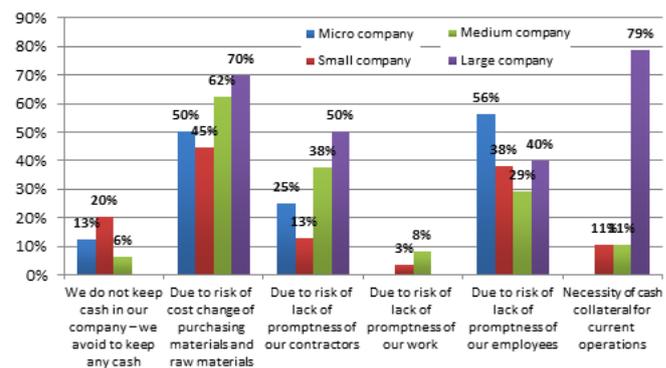


Fig. 7. Reasons for cash levels in FOC firms.

Source: [7].

The highest number of respondents indicated the element of work in progress, as the asset they operate in their day-to-day operations (84%).

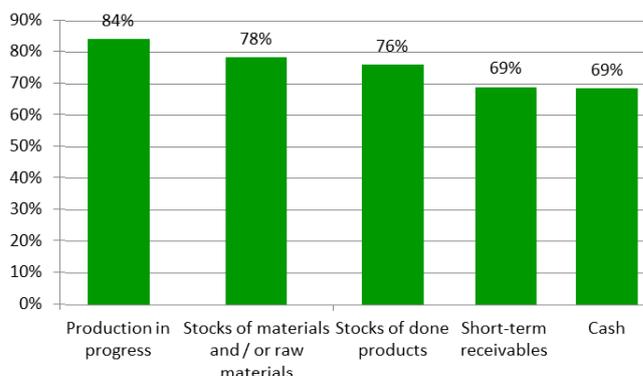


Fig. 8. Reasons for cash levels in FOC firms.

Source: [7].

Two consecutive items had a very similar number of indications. Inventories of materials and / or raw materials for

the production: of 240 indications, which constitutes 78%, of finished goods 233 items, representing 76% [7].

Comparing the full operating cycle and assets used in daily operations to the size of the enter-prise, we notice that microenterprises show the highest number of indications of cash flow (87.5%) and short-term receivables (75%) [7].

In small enterprises, the same number of indications for stocks of raw materials and / or raw materials for production, work in progress, and cash - 76% of responses [7]. Short-term receivables were cited as 75% of all responses [7].

In medium enterprises, the largest number of responses fall to production in progress: 92% of responses, stocks of finished goods: 85% and stocks of materials and / or raw materials to produce: 82% [7].

Large companies in 100% indicated stocks of materials and / or raw materials for production, work in progress, stocks of finished goods. 80% of responses received such elements as short-term receivables and cash [7]. Among the others, 5 respondents pointed to long-term receivables [7].

VII. CONCLUSIONS

Boileau [5] investigates the factors driving the unprecedented rise in corporate liquidities. Boileau [5] finds that an economy-wide reduction in the cost of holding liquidities and an increase in risk best explain the rise in cash holdings and the widespread use of credit lines [8]-[11]. Bates [2] finds that the average cash-to-assets ratio for U.S. full operating cycle firms more than doubles from 1980 to 2006 and that findings are in agreement with CLFOC model presented in that paper. Bates [2] claims that economic importance of cash levels increase is that at the end of the sample period, the average firm can retire all debt obligations with its cash holdings [12]-[23].

Lozano [24] claims that the predominance of family control influence cash holding policy what is also part of findings of survey reported in that paper. Lozano [24] outlines a way to model how family firms define their cash policy and in which they adjust their cash holding to an optimal level what was done also in CLFOC model reported here [25]-[35]. Wu [36] claims that Chinese multinational firms have more exploitation of cash because globalization risk and that is in agreement with CLFOC model presented in that paper. Wu [36] shows that Chinese multinational corporations do not hold significantly more cash relative to domestic firms unless these multinationals heavily rely on the foreign sales and that is similar result to result of survey reported in that paper.

Chen [8] examines whether and how democracy and rule of law—two overarching country-level governance variables—influence corporate governance what is also in a field of CLFOC model presented in that paper. Chen [9] points that cash holdings is a good channel for examining the quality of corporate governance and that demonstrates that agency costs are lower and interests of managers and shareholders are more aligned under such circumstances. In addition, the negative effect of debt issuance and dividend payment on cash is more pronounced when the level of democracy is higher or rule of law is stronger, suggesting that these two approaches become more effective in reducing agency costs and transitively cash holdings influence by reducing agency costs what also is found in survey reported in paper here.

Empirical results are in one accord with expectations of CLFOC model because they confirms that firms with intention of avoiding destruction of **value creation in one full operational cycle (m)** maintains cash levels in firms as buffer against the risk. Decreasing of risk has impact on decreasing Cost of Capital (CoC) and as presented by CLFOC model smaller cost of capital is an impulse for higher levels of cash in firm.

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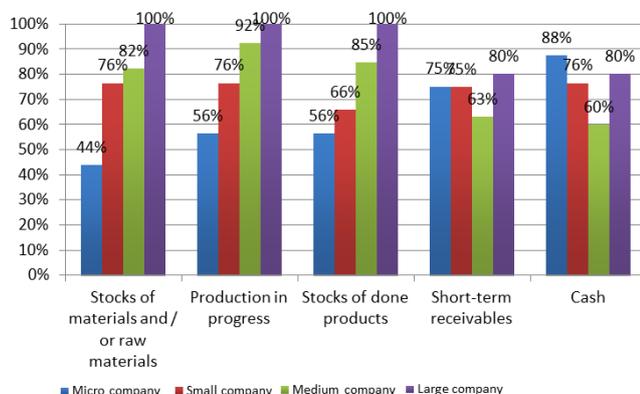


Fig. 9. Reasons for cash levels in FOC firms with size as determination.

Source: [7].

VI. CASH LEVELS AND COMPETITIVENESS

In order to be able to diagnose a company's market situation and how much it is able to invest, what amount of activity is needed on the market we shall take look at how a particular business and given the type of business performs against its competitors [7].

Is there a competition in your area and how strong is it? The more competitive the market is, the harder it is and the more it takes to "win" a Customer [7].

The statistics below show that companies declared high competitiveness in their markets - 42%. Moderately high competition was noted by 27% of respondents, and one in four respondents indicated very high competition [7].

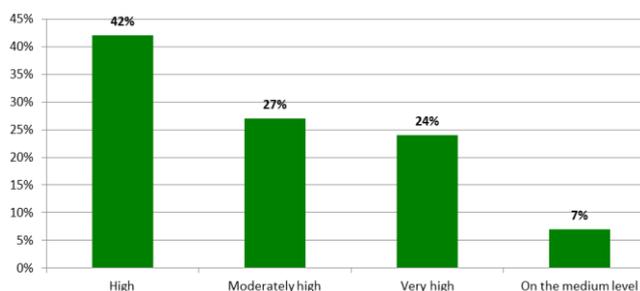


Fig. 10. Competitiveness in surveyed group.

Source: [7].

REFERENCES

- [1] R. Anderson and M. Hamadi, "Cash holding and control-oriented finance," *Journal of Corporate Finance*, vol. 41, no. 1, pp. 410-425, December 2016.
- [2] T. Bates, K. Kahle, and R. Stulz, "Why do U.S. firms hold so much more cash than they used to?" *Journal of Finance*, vol. 64, no. 5, pp. 1985-2021, October 2009.
- [3] A. Bem and G. Michalski, "Hospital profitability vs. selected healthcare system indicators," *CEFE 2015-Central European Conference in Finance and Economics*, pp. 52-61, 2015.
- [4] H. Ben-Nasr, "State and foreign ownership and the value of working capital management," *Journal of Corporate Finance*, vol. 41, no. 1, pp. 217-240, December 2016.
- [5] M. Boileau and N. Moyon, "Corporate cash holdings and credit line usage," *International Economic Review*, vol. 57, no. 4, pp. 1481-1506, November 2016.
- [6] J. Buleca, A. Andrejovska, and G. Michalski, "Macroeconomic factors' impact on the volume of household savings in the V4 countries," *Journal of Applied Economic Sciences*, vol. 12, no. 5(51), pp. 1409-1421, 2017.
- [7] "Funds management in small and medium-sized enterprises (SMEs) implementing full operational cycle," unpublished report.
- [8] N. Chen and A. Mahajan, "Effects of macroeconomic conditions on corporate liquidity-international evidence," *International Research Journal of Finance and Economics*, vol. 35, pp. 112-129, January 2010.
- [9] N. Chen and T. Yang, "Democracy, rule of law, and corporate governance-A liquidity perspective," *Economics of Governance*, vol. 18, no. 1, pp. 35-70, February 2017.
- [10] J. Coles, N. Daniel, and L. Naveen, "Managerial incentives and risk-taking," *Journal of Financial Economics*, vol. 79, no. 2, pp. 431-468, February 2006.
- [11] P. Deb, P. David, and J. O'Brien, "When is cash good or bad for firm performance?" *Strategic Management Journal*, vol. 38, no. 2, pp. 436-454, 1 February 2017.
- [12] V. Dittmar and J. Maht-Smith, "Corporate governance and the value of cash holdings," *Journal of Financial Economics*, vol. 83, no. 3, pp. 599-634, March 2007.
- [13] E. Dudley and N. Zhang, "Trust and corporate cash holdings," *Journal of Corporate Finance*, vol. 41, no. 1, pp. 363-387, December 2016.
- [14] G. Filbeck, X. Zhao, and R. Knoll, "An analysis of working capital efficiency and shareholder return," *Review of Quantitative Finance and Accounting*, vol. 48, no. 1, pp. 265-288, January 2017.
- [15] B. Gavurova and S. Korony, "Efficiency of day surgery in Slovak regions during the years 2009-2014," *Economic Annals-XXI*, vol. 159, no. 5-6, pp. 80-84, 2016.
- [16] B. GavurovÁ, M. ŠoltÉS, and A. J. Balloni, "The economic importance of using of ict in the health system," [Ekonomický význam využívania informačno-komunikačných technológií v systéme zdravotníctva], *Ekonomicky casopis*, vol. 62, no. 1, pp. 83-104, 2014.
- [17] J. Graham and C. Harvey, "The theory and practice of corporate finance: Evidence from the field," *Journal of Financial Economics*, vol. 60, no. 2-3, pp. 187-243, May 2001.
- [18] J. Harford, "Corporate cash reserves and acquisitions," *Journal of Finance*, vol. 54, no. 6, pp. 1969-1997, December 1999.
- [19] Z. He and M. Wintoki, "The cost of innovation: R&D and high cash holdings in U.S. firms," *Journal of Corporate Finance*, vol. 41, no. 1, pp. 280-303, December 2016.
- [20] W. Huang-Meier, N. Lambertides, and J. Steeley, "Motives for corporate cash holdings: the CEO optimism effect," *Review of Quantitative Finance and Accounting*, vol. 47, no. 3, pp. 699-732, October 2016.
- [21] N. Koussis, S. Martzoukos, and L. Trigeorgis, "Corporate liquidity and dividend policy under uncertainty," *Journal of Banking and Finance*, vol. 75, no. 1, pp. 200-214, February 2017.
- [22] M. La Rocca, D. Cambrea, and A. Cariola, "The role of corruption in shaping the value of holding cash," *Finance Research Letters*, vol. 20, no. 1, pp. 104-108, February 2017.
- [23] T. Lin, H. Tsai, N. Imamah, and J. Hung, "Does the identity of multiple large shareholders affect the value of excess cash? Evidence from China," *Pacific Basin Finance Journal*, vol. 40, no. 1, pp. 173-190, December 2016.
- [24] M. Lozano and R. Duran, "Family control and adjustment to the optimal level of cash holding," *European Journal of Finance*, vol. 23, no. 3, pp. 266-295, February 2017.
- [25] E. Lyandres and B. Palazzo, "Cash holdings, competition, and innovation," *Journal of Financial and Quantitative Analysis*, vol. 51, no. 6, pp. 1823-1861, December 2016.
- [26] G. Michalski. (2008). Operational risk in current assets investment decisions: Portfolio management approach in accounts receivable. *Agricultural Economics-czech*. [Online]. 54(1). pp. 12-19. Available: <http://ssrn.com/abstract=1562672>.
- [27] G. Michalski, "Full operating cycle influence on the food and beverages processing firms characteristics," *Agricultural Economics - Zemedelska Ekonomika*, vol. 62, no. 2, pp. 71-77, 2016.
- [28] G. Michalski, "Risk pressure and inventories levels. Influence of risk sensitivity on working capital levels," *Economic Computation and Economic Cybernetics Studies and Research*, vol. 50, no. 1, pp. 189-196, 2016.
- [29] T. Opler, L. Pinkowitz, R. Stulz, and R. Williamson, "The determinants and implications of corporate cash holdings," *Journal of Financial Economics*, vol. 52, no. 1, pp. 3-46, April 1999.
- [30] H. Shah and A. Shah, "The relationship between judicial efficiency and corporate cash holdings: An international study," *Economic Modelling*, vol. 59, no. 1, pp. 448-462, December 2016.
- [31] R. Siedlecki and A. Bem, "Rural versus urban hospitals in Poland," *Hospital's Financial Health Assessment, Procedia-Social and Behavioral Sciences*, vol. 220, pp. 444-451, 2016.
- [32] M. Soltes and B. Gavurova, "Quantification and comparison of avoidable mortality-Causal relations and modification of concepts," *Technological and Economic Development of Economy*, vol. 21, no. 6, pp. 917-938, 2015.
- [33] V. Soltes, "Duration of coupon bonds as a criterion of the price sensibility of bonds with regards to the change of interest rates," (Durácia kupónovej obligácie ako kritérium cenovej citlivosti obligácie vzhľadom na zmenu úrokových sadzieb in Slovak), *Ekonomicky Casopis*, vol. 52/2004, no. 1, pp. 108-114, 2004.
- [34] V. Soltes, "Paradigms of changes in the 21th Century-Quest for configurations in Mosaic," *Ekonomicky Casopis*, vol. 60/2004, no. 4, pp. 428-429, 2012.
- [35] M. Svidronova, G. Vacekova, and V. Valentinov, "The theories of non-profits: A reality check from Slovakia," *Lex Localis-Journal of Local Self-Government*, vol. 14, no. 3, pp. 399-418, 2016.
- [36] W. Wu, Y. Yang, and S. Zhou, "Multinational entities and cash holdings: Evidence from China," *Finance Research Letters*, vol. 20, no. 1, pp. 184-191, February 2017.



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