doi: 10.17221/72/2015-AGRICECON

Full operating cycle influence on the food and beverages processing firms characteristics

Grzegorz MICHALSKI

Department of Corporate Financial Management, Faculty of Engineering and Economics, Wroclaw University of Economics, Wroclaw, Poland

Abstract: The aim of the study is to determine the rules governing the modern cash management in food and beverages processing enterprises with a full operating cycle with a 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 it then as a result of the technological process converts into the finished products, offers them for sale through both cash sales and sales on the basis of the use of trade credit receivables. 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 the finished products before transfer) and the full period of the collection of receivables. Research hypothesis is the belief that observed in many companies operating in industries using the full operating cycle, assessed by 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 the conditions of risk and uncertainty in the value added generated by enterprises with a full operating cycle.

Keywords: financial efficiency of agribusiness, financial liquidity of food processing firms, operating cycle, working capital management

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 the cash held. At the core of the research hypothesis of the paper, there 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 the companies operating effectively in the practice business. The full operation cycle is connected with a higher probability of imperfection in the realization business cycle. The aim of the management of cash is to define the resources of cash in the firm at such a level that it contributes to the highest increase in the owners' property. In other words, it is about bringing the firm's held liquid resources to a level that is optimal from the point of view of the balanced costs of maintaining liquidity and the total cost of holding a too low level of resources. The type and size of these costs is partly dependent on the financial strategy conducted by the firm (Michalski 2014b). The relationship between the level of cash and other current assets, such as the previously discussed inventory and accounts receivable, depends on the specificity of the firm. Firms operating in a situation of high uncertainty and risk will have relatively higher cash resources – compared to the level of other current assets. Another element that may affect the growth of the average level of cash in the enterprise and increase their relative share in the structure of current assets is the amount of the costs of transactions and the cost of capital. Generally, it is recommended that the level of each of these current assets like cash, inventories, and receivables, be analysed separately. Connections between them are then taken into account when designing the cash poll. The approach to cash management in enterprises is different from the approach taken in large companies. As in most cases, when the owner controls all matters pertaining to the cash in the enterprise, it is possible for the owner to flexibly adapt the cash management models to a much greater extent than in the case of companies in which the knowledge of the individual areas related to the inflows and outflows of cash is distributed among many employees, or even between different branches of the enterprise. Based on the observations of the current inflows and outflows, an enterprise can classify its situation in the cash management

doi: 10.17221/72/2015-AGRICECON

as one of the following: I. Future inflows (CIF) and outflows (COF) are possible to predict, and inflows are greater than outflows. II. Future inflows (CIF) and outflows (COF) are possible to predict, and outflows exceed inflows. III. Future inflows (CIF) and outflows (COF) are possible to predict, but it is not possible to determine which kind of the cash flow prevails. IV. Future inflows (CIF) and outflows (COF) of cash are not possible to predict.

Depending on the character and the sizes of the cash inflows and outflows of an enterprise, one of the four basic models can be used for the management of cash. These models are the Baumol, Beranek, Miller-Orr, and Stone models. It is normal that, for an enterprise, one of the previously mentioned circumstances does not have to be present permanently. The same enterprise can experience both a period in which there is a surplus of inflows over the cash outflows, as well as one in which there is the opposite situation or it is not possible to define it. The same applies to the predictability of the future cash inflows and outflows. There are both periods in which, with no major difficulties, the trader can predict inflows and outflows, as well as the periods when it becomes very difficult, if not impossible, to do so (Figure 1).

In each of these models, like in the inventory models, it is necessary to know the minimal cash balance (LCL). The formula for the LCL is based on the inventory's minimal level adequate for the cash balances reinterpretation (Michalski 2014a):

$$C^* = L_{cash} = \left(-2 \times SD^2 \times ln \times \frac{CC \times G^* \times SD \times \sqrt{2\Pi}}{P \times K_{loc}}\right)^{0.5} \quad (1)$$

where SD = standard deviation of the daily net cash inflows/outflows, K_{loc} = the cost of the lack of cash, L_{cash} = C^* = low cash level or minimum cash level, CC = cost of capital, Π = 3,1416..., P = the sum of all cash inflows (CIF) and cash outflows (COF) in the analysed period, K_{loc} = full expected cost of lack of cash, and G^* = average size of one cash transfer, which is the basis of standard deviation calculation. In the Beranek and Baumol-Allais-Tobin (BAT) models, transfer G^* is twice the optimal cash level; in the Stone and Miller-Orr models, the average transfer G* is assigned from the real historic data or from its anticipation (Michalski 2014a).

The cost of the lack of cash depends on the risk sensitivity of the firm and that cost could be estimated as follows (Michalski 2014a):

$$K_{loc} = |\Delta V_{NCSH}| = \left|\Delta FCF_{0(NCSH)} + \frac{\Delta FCF_{1..\infty(NCSH)}}{CC_{(NCSH)}}\right| \quad (2)$$

where ΔV_{NCSH} = lack of cash firm value influence (usually the firm value destruction).

Depending on the kind of business, a lack of cash is always destructive and costly, but not always at the same level. During a higher risk pressure, K_{loc} is higher than the time with a lower operational risk.

The goal of the paper is to find if there is a correspondence between the fact of having a full operating cycle and the firms' cash levels observed in the real economy. As main representatives of the real economy, there are used firms from two agriculturally connected sectors: processing of food and processing of beverages industries. That is not a perfect choice, but, at first, such sectors have a full operating cycle, and we have good quality data for those sectors for the firms that operate in the V4 countries.

As we can see in Table 1, the unleveraged betas for 2010–2012 period were stable for the total population of the firms. In 2013, the general population have noted decreasing of that operational risk measure, but the beverage producers noted a higher level of that indicator, what could be interpreted as an increasing

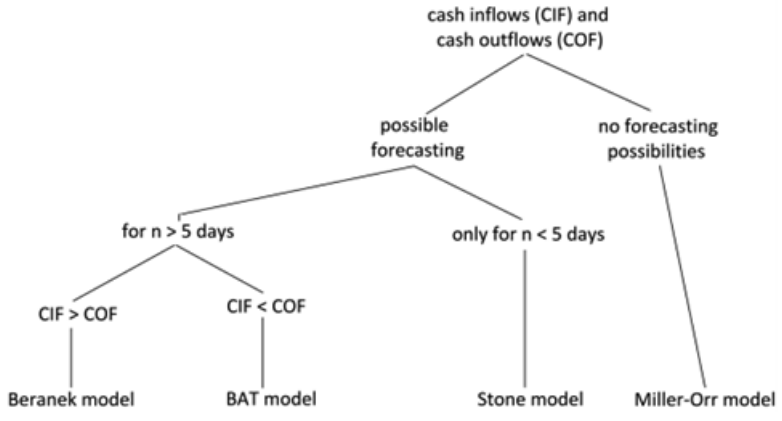

Figure 1. An integrated approach to the use of the cash-resources-management models depending on the quality of information possessed on inflows (CIF) and outflows (COF) of cash in the businesses.

Source: (Michalski 2014a)

doi: 10.17221/72/2015-AGRICECON

Table 1. Unleveraged betas levels for OECD countries at the end of the year

[unleverag.beta]	2010	2011	2012	2013
Total	0.88	0.82	0.86	0.6
Beverages	0.83	0.73	0.8	1.17
Food	0.71	0.74	0.74	0.69

Source: A. Damodaran Page: Betas by Sector [2015-02-01 access: http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/Betas.html]

level of the operational risk. Cash levels in firms are part of the so-called liquid assets or known also as the working capital levels. Levels of cash from the investment point of view are maintained in firms for hedging purposes against the risk of illiquidity connected with the risk of breaking the production fluency and the risk of the lack of final offer for the clients (Faulkender and Wang 2006; Bates et al. 2009). Investments in current assets with a higher liquidity (cash and near- cash assets), have also built in value considered from the real option approach. We think about the option of the American type connected with holding more liquid current assets and the value of option of the European type from holding less liquid current assets components like inventories and accounts receivables (Šoltés and Rusnakova 2013; Michalski 2014). There is believed that, both cash and other current assets levels should be as small as possible (Miller and Orr 1966; Kim et al. 1998; Ferreira and Vilela 2004). Unfortunately, a too small cash level is not accurate in the higher risk sensitivity context. If the financial management decision should be done in context of the future free cash flows generated by the firm in the risk and uncertainty context, then the truth is that the risk is higher, the working capital levels have a higher utility (Polak 2009; Uzik and Šoltés 2009; Belas et al. 2012). There exist very few firms not suffering from that risk, and they do not suffer in the same way always (Opler et al. 1999; Pinkowitz and Williamson 2001). The firms' sensitivity on risk is different, and it depends on the factors connected with its business environment (Ozkan and Ozkan 2004; Kulhanek 2012; Hudson and Orviska 2013). In that paper our model explains noted in the empirical data the phenomenon of sensitivity on risk (Dittmar and Mahrt-Smith 2007). We also can derive a suggestion that cash to the total assets indicator can serve as a forecasting information and a forewarning signal about the whole manufacturing part of economy as the firm environment (Kalcheva and Lins 2007; Horvatova 2008; Gavurová 2012). Cash levels are a result of the use of active policy in attracting the offer to clients in time and the full answer on the purchasers needs (Michalski 2014a). The scale of investment in cash and near- cash assets levels and the money tied in the capital involved in cash levels is a result of the enterprise position in the economic environment (Gazda 2002; Pinkowitz et al. 2006; Gavurová 2011; Gavurová et al. 2014). In effect, there are entities that do not hold large levels of cash. That strong in position firms have a small financial vulnerability and a lower sensitivity on risk and are not afraid of a situation in which the risk of a too small level of cash occurs (Gavurová and Hyranek 2013). It is because the cost of holding too small levels of cash to the total assets for that kind of firms is very small or even they have no such opportunity cost or is not linked with negative value calculated from the real option approach (Šoltés 2010; Glova and Sabol 2011). But also, there are firms with large financial vulnerability and sensitivity on risk connected to small levels of cash in relation to total assets (Michalski 2014a). Those entities need to keep larger cash levels to hedge against the costly risk of too small cash levels (Šoltés and Gavurová 2013, Bartak and Gavurova 2014). Too small cash levels lead that group of firms to negative changes in their sale levels. The destruction of cash revenues creation possibilities is dangerous for them and it is hard to rebuild the possibilities to create future cash revenues. Free cash flows are generated in context of uncertainty and risk and depend also on the cash management policy of the firm (Michalski 2014a).

$$\Delta V = \Delta V_{TZ} + \Delta V_{BZ} =$$

$$= \Delta FF_{0(TZ)} + \frac{\Delta FF_{1..\infty(TZ)}}{C_{(TZ)}} + \Delta FF_{0(BZ)} + \frac{\Delta FF_{1..\infty(BZ)}}{C_{(BZ)}} \quad (3)$$

where: ΔV = enterprise value growth, ΔFF = free cash flows increase or decrease (it could be positive when increase or negative when decrease). C = rate of cost of capital financing of the firm, indices: BZ = to small cash levels consequences, TZ = consequences of holding of cash levels.

MODEL AND DATA

The risk and uncertainty are mirrored in the cost of the capital rate that could be used to evaluate the

doi: 10.17221/72/2015-AGRICECON

current economic value of the future free cash flows. The firm keeps larger levels of cash, and does that, because its managing team has presumption that effect of that action will be the firm value building factor. Strategic decision about level of investment in capital tied in cash levels is made in context of all advantages and all disadvantages. The general maximizing value of the firm equation for cash Wilson based model is presented below (4)–(7):

Risk sensitivity stimulates the cost of the lack of cash and in effect, the risk sensitivity is responsible for the growing levels of cash. Each firm should try to suit its cash levels to its business environment. The individual risk sensitivity is a result of the firm answer on changes in its internal economic health but also it is the response to the general economic changes. Here there are presented: current ratio, return on assets ratio, return on equity ratio and cash to the total assets ratio in food and beverage producing firms reported in the Amadeus database. That results are presented in comparison between the full operating cycle firms (right) and the general population of such firms (left). Especially we are concerned with the 2010–2013 period. The empirical data confirm our projections derived from the theory based on our model (Michalski 2012a, b, c, 2013). That is useful to describe the expected relationship of cash levels and the total assets (CSH/TA) and it depends on the firm individual risk sensitivity level. Michalski and Mercik (2011) and Zietlow and Michalski (2012) presented such sensitivity on risk relation on the Polish non-profit organizations.

In the full operational cycle context, according to our predictions, the current ratio should be higher for the full operating cycle firms, the return on assets ratio should be higher for the full operating cycle firms, the return on equity ratio should be higher for the full operating cycle firms and the cash to total assets ratio should be smaller for the full operating cycle firms. The empirical results are near to those expectations (Figures 2–5).

DISCUSSION AND CONCLUSIONS

Bem et al. (2014a), claim that the liquidity management area, or broadly speaking, the working capital management, is still considered secondary and that the concept of the financial situation assessment with the financial liquidity is to be a key area (Bem et al. 2014b). Such paper is one from an attempts in changing such a perspective. A further study should take into consideration the next configurations of branches, countries and the liquidity indicators. The next research should be concentrated on the future control of the overall fit of our model and its predictions in the conditions of a higher operational risk, across the countries and across the sectors research that could answer how the risk sensitivity characterizes the firms from various business branches, and

$$\Delta V = \left(-\left(\frac{Q}{2}+L_{cash}\right) \times v - \frac{\left(\frac{P \times K_{sup}}{Q} + \left(\frac{Q}{2} + L_{cash}\right) \times v \times C_{nf}\right) \times TAXS}{CoC} \right) \quad (4)$$

$$\left(-\left(\frac{Q}{2}+L_{cash}\right) \times v - \frac{\left(\frac{P \times K_{sup}}{Q} + \left(\frac{Q}{2}+L_{cash}\right) \times v \times C_{nf}\right) \times TAXS}{CoC} \right)' = 0 \quad (5)$$

$$-\frac{v}{2} + \frac{P \times K_{sup} \times TAXS}{Q^2 \times CoC} - \frac{v \times C_{nf} \times TAXS}{2 \times CoC} = 0 \quad (6)$$

$$Q^* = \sqrt[2]{\frac{2 \times P \times K_{sup} \times TAXS}{v \times \left(CoC + C_{nf} \times TAXS\right)}} \quad (7)$$

where: SD = standard deviation of the distribution of cash levels, K_{loi} = the cost of the lack of cash, the cost of the lack of cash (K_{loi}) includes also alternative costs of short of speculative cash levels, C_{cash} = the cost of maintaining cash (the percentage). Q = order quantity; P = demand for cash in the period (year, month); K_{sup} = cost per order; C_{cash} = holding cost factor ($C_{cash} = CoC + C_{nf}$); and v = 1, except cases with foreign currency.

doi: 10.17221/72/2015-AGRICECON

various countries. The presented data from firms are in accord with our model predictions. Forecasting of our model is useful for making quick judgments about the current and future condition of the general population of enterprises, the population risk sensitivity and the global effect of that. It is possible to guess the future condition of the whole manufacturing part of the economy as well. The goal of the paper was to find if there is a correspondence between having full operating cycle and the firms ROA, ROE, the current assets and the cash levels observed in the real economy. That correspondence, as it is presented in Figures 2–5, exists with the average probability. As the main representatives of the real economy, were

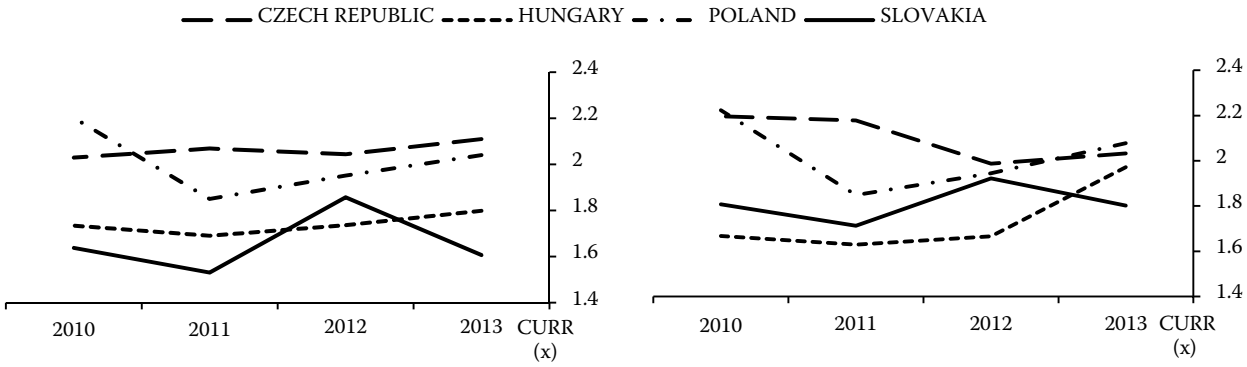

Figure 2. Comparison dynamics of the Return on Equity (ROE) levels for the general population (left) and only full operating cycle (right) food and beverages processing firms that operate in the V4 countries.

Source: own study based on the data from 2943 firms reported in the Database Amadeus product of the Bureau van Dijk, [date: 2015 FEB 01]

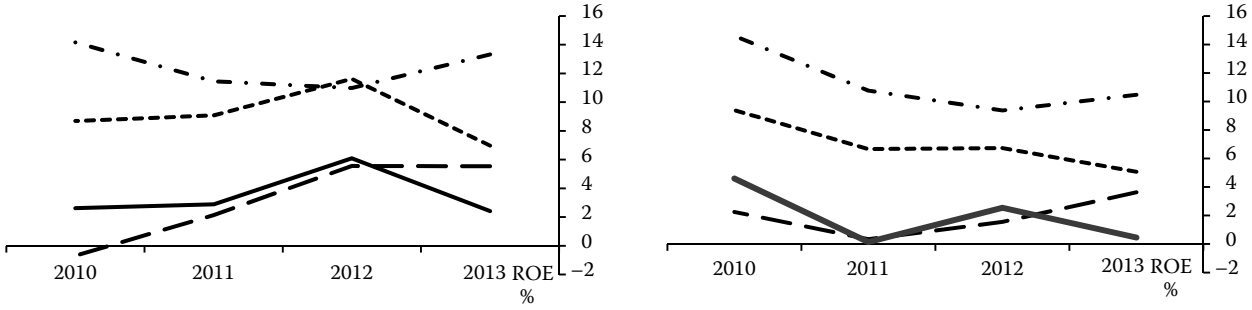

Figure 3. Comparison dynamics of the Return on Assets (ROA) levels for the general population (left) and only full operating cycle (right) food and beverages processing firms that operate in the V4 countries

Legend and source see Figure 2

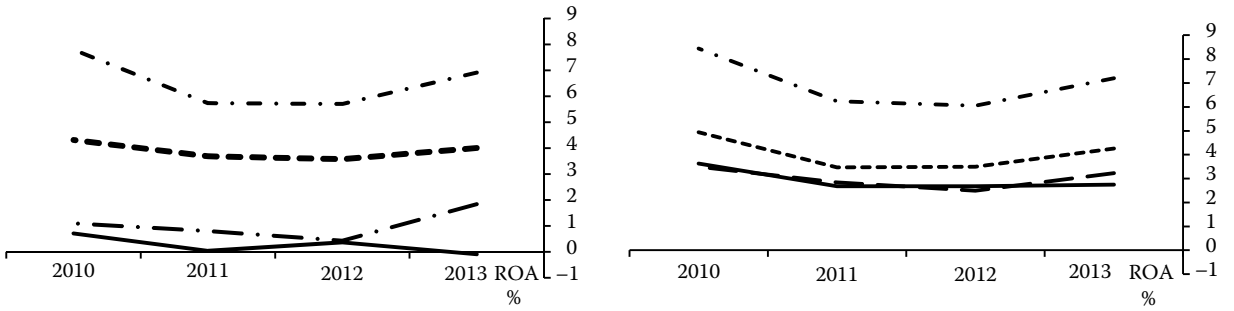

Figure 4. Comparison dynamics of the Current Ratio levels for the general population (left) and only full operating cycle (right) food and beverages processing firms that operate in the V4 countries

Legend and source see Figure 2

doi: 10.17221/72/2015-AGRICECON

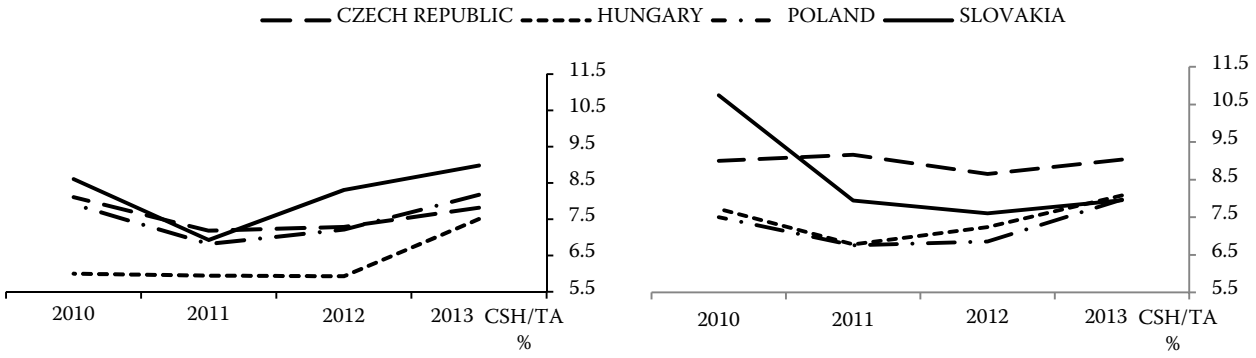

Figure 5. Comparison dynamics of the Current Ratio levels for the general population (left) and only full operating cycle (right) food and beverages processing firms that operate in V4 countries.

Source: own study based on the data from 2943 firms reported in the Database Amadeus product of the Bureau van Dijk, [date: 2015 FEB 01]

used firms from four sectors: processing of food and processing of beverages and that illustration showed us that the financial markets changes in the countries of the V4 region have an influence on the possibilities of supporting the economic condition by the operational risk influence. The paper findings also show that the V4 region can share its experience in the cash managing area with other European countries. The value-based model of cash holdings served to form the theoretical expectation how the cash levels should works in real economy in connection to the firm characteristics. Finally, the empirical data illustrated fitting of the enterprise cash levels with the presumptions of the model. Our analysis used as an illustration the empirical data from Poland, Slovakia, the Czech Republic and Hungary. Cash levels in enterprises as dependable on the condition of financial sector changed according to our model expectations.

Acknowledgements

The presented work and results is part of the monothematic cycle realized as a part of the grant titled: Cash management in small and medium enterprises that use full operating cycle. This work was supported by the Narodowe Centrum Nauki (National Science Centre, Poland). The research is financed from the Polish science budget resources in the years 2015–2018 as the research project financed by the National Science Centre granted according decision No. DEC-2014/13/B/HS4/00192 (project number: 2014/13/B/HS4/00192).

REFERENCES

Barták M., Gavurová B. (2014): Economics and social aspects of long-term care in the context of the Czech Republic and the Slovak Republic EU membership. In: 12th International Scientific Conference "Economic Policy in the European Union Member Countries". Sept 16–18, 2014, Ostravice.

Bates T., Kahle K., Stulz, R. (2009): Why do US firms hold so much more cash than they used to? The Journal of Finance, 64: 1985–2021.

Belas J., Cipovova E., Novak P., Polach J. (2009): Impacts of the foundation internal ratings based approach usage on financial performance of commercial bank. E & M Ekonomie a Management, 15: 142–155.

Bem A., Predkiewicz K., Predkiewicz P., Ucieklak-Jez P. (2014a): Determinants of hospital's financial liquidity. Procedia Economics and Finance, 12: 27–36.

Bem A., Predkiewicz K., Predkiewicz P., Ucieklak-Jez P. (2014b): Hospital's Size as the Determinant of Financial Liquidity. In: Proceedings of the 11th International Scientific Conference European Financial Systems 2014. Masaryk University, Brno: 41–48.

Dittmar A., Mahrt-Smith J. (2007): Corporate governance and the value of cash holdings. Journal of Financial Economics, 83: 599–634.

Faulkender M., Wang R. (2006): Corporate financial policy and the value of cash. Journal of Finance, 61: 1957–1990.

Ferreira M., Vilela A. (2004): Why do firms hold cash? Evidence from EMU countries. European Financial Management, 10: 295–319.

Gavurová B., Šoltés M., Balloni A.J. (2014): Ekonomický význam využívania informačno-komunikačných technológií v systéme zdravotníctva. (The economic impor-

doi: 10.17221/72/2015-AGRICECON

tance of using of ICT in the health system). Ekonomický časopis/Journal of Economics, 62: 83–104.

Gavurová B. (2012): Source identification of potential malfunction of balanced scorecard system and its influence on system function. E + M Ekonomie a management, 15: 76–90.

Gavurová B. (2011): Systém Balanced Scorecard v podnikovom riadení. (The balanced scorecard system in enterprise management.) Ekonomický časopis, 59: 163-177

Gavurová B., Hyránek E. (2013): Determinanty rozvoja jednodňovej zdravotnej starostlivosti na Slovensku. (Determinants of Day Health Care Development in Slovakia.) Ekonomický časopis. 61: 134–154.

Gazda V. (2002): Estimation of beta coefficients for CAPM using daily time series. Ekonomický časopis, 50: 489–511.

Glova J., Sabol T. (2011): Analysis of bonds with embedded options. E & M Ekonomie a Management, 14: 77–86.

Horvatova E. (2008): Capital adequacy conception of banks and investments firms in conditions of European Union. Ekonomický časopis, 56: 582–597.

Hudson J., Orviska M. (2013): Firms' adoption of international standards: One size fits all? Journal of Policy Modeling, 35: 289–306.

Kalcheva I., Lins K. (2007): International evidence on cash holdings and expected managerial agency problems. Review of Financial Studies, 20: 1087–1112.

Kim C., Mauer D., Sherman A. (1998): The determinants of corporate liquidity: Theory and evidence. The Journal of Financial and Quantitative Analysis, 33: 335–359.

Kulhanek L. (2012): The relationship between stock markets and gross domestic product in the Central and Eastern Europe. In: Kotlebova J. (ed.): How does Central and Eastern Europe Cope up with the Global Financial Crisis? Proceedings of the 7th International Conference on Currency, Banking And International Finance: 135–145.

Michalski G. (2014a): Value-Based Working Capital Management. Determining Liquid Asset Levels in Entrepreneurial Environments. Palgrave Macmillan, New York.

Michalski G. (2014b): Value maximizing corporate current assets and cash management in relation to risk sensitivity: Polish firms case. Economic Computation and Economic Cybernetics Studies and Research, 48: 259–276.

Miller M.H., Orr D. (1966): A model of the demand for money by firms. Quarterly Journal of Economics, 80: 413–435.

Opler T., Pinkowitz L., Stulz R., Williamson R. (1999): The determinants and implications of corporate cash holdings. Journal of Financial Economics, 52: 3–46.

Ozkan A., Ozkan N. (2004): Corporate cash holdings: An empirical investigation of UK companies. Journal of Banking & Finance, 28: 2103–2134.

Pinkowitz L., Williamson R. (2001): Bank power and cash holdings: Evidence from Japan. Review of Financial Studies, 14: 1059–1082.

Pinkowitz L., Stulz R., Williamson R. (2006): Contribution of corporate cash holdings and dividends to firm value depend on governance? A cross-country analysis. The Journal of Finance, 61: 2725–2751.

Polak P. (2009): The centre holds – from the decentralised treasury towards fully centralised cash and treasury management. Journal of Corporate Treasury Management, 3: 109–112.

Šoltés M. (2010): Relationship of speed certificates and inverse vertical ratio call back spread option strategy. E & M Ekonomie a Management, 13: 119–124.

Šoltés V., Rusnakova M. (2013): Hedging against a price drop using the inverse vertical ratio put spread strategy formed by barrier options. Inzinerine Ekonomika-Engineering Economics, 24: 18–27.

Šoltés V., Gavurová B. (2013): Application of the cross impact matrix method in problematic phases of the Balanced Scorecard system in private and public sector. Journal of Applied Economic Sciences, 8: 99–119.

Uzik M., Šoltés V. (2009): The effect of rating changes on the value of a company listed in the capital market. E & M Ekonomie a Management, 12: 49–56.

Zietlow J., Michalski G. (2012): Nonprofit Solvency Measures: Polish Evidence. Unpublished paper presented at the annual meeting of the ARNOVA Annual Conference, Indianapolis, Unpublished Manuscript.

Received: 22th February 2015
Accepted: 5th May 2015

Contact address:

Grzegorz Michalski, Department of Corporate Financial Management, Faculty of Engineering and Economics, Wroclaw University of Economics, Komandorska 118, 53-345 Wroclaw, Poland
e-mail: Grzegorz.Michalski@gmail.com