Is cash conversion cycles optimum in Turkish listed food-beverage firms?

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Abstract. *In this study, the optimality of cash conversion cycles of firms at food-beverage index of BIST (Istanbul Stock Market) is investigated. Panel KSS unit root test developed by Uçar and Omay (2009), which is suitable for heterogeneous panels & for non-linear financial series and taking into account cross sectional dependence, is used in study with quarterly data spanning the period 2008-2013. Cash levels of 13 firms among 15 are observed non-optimal by the aid of Sequential Panel Selection Method (SPSM) developed by Chortareas and Kapetanios (2009). This results show most firms at food-beverage index do not pursue a balanced working capital policy.*

Keywords: Cash Conversion Cycles, Non-Linear Panel Unit Root Test, Sequential Panel Selection Method, Food and Beverage Sector, Turkey.

JEL Classification: F32, G31, G32.
REL Classification: 10B.

1. Introduction and theoretical background

The idea that working capital management affects a firm's profitability and risk is generally accepted and has recently received considerable attention. Having a healthy financing structure depends on not only long-term financing and investment decisions such as capital budgeting and capital structure, dividend policy but also decisions for liquidity control (Banos-Caballero, 2012). In periods of crisis, although firms are able to continue their existence by way to reduce or postpone long-term investment, failure at cash management and liquidity control can be brought to the point of completely stopping their activities for failing to give enough attention to working capital management. In this context, an effective working capital management is required for companies in order to both continue their existence and increase their competitiveness (Yücel and Kurt, 2002).

At effective management of working capital, cash conversion cycle is an important criterion especially in cash management (Attari and Raza, 2012). Cash conversion cycle, where the decisions about investments on accounts receivable & inventories and about acceptance of credit from suppliers, are reflected (Garcia-Teruel and Martinez-Solano, 2007), is defined as the period of money return of funds used for working capital (Omağ, 2009). While cash conversion cycle is shorter in some firms, it could be quiet longer for others. In fact, in some firms payment period comes to be negative due to its longer duration than efficiency period (İşeri and Chambers, 2003). With short cash conversion cycle, a firm can keep less cash among the elements of working capital and have liquidity due to deferred payments (Çakır, 2013). Moreover, a firm can increase its profitability and value via using funds to increase efficiency (Nobanee, 2010). On the other hand, increased sales due to prolongation of cash conversion cycle may also provide increase in profitability. That is; with prolongation of the cash conversion cycle, glut of inventory may prevent interruptions in the production process and job losses that may arise due to the scarcity of products (Banos-Caballero, 2010), customers who want long-term purchases may be unimpeded when prolonged period of receivables (Çakır, 2013), supplier financing can be reduced by utilizing early payment discount in case of shorter debt repayment period (Wang, 2002). However, when the cost of investments in working capital is greater than the return of loans granted to customers with the investment made in stock, profitability can be adversely affected by the cash conversion cycle (DeLoof, 2003). Maintaining high investment in working capital, and relinquish other efficient investments to make these and existence of long cash conversion cycle can lead companies to bankruptcy (Banos-Caballero, 2010).

Having optimum period of cash conversion is a necessity of effective liquidity management. However, the differences of firms arising from the production

processes in the sector, the conditions of competition, buying and selling opportunities with credit and the built-in applications in the sector can affect their credit sales, inventory and debt policies, and this may lead cash conversion cycles to differ by sector. In other words, a receivable, inventory or commercial debt level that can be considered optimal in one sector, are not pointing an optimal level for a company in another sector. In this context, each sector has its own average cash conversion cycle (Kök et al., 2013).

In literature, while there are many studies to investigate the relationship between cash conversion cycle as a major tool of working capital and variety of variables, there are few to test the stationarity of cash conversion cycles (Kök et al., 2013). In our study compared to the other studies, whether firms of food-beverage index have optimum cash level is tested via non-linear unit root test which is more suitable for financial time series and the significance of taking into account the optimum cash level when creating liquidity investment and financing policies for companies is expressed.

2. Literature review

Effective liquidity management contains both reduction of the inability risk to cover short-term liabilities and planning & control of current assets by avoiding over-investment and short term liabilities (Eljelly, 2004). Liquidity management is necessary for fulfillment of the obligations and to ensure warranty of a profitable venture (Attari and Raza, 2012). Moreover, fully concentration on liquidity of companies led to a decrease in profitability, received financial decisions to maximize profitability of the company will reduce the chances of having sufficient liquidity (Yücel and Kurt, 2002).

In most studies, a negative correlation has been found between cash conversion cycle and profitability [Wang (2002), Jose et al., (1996), Shin and Soenen (1998), S. Harma and Kumar, Yücel and Kurt (2002), Eljelly (2004), Lazaridis and Tryfonidis (2006), Garcia-Teruel and Martinez-Solano (2007), Raheman and Nasr (2007), Nobanee (2011), Attari and Raza (2012)].

Lyroudi and Lazaridis (2000) examined the relationship between cash conversion cycles of firms in food sector in Greece and variables like liquidity, profitability, debt structure and size of company in their study. While they couldn't find any relationship between cash conversion time and leverage ratio, they have determined the positive relationship between liquidity and profitability ratios. On the other side, they stated that there is no difference in terms of liquidity ratios between small and large scale companies. Similar study was made on companies in BIST (Stock Market of Istanbul) (Yücel and Kurt, 2002). It is examined in their

study that whether cash conversion cycle, liquidity, profitability and leverage ratios of companies in the study content differ significantly according to company scale, periods and sectors. Liquidity ratios have positive relationship with cash conversion cycle, negative relationship with profitability and have no relationship with leverage ratios. Moreover, it is observed that cash conversion cycles varied according to sectors, the cash conversion cycle of companies in industry sector was longer when compared with other sectors, cash conversion cycle has not changed during the recession and large scale companies have longer cash conversion cycle by small and medium-sized entities (SMEs). Belt (1985) have studied American companies and observed that cash conversion cycles of retail and wholesale trade companies is shorter than production companies, cash conversion cycle has increased in times of recession and while cash conversion cycle of non-durable goods decreased in a consistent manner, the durable goods cash conversion cycle has been unstable but declining for the examined time period.

Uyar (2009) tried to test how cash conversion cycles of companies operating in the commerce, stone-ground and textile sector on BIST are affected by global economic crisis. In study, it is stated that due to crisis, the period length of receivables collection and the retention of inventories cause long periods of cash conversion in stone-ground and the textile industry, and commerce companies have shorter cash conversion cycle by extending their debt repayment period. In study made by İşeri and Chambers (2003) examining cash conversion cycles of firms in food, beverages, tobacco and retail commerce sector, almost all of the companies of production and companies in the retail sector have all been shown to be negative conversion time. However, this is interpreted differently in terms of sectors. Being longer payment periods of debts than the collection periods of receivables and inventory holding periods is evaluated negatively by manufacturing companies. Since firms have chosen the extension way of the payment period of short-term debt before unable to shorten their collection and inventory holding periods. On the other hand, while buying goods by credit & selling by cash, having the ability to be easily converted into cash of inventories and increase the period of short-term debt payments of companies in the retail sector have made negative conversion periods to be interpreted positively. Furthermore, being as much unaffected as manufacturing firms of companies in this sector is interpreted as an advantage in terms of cash conversion cycles.

Companies hold liquid assets in their hand in order to fulfill their daily activities, to fight with encountered extraordinary situations and to provide short-term gains. Since large companies have access to both monetary and capital markets easily, they have no reason to possess liquid assets as much as SMEs. The challenges faced by SMEs in finding resources have increased the importance of an effective

liquidity management for these companies (Moss and Stine, 1993). In the literature, large enterprises and SMEs have been studied for the management of liquidity.

Sakarya (2008) has investigated the cash management efficiency of SMEs in his study and observed not having effective cash management of companies. In study, cash conversion cycles vary by sub-sectors in manufacturing industry and some sub-sectors undulate according to the overall average. SMEs can make their cash management more effective by analyzing their cash conversion cycles (Peel et al., 2000). Small-scale companies have relatively more current assets, a high proportion of short-term debt and fluctuating cash flows (Padachi, 2006). Omağ (2009) studied cash conversion cycle of SMEs in Turkey and USA. He has found that fluctuations in cash conversion cycles of SMEs in Turkey are higher. Banos-Caballer (2010) analyzed the determinants of cash conversion cycles of SMEs and stated that these companies identified their target cash conversion cycles and tried to reach this goal. Moreover, they observed that companies with large cash flows and former companies have longer cash conversion cycles. Also, companies with the higher leverage effect, fixed asset investment & asset profitability and companies having opportunity to grow have more aggressive cash management policy, namely they have shorter cash conversion cycle. Ebben and Johnson (2011) have investigated the relationship between invested capital and performances of manufacturing and retail SMEs. They stated that companies with effective cash conversion cycles are more liquid and they have higher profitability. Lyroudi and McCarty (1993) examined the relationship between cash conversion cycles & the current ratios and cash conversion cycles & liquidity ratios. It is said that cash conversion cycle has negatively relationship with current ratio, stock return time & debt repayment period and positively relationship with receivable collection period. Furthermore, cash conversion cycle differs according to manufacturing, retail, wholesale & service sectors and cash conversion cycle is higher in service sector (Lyroudi and Lazaridis, 2000).

Fluctuations may occur at cash conversion cycles depending on both the developments in industry and macroeconomic factors like inflation, interest rates, growth rates (Omağ, 2009). The presence of optimal working capital level for sector, the investments on working capital of companies due to the fluctuations, and temporary & different changes in policies relating to the financing of these investments may occur, but will show the return again to its former level. Namely, fluctuations in cash conversion cycles will take place around sector average and later will return the average value. Kök et al. (2013) tried to test the existence of optimal working capital policy according to sectors by applying panel KPSS test to series of cash conversion cycles of 7 manufacturing industry sectors in BIST in the period 1990-2009. In their study, it is determined that a working capital policy

and optimal working capital level for each sector exist, although they are at different levels. Moreover, NDS series is stationary for all sectors and has a tendency to return to average in long-run.

3. Econometric methodology

In literature, nonlinear panel unit root test developed by Uçar and Omay (2009) (UO) has been used in many areas like stock market efficiency (Omay and Karadağlı, 2012; Suresh et. al. 2013), testing unemployment hysteria (Bolat et al., 2014), the validity of purchasing power parity (Bahmani-Oskooee et. al., 2013; He and Chang, 2013).

Instead of ADF unit root test at Im, Pesaran and Shin (IPS) panel unit root test, UO (2009) panel unit root test uses nonlinear unit root test developed by Kapetanios et al. (2003). The difference between UO and IPS panel unit root tests is based on their alternative hypothesis. Alternative hypothesis of IPS accepts that at least one series is stationary and all series are linear. However, alternative hypothesis of UO tests that at least one series follows the Panel Exponential Smooth Transition Autoregressive Process (PESTAR).

The null hypothesis of UO panel unit root test shows that all units follow unit root process ($H_{0:}\phi_i=0$). Since Y_i is not defined under this hypothesis, it cannot be tested directly. Therefore, Uçar and Omay (2009) parameterized this equation again by following the study of Kapetanios et al. (2003) by obtaining its first-order Taylor expansion around $\phi i=0$:

$$\Delta y_{i,t} = \propto_i + \delta_i y_{i,t-1}^3 + \sum_{j=1}^{p_i} \beta_{i,j} \Delta y_{i,t-1} + \epsilon_{i,t}$$

In this equation, y represents the series of cash conversion cycles, t is period number, $\propto$ and δ_i are prediction parameters. If $\delta_i = 0$, null hypothesis is that panel has a unit root. If $\delta_i < 0$, alternative hypothesis is that there exists nonlinear at least one stationary series in the panel.

Uçar and Omay (2009) suggested the test statistic given below to test null hypothesis of unit root:

$$\bar{Z} = \frac{\sqrt{N}(\bar{t}_{NL} - E[t_{i,NL}])}{\sqrt{var[t_{i,NL}]}}$$

In here, $E[t_{i,NL}]$ shows the expected value of $t_{i,NL}$ and $var[t_{i,NL}]$ represents the variance of $t_{i,NL}$. This test takes into account cross-sectional dependence and is suitable for heterogeneous and nonlinear series.

The main problem of panel data techniques is that alternative hypothesis is for stationarity of at least one series. In such cases, it can be said that panel has stationarity. However, there isn't any idea about which series are stationary and which are not. Therefore, stationary and non-stationary series are distinguished via sequential panel selection method developed by Chortareas and Kapetanios (2009).

The SPSM proposed by Chortareas and Kapetanios (2009) is based on the following steps:
- Uçar and Omay panel unit root test is applied to the panel. If the unit root null cannot be rejected, the procedure is stopped, and all the series in the panel are non-stationary. If the null is rejected, we move to step 2.
- Same analysis is continued by removing series with Minimum KSS statistics from the panel.
- This process lasts till the acceptance of alternative hypothesis which is at least one series in the panel is stationary. Thus, stationary and non-stationary series are distinguished.

Moreover, Bootstrap simulation was performed by 10.000 replications when carrying out analysis.

4. Data and empirical results

In this study, the existence of optimal cash conversion cycle of firms in Food and Beverage Index of BIST is tried to be determined by the quarterly dataset containing cash conversion cycle series between the periods 2008 and 2013. In this context, data of these 15 firms quoted to index with their correctly available data was obtained from official websites of BIST, Public Disclosure Platform (Kamuyu Aydınlatma Platformu-KAP) and companies. Cash conversion cycles of firms in question are calculated by subtracting debt payment period from the sum of the receivables collection period and inventory turnover period.

Unit root tests are in suitable structure in order to determine whether cash conversion cycles are at optimum level. In order to choose suitable unit root test for panel, the homogeneity and linearity of series, and cross sectional dependence of the panel must be determined. According to slope homogeneity test developed by Pesaran and Yamagata (2008), series are heterogeneous. These results are given in Table 1.

Table 1. *Pesaran and Yamagata (2008) Slope Homogeneity Test Results*

	Test Statistics	Prob.
Δ	4.310	0.000
Δ_{adj}	4.595	0.000

Cross sectional dependence is another test which must be applied before investigation of unit root presence. In order to search cross sectional dependence, the results on Table 2 should be viewed. When time dimension is larger than cross sectional dimension, Breusch and Pagan (1980) CD LM1; when time dimension is equal to cross sectional dimension, Pesaran (2004) CD LM2; when time dimension is smaller than cross sectional dimension, Pesaran (2004) CD LM results should be taken into account. In our study, the significance and test statistics of CD LM1 (Breusch and Pagan 1980) should be considered since our time dimension is larger than cross sectional dimension. According to this result, cross sectional dependence exists in the panel for both models of level and level & trend. In this situation, using second generation unit root tests which take into consideration cross sectional dependence will be suitable.

Table 2. *Cross Sectional Dependency Test Results*

	Level	Level & Trend
Cd LM1 (Breusch and Pagan 1980)	729.567 (0.000)	659.641 (0.000)
Cd LM2 (Pesaran 2004)	39.347 (0.000)	34.838 (0.000)
Cd LM (Pesaran 2004)	-1.200 (0.115)	-0.949 (0.171)

Values in parenthesis represent significance levels.

Many reasons about non-linearity can be mentioned according to characteristic feature of examined financial series (Çil Yavuz and Yılancı, 2012). In literature, it is proven by many studies that financial series show non-linear behavior. In this context, using linear tests may lead inaccurate results. Therefore, non-linear test should be used. Cash conversion cycles should be considered as a non-linear. Because, in the creation of receivable collection period (RCP), stock return period (SRP) and debt payment period (DPP) values, heterogeneous structure of market and non-linear commercial tendencies of investors in the market can be considered as the reasons of this situation.

According to the results on Table 1 and Table 2, it is reasonable to use a panel unit root test which is suitable for nonlinear, cross sectional dependent and heterogeneous panels. Namely, extended version of Nonlinear KSS unit root test for panel is test we are going to use. This test is developed by Uçar and Omay in 2009 and known as "Panel KSS" & "UO panel unit root test" in literature.

Table 3. *Uçar and Omay (Panel KSS) Unit Root Test Results*

Series		Panel	
Firms	Tvalue	Tbar	Pvalue
Merko	-2.088	-1.337	0.049**
Pınar Et ve Un	-1.758	-1.210	0.072*
		-0.998	0.144

Since series have a fluctuating structure, the results of only trend and intercept model was stated.
*, **, *** represents 1%,5% and 10%, respectively.

According to UO panel unit root test (2009), null hypothesis states nonexistence of unit root in the panel, alternative hypothesis represents that at least one of the cross sections in the panel follows the Panel Exponential Smooth Transition Autoregressive Process (PESTAR). As can be seen, alternative hypothesis indicates that at least one series is stationary. However, it does not state which series are stationary and which series are not. In order to solve this problem, Sequential Panel Selection Method (SPSM) developed by Chortareas and Kapetanios (2009) is used in our study. According to this, first of all analyze is performed again by extracting from panel Merko firm with the lowest Tvalue statistics. After seeing panel significant, this time Pınar Et-Un firm with the lowest Tvalue statistics is extracted from panel. Null hypothesis that panel has a unit root is accepted in this new situation after removing these two firms from the panel respectively. If the stationarity in the panel was still going on, same procedure would be carried out by extracting the firm with the lowest Tvalue statistics from the panel. The series of these firms are observed stationary and cash conversion cycles of these firms are at optimum level. However, cash conversion cycles of other firms are not optimum, and therefore follow fluctuating working capital cycle. These results were given in Table 3. In the table, extracted firms from the panel, Tvalues of these firms, Tbar value of remaining panel after extraction and significance level at this situation was stated respectively.

5. Conclusion and discussion

Planning and controlling the current assets and short term liabilities of companies maintaining their activities by balancing liquidity - profitability are necessary for effective cash management in many companies.

Because, when companies prefer to stay liquid by a conservative approach, they can miss the profitable investment chances. When pulled profitability to the forefront and focused on investments, they may confront with liquidity crisis. At this point, the determining cash level at an optimum level for companies has a great significance.

In this study, the existence of optimal cash conversion cycle of firms in Food and Beverage Index of BIST is tried to be determined by the quarterly dataset between the periods 2008 and 2013. The stationarity of series was investigated via nonlinear panel unit root test developed by Uçar and Omay (2009). By using Sequential Panel Selection Method (SPSM), 13 of 15 firms were observed non-stationary except Merko and Pınar Et-Süt. In this context, companies in food-beverage sector were found that they do not have optimal working capital cycle, their cash conversion cycle differ from average in long-run and have a volatile

structure. The reason for this situation can be considered as the non-stationary, constantly vulnerable against crisis of economic structure of Turkey. Moreover, these findings contradict with the findings of the study made by Kök et al. (2013).

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