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RISK PRESSURE AND INVENTORIES LEVELS. INFLUENCE OF RISK SENSITIVITY ON WORKING CAPITAL LEVELS

Abstract. *That paper as a continuation of the studies about financially efficient working capital decisions model components and its applications, presents discussion about risk sensitivity influence on enterprise decisions in area of net working capital investments. Effectiveness of net working capital investments is only one from possible explanations of liquidity measures in enterprises. Too small net working capital leads some enterprises to negative changes in their sale levels and as effect to weaker profits. Destruction of cash revenues creation possibilities is dangerous for them and is hard to rebuild possibilities to create cash revenues. Financially efficient working capital decisions predicts that before the crisis, during the crisis and after the crisis phases are connected with higher levels of working capital in processing enterprises. Investments in liquidity are a hedging instrument against individual risk sensitivity that is higher in crisis affected times. The paper aim is to compare real economy data with financially efficient working capital decisions predictions. The financially efficient working capital decisions model expected that liquidity measures like current liquidity indicator should be treated as forecasting indicator about future risk sensitivity of the entities. It could be also suitable as forewarning impulse of future standing of whole processing part of economy.*

Key words:*working capital, risk sensitivity, enterprise value creation, financial analysis.*

JEL Classification: D92, E44, G00, G01, Q14

1. Introduction

Inventory levels in enterprises are part so called net working capital or known. Levels of inventory from investment point of view are maintained in entities for hedging purposes against the risk of breaking production fluency and risk of lack final offer for the clients (Bates, Kahle, & Stulz 2009; Faulkender, & Wang 2006).

More: net working capital investments, like cash and near cash assets, have also option value. We think about option of American type connected with holding more liquid current assets and value of option of European type from holding less liquid current assets components like inventories and accounts receivables (Mura et al. 2014, Michalski 2014; Soltes, Rusnakova 2013, Michalski 2013). There is believed that, both cash and inventory levels should be as small as possible (Ferreira, Vilela 2004, Kim et al. 1998, Miller, Orr 1966). But small as possible levels are not accurate in higher risk sensitivity context. If financial management decision should be done in context of future cash flows generated by the enterprise in the risk and uncertainty context, then truth is that the risk is higher, the working capital levels have higher utility (Raisova et al. 2014, Belas et al. 2012, Qineti et al. 2011, Uzik, Soltes 2009). There exists very few enterprises not suffering from that risk, and they do not suffer in the same way always (Opler et al. 1999). Enterprises sensitivity on risk is different, and it depend on factors connected with its business environment (Tkacova, Sinicakova 2015), including before the crisis, during the crisis and after the crisis context (Kulhanek 2012, Ozkan, Ozkan 2004; Hudson, Orviska 2013, Kulhanek, Uherek 2003). That paper is about financially efficient working capital decisions model predictions, and empirical data explanation of phenomenon of sensitivity on risk (Dittmar, Mahrt-Smith 2007). I also try to suggest that inventory to total assets indicator serves as forecasting information and forewarning signal about whole manufacturing part of economy as enterprise environment (Horvatova 2008, Kalcheva, Lins 2007, Gavurova 2012).

Inventory levels are a result of use active policy in attract the offer to clients by on time and full answer on the purchasers needs (Michalski 2014, Michalski 2009). Scale of investment in inventory levels and capital involved in inventory levels is a result of enterprise position in economic environment (Pinkowitz et al. 2006, Gazda 2002, Gavurova 2011). In effect there are entities that do not hold large levels of inventory. That strong in position enterprises have small financial vulnerability and lower sensitivity on risk and do not afraid of situation in which risk of too small level of inventory occur (Gavurova, Hyranek 2013). It is because the cost of holding too small inventory levels for them is very small or even they have no such opportunity cost or is not linked with negative option value (Soltes 2010, Glova, Sabol 2011). But also, there are enterprises with large financial vulnerability and sensitivity on risk connected to small levels of inventory (Michalski 2016). That entities need to keep larger inventory levels to hedge against costly risk of too small inventory levels (Soltes, Gavurova 2013). Too small inventory lead that kind of enterprises to negative changes in their sale levels. Destruction of cash revenues creation possibilities is dangerous for them and is hard to rebuild possibilities to create future cash revenues. Free cash flows are generated in context of uncertainty and risk and depend also on inventory management policy of the enterprise (Michalski 2014). That risk and uncertainty are mirrored in cost of capital rate that could be used to evaluate current economic

value of future free cash flows. The enterprise keeps larger levels of inventory, and does that, because its managing team has presumption that effect of that action will be enterprise value building factor. Strategic decision about level of investment in capital tied in inventory levels is made in context of all advantages and all disadvantages.

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

where: ΔV = enterprise value growth, ΔFF = free cash flows increase or decrease (could be positive when increase or negative when decrease). C = cost of money or rate of cost of capital financing of the enterprise, indices: BZ = to small inventory levels consequences, TZ = consequences of holding of inventory levels.
Depending on individual enterprise situation their individual financial vulnerability and sensitivity on risk, consequences in keeping higher levels of working capital depend on risk sensitivity reported by Financially efficient working capital decisions model predictions.

2. Model and data

The INV/TA, inventory to total assets in manufacturing enterprises could serves as forewarning indicator about general economic condition of manufacturing part of real economy.
General maximizing value of the enterprise equation for inventory Wilson based model is presented below (2). (3). (4) and (5):

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

$$\left(-\left[\frac{Q}{2} + L_{INVL}\right] \times v - \frac{\left[\frac{P \times K_{\sup}}{Q} + \left(\frac{Q}{2} + L_{INVL}\right) \times v \times C_{nf}\right] \times TAXS}{CoC} \right)' = 0 \quad (3)$$

$$-\frac{v}{2} + \frac{P \times K_{\sup} \times TAXS}{Q^2 \times CoC} - \frac{v \times C_{nf} \times TAXS}{2 \times CoC} = 0 \quad (4)$$

$$Q^2 = \frac{2 \times P \times K_{\sup} \times TAXS}{v \times \left(CoC + C_{nf} \times TAXS\right)} = VBEOQ^2 \quad (5)$$

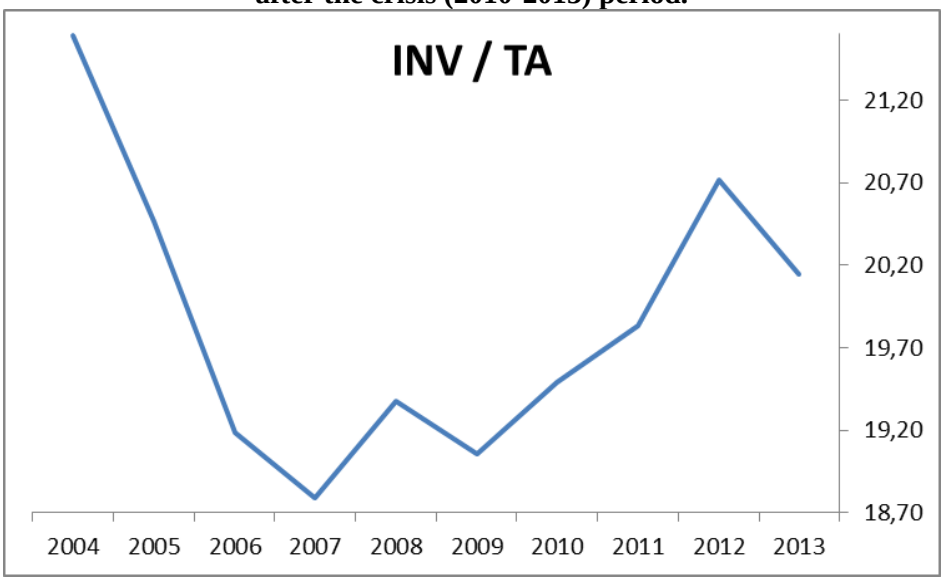
where:

$$L_{INVL} = \left(-2 \times SD^2 \times \ln \frac{C_{INV} \times Q \times SD \times v \times \sqrt{2\Pi}}{P \times K_{loi}} \right)^{0,5} \quad (6)$$

where: SD - standard deviation of consumption of stocks, K_{loi} - the cost of the lack of inventory, the cost of the lack of inventory (K_{loi}) includes also alternative costs of short of speculative inventory levels, C_{INV} - the cost of maintaining inventory (the percentage) and v - unit cost [price] ordered stocks). Q - order quantity; P - demand for the product/inventory in period (year, month); K_{sup} - cost per order; C_{inv} - holding cost factor ($C_{inv} = CoC + C_{nf}$); and v - purchase cost per unit.

Risk sensitivity stimulates the cost of the lack of inventory and in effect, risk sensitivity is responsible for grooving levels of inventory.
Each enterprise tries to suit its inventory levels to its business environment. Individual risk sensitivity is a result of entity answer on changes in its internal economic health but also is response on general economic changes. Here we present inventory to total assets indicator in enterprises reported in Amadeus database.

Figure 1. The relationship between inventory and total assets (INV/TA) in enterprises before the crisis (2004-2006). during the crisis (2007-2009) and after the crisis (2010-2013) period.



Source: own study based on data from 4525 enterprises reported in Database Amadeus product of Bureau van Dijk, [date: 2015 MAR 2]

That results are presented in three business environment conditions: 2002 - 2006 period, named by us as „before the crisis", 2007-2009 „during the crisis", and 2010-2013 „after the crisis". Empirical data is in correspondence with our projections derived from theory based on financially efficient working capital decisions model. Financially efficient working capital decisions model was presented by Michalski (Michalski 2016, Michalski 2013). That is useful to describe expected relationship of inventory levels and total assets (INV/TA) and it depends on enterprise individual risk sensitivity level. Zietlow and Michalski (Zietlow, Michalski 2012) presented such sensitivity on risk relation on Polish nonprofit organizations (comp. with Vacekova, Svidronova 2014, Svidronova 2013). In that paper the relation of risk sensitivity with inventory levels is presented for general population of entities reported in Amadeus database, which have unbroken 10 years reports about their inventories and total assets. We started with collection of over 2960000 enterprises that operate in Romania, next we have reduced that group to population of 4525 manufacturing enterprises that operate with use of full operating cycle during production. Such enterprises report both inventory and total assets levels in each year from the 2004 – 2013 period. In the context of risk sensitivity, the growth of risk sensitivity is a basis for increase of relation between inventories and total assets (INV/TA).

Table 1. The relationship between inventory and total assets (INV/TA) in enterprises that use full operating cycle before the crisis (2004-2006). during the crisis (2007-2009) and after the crisis (2010-2013) period.

[%]	2013	2012	2011	2010	2009	2008	2007	2006	2005	2004
MEAN (INV/TA)	20.15	20.71	19.84	19.49	19.06	19.38	18.79	19.18	20.46	21.59
SD (INV/TA)	16.05	15.98	15.41	15.00	14.89	14.93	14.49	14.74	15.61	16.78
MEDIAN (INV/TA)	16.43	16.98	16.08	16.17	15.49	15.93	15.48	15.82	17.07	17.98

Source: own study based on data from 4525 Romanian enterprises reported in Database Amadeus product of Bureau van Dijk, [date: 2015 MAR 2]

In crisis context, according to financially efficient working capital decisions model predictions, that relationship could be treated as an forewarning information of increasing probability of danger of financial difficulties in manufacturing branch. We expected that growing values of inventories levels to total assets (INV/TA) relationship is seen even earlier, before other economic indicators are a pretty decent. Figure 1 together with table 1 present relationship of average inventory levels to total assets (INV/TA) for data collected from enterprises reported in Amadeus database.

3. Conclusions

Presented data from enterprises is with one accord with Financially efficient working capital decisions model predictions. Forecasting of the Financially efficient working capital decisions model is useful for make quick judgments about current and future condition of the general population of enterprises, that population risk sensitivity and as global effect of that. There is possible to guess future condition of the whole manufacturing part of economy as well. Next research should be concentrated on future control of overall fit of the Financially efficient working capital decisions model and its predictions in after the crisis conditions, cross the countries and cross the sectors research, that could answer how the risk sensitivity characterize the enterprises from various business branches, and various countries.

ACKNOWLEDGEMENTS: ***The presented work and results is part of monothematic cycle realized as part of grant titled: Cash management in small and medium enterprises that use full operating cycle. This work was supported by 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 National Science Centre granted according decision nr DEC-2014/13/B/HS4/00192 (project number: 2014/13/B/HS4/00192).***

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