The Relationship Between the Consumer Price Index, Operating Cycle, Size and Growth Opportunities with the Cash Holding in Tehran Stock Exchange

Ebrahim Abbasi[a]   Meysam Kaviani[b]   Sara Boostani[c]

[a] Associate Professor at Alzahra University, Iran,Tehran

[b] Corresponding Author, PHD Student (Financial management), Islamic Azad University, Iran

meysamkaviani@gmail.com

[c] Department of Accounting, South Tehran Branch, Islamic Azad University, Tehran, Iran

Keywords

Abstract

Cash holding in businesses depends largely on their resource management because operational activities in a period which usually lasts one year concern the recognition and optimal management of working capital. The working capital is not primarily determined to increase profits but managers try to obtain a favorable level of liquidity so that they can meet the company's profitability goals. This article aims to explain the relationship between consumer price index (CPI), operating cycle, and size and growth opportunities with cash holding in Tehran stock Exchange. To achieve this goal, 75 companies listed in Tehran Stock Exchange whose financial data were accessible from 2012 to 2016 were selected as the research sample. The results indicated that CPI and the operating cycle have no significant relationship with cash holding. In addition, the analysis of other variables suggested that the firm size, net changes in working capital, changes in current liabilities, and cash holding have a significant relationship with cash holding. Finally, the results of this study showed that there is a significant relationship between the company size and cash holding, while growth opportunities do not show any significant correlation with cash holding.

1. Introduction

Cash is an asset unprofitable, especially during periods of inflation; it can cause the loss of purchasing power and increase cash holding costs, prices, interest rates, and capital costs. When assessing investment projects, rate of return on investment is used as the discount rate for adjusting and calculating the present value of future cash flows. The positive net present value (NPV) for investment projects will lead to investment opportunities and future investment returns that can be used by companies to reduce their cash holding. As a result, companies reduce cash holding in their assets (Ferreira, 2003). In addition, when companies attempt to keep cash equivalents they can convert into cash it at lower costs so that the sale of these assets to raise cash is cost-effective (Shleifer & Vishny, 1984) Companies that hold a considerable amount of realizable assets are less likely to have cash holdings. Especially during periods of inflation when the price increases the fair value of assets is generally higher than the book value of assets. So, instead of cash holding, companies tend to increase their cash assets. Inflation may also affect the company's cash reserves. At the time of inflation, companies need more money to buy raw materials and other goods. As a result, the excessive consumption of working capital results in creating less cash through the operating cycle. As prices rise, the company anticipating inflation will pre-purchase more raw materials in order to prevent increasing costs and the use of additional reserves. Besides, other companies may invest in gold or real estate to avoid the loss of their purchasing power and high production. Therefore, the companies that hold too much cash may end up in higher working capital and lower cash holding. Besides, the rise in prices can lead to rising interest rates and higher uncertainty in investment return (Friedman, 1977). Furthermore, the operating cycle in companies may be affected by factors such as industry, the company's business model, and the management efficiency. In general, if the company continues its operations, the company's operating assets and working capital needs to be kept in balance. In other words, from the demand-side perspective of demand, if products are to be produced in a shorter operating cycle, the capital will circulate in relatively less time and the company has to consistently provide funds to rapidly complete the purchase, production, and sale cycles. Such companies must hold more money to cover transactions to be in line with transactional motivation for

holding cash. From the supply-side perspective, a shorter operating cycle means a shorter process of obtaining inventory, sales, and earning more cash. Capital accumulation within the company is effective when the working capital is obtained through inventory and reducing accounts receivable. Thus, at a certain level, by enhancing the product cycle, especially when accounts receivable collection rate decreases, the company will experience a longer operating cycle as a result of the need for holding more cash to protect against risk and future uncertainty. Based on the above analysis, we address the inverted U-shaped relationship between operating cycle and cash holding. The extension of operating cycle in a certain range means that continuous supply of money through the cash cycle is longer and the company does not need to hold a lot of cash for transactions. At the same time, the development of operating cycles reduces the efficiency of working capital, and more cash is acquired through inventory and accounts receivable and the liquidity speed of the cash balance is reduced for cash holding.

In the Tehran Stock Exchange, some researches have been done in line with the relationship between inflation, operating cycle and cash accumulation; research of Lashgari et al. (2015) and Fe'le-Gary and Karmani (2015) showed that the factor of inflation has no significant influence on the cash. Since the manager of Iranian companies predicting theirs budget in their investment decision without attention to inflation and its outcome; predicting their budget, therefore, inflation has no significance relation with internal factor of firm. Given the fact that inflation rate in 2017 in Iran was determine by single-rate policy makers; therefore, inflation rate can decrease the rate of interest rates and this may affect the investment and financing decisions of the companies, and the managers predict the effects of reducing inflation more than before. But this study assumed that the inflation changes had no effect on the company's internal decisions such as cash management, while larger companies have lower cash for achieving profitable investment opportunities, because larger companies have more opportunities.

2. Literature and Background

Fallah and Hasheni (2017) indicated that the relationship between inflation and cash holdings was invert at a certain level and its direction change from that level, and this was a direct relationship. On the other hand, the relationship between operating cycle and cash

holdings was reversed to a certain degree and the direction change from that level on, so this relationship became direct. Dehghanfard and Moslemi (2017) indicated that inflation and operational cycle has not a significant influence on firm's cash holding. The results showed that there is no significant influence of inflation through the operating cycle on cash holding. Rostami Jazz et al. (2016) concluded that the operating cycle and inflation have a significant impact on cash holdings. This can be a sign of the firm's response to inflation. In other words, at the time of inflation, firms tend to keep more cash, rather than exchanging the cash to other assets and when the operating cycle is high, firms tend to reduce cash holdings in the firm to other assets that will lead to the firm's profitability. Ghadiri Moghaddam et al. (2015) indicated while no significant correlation could be found between the firm's operating cycle and its cash holdings level, there is a U-shaped relationship between inflation and the firm's cash holdings level. In their study, Ghi (2015) concluded that there is a significant positive association between cash holdings and the CPI to cash holding of trade sector in Vietnam. Yanchao Wang et al. (2013) concluded that there is negative significant relationship between cash holding and the consumer price index (CPI). They also found an inverted U-shaped relationship between operating cycle and cash holding. Martínez-Carrascal (2010) showed that the relationship between cash holdings and tangible assets, which facilitate access to external finance, is powerful for small and medium firms than for large firms. In contrast, cash holding sensitivity to changes in the spread between the return on liquid assets and alternative uses of these funds (debt repayment, in the empirical specification presented) is greater for larger firms, something that may be linked to their better access to capital markets and their less need to keep a cash buffer for precautionary reasons. Mikkelson et al. (2003) showed that continuous surplus cash holding does not lead to a weak performance and does not show conflict of interest between managers and shareholders. Their evidence supports this assumption that cash holding increases the company value. Harford (1999) suggests that companies that are richer in cash are more likely to acquire other companies and such decision is more likely to reduce the company value. In their study on NYSE, Subramaniam et al. (2011) found that companies with decentralized and diversified ownership have significantly less cash holding than those with centralized ownership. Their further analysis showed that since companies with diversified ownership have more interactions

with other companies and special industries, they are exposed to more investment and growth opportunities and thus they have less cash holding.

3. Hypotheses

The following hypotheses are developed and tested in this study:

– **Hypothesis 1:** There is no significant (linear or nonlinear) relationship between the consumer price index and cash holding.

– **Hypothesis 2:** There is no significant (first-degree) relationship between the consumer price index and cash holding.

– **Hypothesis 3:** There is no significant (second-degree) relationship between the consumer price index and cash holding.

– **Hypothesis 4:** There is no significant (linear or nonlinear) relationship between operating cycle and cash holding.

– **Hypothesis 5:** There is no significant (first-degree) relationship between operating cycle and cash holding.

– **Hypothesis 6:** There is no significant (second-degree) relationship between operating cycle and cash holding.

– **Hypothesis 7:** There is no significant relationship between the company size and cash holding.

– **Hypothesis 8:** There is no significant relationship between growth opportunities and cash holding.

4. The Model

To test the research hypotheses and achieve the main goal of the study, we used a multiple regression model presented as follows:

$$\Delta \text{Cash}_{i,t} = \beta_0 + \beta_1 \text{CPI}_{i,t} + \beta_2 \text{CPI}_{i,t}^2 + \beta_3 \text{Cycle}_{i,t} + \beta_4 \text{Cycle}_{i,t}^2 + \beta_5 \text{CF}_{i,t} + \beta_6 \text{Tobin}_{i,t}$$
$$+ \beta_7 \text{Lnasset}_{i,t} + \beta_8 \Delta \text{NWC}_{i,t} + \beta_9 \Delta \text{Sdebt}_{i,t} + \varepsilon_{i,t}$$

Where $\Delta \text{Cash}_{i,t}$ is defining criteria for cash holding differences calculated as the sum of cash and short-term investment in year t and t-1 by the total assets in year t.

CPI is the consumer price index that is calculated on the basis of the previous year (previous year = 100) as changes in the price level of consumer goods and services

purchased by households, which are extracted from the Central Bank of the Islamic Republic of Iran.

Cycle: It is calculated as operating cycle divided by 1000. Operating cycle starts from the cash payment for purchasing raw materials and goods and ends in collecting cash from sales.

CF: It represents cash flow and is calculated as the sum of operating cash flow divided by total assets.

Ln asset: It is the logarithm of total assets, representing the company's size and as a control variable in this study is equal to the natural logarithm of total assets and is derived from companies' financial statements.

Tobin q: It represents growth opportunities, and is considered as the second control variable in this study. Tobin Q is calculated as the product of the market value of corporate securities, long-term debts plus book value of short-term debt divided by the value of company assets.

ΔNWC_{it}: It is the net difference between the working capital from year t year to year t-1 divided by total assets in year t. The difference between the company's current assets and current liabilities is called the net working capital.

$\Delta Sdebt_{it}$: It is the difference in current liabilities between year t and year t-1 divided by total assets in year t.

To test the research hypothesis, the conceptual model of the study is examined using the following three models:

Model 1: In this model, there is no variable as operating cycle and the relationship CPI and other variables with capital accumulation is examined as follows:

$$\Delta Cash_{i,t} = \beta_0 + \beta_1 CPI_{i,t} + \beta_1 CPI_{i,t}^2 + \beta_3 CF_{i,t} + \beta_4 Tobin_{i,t} + \beta_5 Lnasset_{i,t} + \beta_6 \Delta NWC_{i,t} + \beta_7 \Delta Sdebt_{i,t} + \varepsilon_{i,t}$$

In this model, if both coefficients $\beta 1$ and $\beta 2$ are estimated to be insignificant, there will be no relationship between CPI and cash holding. However, if both coefficients are significant or if the coefficient β_2 is only significant, there will be a second-degree relationship between CPI and cash holding. Furthermore, if the coefficient β_1 is only significant, there will be a linear relationship between CPI and cash holding.

Model 2: In this model, CPI is omitted and relationship of operating cycle and other variables with capital is investigated as follows:

$$\Delta Cash_{i,t} = \beta_0 + \beta_1 Cycle_{i,t} + \beta_2 Cycle_{i,t}^2 + \beta_3 CF_{i,t} + \beta_4 Tobin_{i,t} + \beta_5 Lnasset_{i,t} + \beta_6 \Delta NWC_{i,t} + \beta_7 \Delta Sdebt_{i,t} + \varepsilon_{i,t}$$

In this model, if both coefficients β_1 and β_2 are estimated to be insignificant, there will be no relationship between CPI and cash holding. In contrast, if both coefficients are significant or if the coefficient β_2 is only significant, there will be a second-degree relationship between CPI and cash holding with a U-shaped function. Furthermore, if the coefficient β_1 is only significant, there will be a linear relationship between CPI and cash holding.

Model 3: In this model, the relationship of CPI and operating cycle with the cash holding is explored simultaneously as follows:

$$\Delta Cash_{i,t} = \beta_0 + \beta_1 CPI_{i,t} + \beta_2 CPI_{i,t}^2 + \beta_3 Cycle_{i,t} + \beta_4 Cycle_{i,t}^2 + \beta_5 CF_{i,t} + \beta_6 Tobin_{i,t} + \beta_7 Lnasset_{i,t} + \beta_8 \Delta NWC_{i,t} + \beta_9 \Delta Sdebt_{i,t} + \varepsilon_{i,t}$$

In this model, if both coefficients β_1 and β_2 are estimated to be insignificant, there will be no relationship between CPI and cash holding. In contrast, if both coefficients are significant or if the coefficient β_2 is only significant, there will be a second-degree relationship between CPI and cash holding with a U-shaped function. Furthermore, if the coefficient β_1 is only significant, there will be a linear relationship between CPI and cash holding. Likewise, if both coefficients β_3 and β_4 are estimated to be insignificant, there will be no relationship between CPI and cash holding. On the other hand, if both coefficients are significant or if the coefficient β_4 is only significant, there will be a second-degree relationship between CPI and cash holding with a U-shaped function. Furthermore, if the coefficient β_3 is only significant, there will be a linear relationship between CPI and cash holding**.**

5. Testing Hypotheses

The research hypotheses are defined based on coefficients of models 1, 2, and 3 as follows:

A) Testing hypotheses 1, 2, and 3 based on models 1 and 3:

To test hypotheses 1, 2, and 3, we use models 1 and 3. It should be noted that all three tests are first performed through regression models 1 and 3. If the results of the tests

show that null hypothesis 1 is not rejected, the two null hypotheses 2 and 3 will be also accepted.

B) Testing hypotheses 4, 5, and 6 based on models 2 and 3:

To test hypotheses 4, 5, and 6, we use models 2 and 3. It should be noted that all three tests are first performed through regression models 2 and 3. If the results of the tests show that null hypothesis 4 is not rejected, the two null hypotheses 5 and 6 will be also accepted.

C) Testing hypotheses 6 and 8

To test hypotheses 6 and 7, we use all the three models. This shows that the three tests are performed through regression models 1, 2, and 3.

6. Methodology and data

This research used induction method (move from part to whole) that describe The relationship between the Consumer Price Index, Operating Cycle, Size and Growth opportunities with the Cash Holding by using cross-sectional correlation method. Also, according to the general historical data collection plan, this research is post-event type. Data collected from listed companies on the Tehran Stock Exchange between 2012 and 2016. The selected samples include companies that have a 12-month financial period, and secondly, their information is available from the beginning of fiscal year 2012 to the end of fiscal year 2016 (5 years), and thirdly, sample members are not included of financial corporate. According to the above-mentioned conditions, 75 companies have been selected as a statistical sample.

7. Stationary test of Variables

A precise study of the reliability of time series requires the use of statistical testing method. Correlation methods, Dickey Fuller, generalized Dickey Fuller, and Phillips Peron are common methods that used in the reliability testing of variables (Nasrstadi, 1999). The unit root test is one of the most common tests used to detect the stationary of the process. The root of the unit root test is based on the assumption that when $\rho = 1$, the process is not stationary. if there are no stationary variables in the model, so there is a possibility of false regression. The results of this test, which are presented in Table (1), indicate that the data is stationary.

Table 1: Results of Fisher's Unit root test

variable	Statistic	Prob
CASH	193.024	0.0102
CF	261.407	0.0000
CPI	275.01500	0.0000
CPI2	287.146	0.0000
CYCLE	258.179	0.0000
CYCLE2	196.004	0.0069
DCASH	213.604	0.0005
LNASSET	204.915	0.0019
NWC	235.411	0.0000
SDEBET	277.313	0.0000
TOBINQ	180.500	0.0453

6. Model estimation and hypothesis testing

Before estimating the model coefficients, the method of their calculation must be determined. To this end, F-Chow, Breusch-Pagan, and Hausman tests are used. Chow test compares the joint effects with the fixed effects, and the Breusch-Pagan test examines the joint effects versus random effects. If the desired model is not determined using these two tests, we will employ the Hausman test. The results of these tests are shown in Table 2:

Table 2: Results of F-Chow, Breusch-Pagan, and Hausman diagnostic tests.

Models	F Chow		Breusch-Pagan		Hausman		results
	Statistics	Test result	Statistics	Test result	Statistics	Test result	
Model 1	3.80 (0.00)	Fixed vs. joint effects	80.61 (0.000)	Radom vs. joint effects	0.00 (1.00)	Radom vs. fixed effects	Random effects
Model 2	3.86 (0.00)	Fixed vs. joint effects	81.24 (0.000)	Radom vs. joint effects	0.00 (1.00)	Radom vs. fixed effects	Random effects
Model 3	3.82 (0.00)	Fixed vs. joint effects	80.91 (0.000)	Radom vs. joint effects	0.00 (1.00)	Radom vs. fixed effects	Random effects

Note: Significance levels (P-value) are shown in parentheses.

As it can be seen in Table 2, all three models should be estimated using random effects. The results of model estimation are presented in Table 3:

Table 3: Relationship of CPI and operating cycle with cash holding

Models Coefficients	Model 1	Model 2	Model 3
Intercept	0.15 (0.005)	(0.000) 0.16	-
CPI	0.0005 (0.20)	-	-2.17×10^{-7} (0.94)
CPI^2	-2.17×10^{-6} (0.19)	-	-1.15×10^{-7} (0.98)
Cycle	-	0.03 (0.71)	0.035 (0.73)
Cycle^2	-	-0.001 (0.98)	-0.007 (0.92)
CF	0.006 (0.53)	0.005 (0.57)	0.006 (0.44)
Tobin Q	0.006 (0.37)	0.007 (0.3)	0.006 (0.46)
Ln asset	-0.013 (0.000)	-0.013 (0.000)	-0.013 (0.000)
NWC	0.002 (0.065)	0.0026 (0.09)	0.003 (0.097)
Sdebt	0.0002 (0.089)	0.0001 (0.15)	-0.0001(0.3)
F	8.364 (0.000)	8.346 (0.000)	6.835 (0.000)
Adjusted R ^{2}	0.14	0.14	0.13
Durbin-Watson	1.64	1.65	1.64

Note: Significance levels (P-value) are shown in parentheses. If the P-value is smaller than 0.1, the calculated coefficient is significant at 90%, if it is smaller than 0.05 the calculated coefficient is significant at 95%, and finally if it is smaller than 0.01 the calculated coefficient is significant at 99%.

As it can be seen in Table 3, the CPI and CPI^2 values in both models 1 and 3 are very small and they are not significant at 95% and 90% levels. Therefore, it can be suggested that the null hypotheses 1, 2, and 3 are confirmed and it can be concluded that the CPI has no significant relationship with cash holding in the companies listed on the Tehran Stock Exchange. Similarly, the Cycle and Cycle^2 values in both models 2 and 3 are not significant, and thus it can be suggested that the null hypotheses 4, 5, and 6 are confirmed, showing the operating cycle has no significant relationship with cash holding in the companies listed on the Tehran Stock Exchange. Similarly, the significance levels for CF and Tobin Q shows that these two variable are not significantly correlated with cash holding the in the sample companies. However, Ln asset has a significant correlation with cash holding (P < 0.01). Besides, NWC has a significant correlation with cash holding (P < 0.1) and Sdebt shows the same relationship only in model 1, while it is not significantly associated with cash holding as suggested by models 2 and 3. In addition, Fisher value (F) in all three models is significant at 99% level of significance (P < 0.01). This finding indicates that the null hypothesis in the Fisher test stating that model coefficients are all zero is rejected. The

adjusted R^2 values in models 1, 2, and 3 are 1.14, 1.14, and 1.13, respectively, which represents the explanatory power of the model. In other words, in these three models, the explanatory variables are able to explain 14%, 14%, and 13% of variations in the dependent variable (cash holding) and the remaining variations are explained by other factors that are not included in these models. Besides Durbin-Watson coefficients in all three models had values close to 2, indicating there were no autocorrelation problems.

7. Conclusion

The results of this study showed customer price index and operating cycle have no significant relationship with cash holding in Iranian companies. This finding is contrary to the results observed by Yanchao Wang et al. (2013). Since at the time of inflation companies need more money to buy raw materials and other goods, the excessive consumption of working capital results in creating less cash through the operating cycle. This suggests that consumer price index affects cash holdings in companies. However, such relationship is not statistically significant in Iranian companies. For possible explanation for such discrepancy is that when prices rise, Iranian companies which do not anticipate inflation will not by more raw materials in order to prevent increasing costs and the use of additional reserves. The results of this study concerning other variables indicated that as it has been explained previously, the lack of cash consumption leads to an increase in cash holding and thus results in changes in net working capital, which is in line with the the results of this study that indicated a significant relationship between these two variables. Furthermore, changes in current liabilities result in an increase in cash holding. Therefore, changes in current liabilities have a significant positive correlation with cash holding. This means that because of changes in current liabilities, cash holding as a source of financing increases instead of being used in the company's operations. This can be supported by the lack of a significant relationship between growth opportunities and cash holding. This suggests that cash is accumulated instead of being invested in growth opportunities. Finally, large and small-sized companies behave differently towards cash holding, suggesting small-sized companies will take more conservative approach than the large-sized ones. Therefore, investors are suggested that when making investment decisions in large and small-sized companies they should take into account the extent that

they are risk-taking or risk-aversive. Besides, managers of banks and loaning institutions are recommended that to use the insights offered by this study when assessing corporate risks including business, financial, and liquidity risks in order to take more effective loading decisions.

References

1. Dehghanfard, K., & Moslemi, A. (2017). Inflation, Operating Cycle, Cash Holding.

2. Fallah, S., & Hashemi, S. A. (2017). The Effects of Inflation and Operating Cycle on Cash Holdings (Liquidity) of Listed Companies in Tehran Stock Exchange. Asian Economic and Financial Review, 7(1), 43.

3. Felegari, & Kamrani Mousavi, M. B. (2012). Study of the Effect of Inflation and the Operational Cycle on Cash Holdings, The First International Conference on Accounting, Business Management and Innovation, Guilan, Iran. (in Persian)

4. Ferreira, V ., (2003) Why do firms hold Cash? Evidence from EMU countries. ISCTE School of Business, SSRN, Working Paper.

5. Fresard, L., 2010. Financial strength and product market behavior: the real effects of corporate cash holdings. Journal of Finance 65, 1097–1122.

6. Friedman, M.,(1977). Nobel lecture: inflation and unemployment. Journal of Economic Dynamics and Control 12, 231–254.

7. Ghi, T. N. (2016). IMPACT OF INFLATION AND OPERATING CYCLE ON CASH HOLDING IN VIETNAM.

8. Harford. Jarrad, Wayne, Mikkelson. Megan, Partch. (2008). "The Effect of Cash Reserves on Corporate Investment and Performance in Industry Declines". Working paper.

9. Jazz, H. R., Hajalizadeh, M., Tombeki, E. B., & Lori, B. G. (2016). The Impact of Inflation Rate and Operating Cycle on Cash Holdings of Firms. Academic Journal of Accounting and Economic Researches ISSN 2333-0783, 5(3).

10. Lashgari, Z., Ahmadzadeh Y., & Tahan Ma. (2012). The effect of cash surplus on stock returns under inflationary conditions. Financial Accounting and Auditing Research (Journal of Accounting and Auditing): 7(25); pp 65 - 78. (in Persian)

11. Martínez-Carrascal, C. (2010). Cash Holdings, Firm Size and Access to External Finance-Evidence for the Euro Area.

12. Mikkelson, W. Partch, M. (2003). "Do persistent large cash reserves hinder performance?. Journal of Financial and Quantitative Analysis". 38, 275–294.

13. Moghaddam, A. G., Kameli, A., Rohani, M., Zahiri, N., Besharatpour, A., & Saeidi, F. (2015). Inflation, Operating Cycle, and Cash Flow: Evidence from Companies Listed in Tehran Stock Exchange. Asian Journal of Research in Banking and Finance, 5(4), 79-85.

14. Shleifer, A., Vishny, R.W.,(1984). Liquidation values and debt monitoring. Review of Economic Studies 51, 393–414.

15. Subramaniam, Venkat. Tony T. Tang, Heng Yue. Xin Zhou. (2011)."Firm Structure and Corporate Finance". No 17, 759_77.

16. Wang, Y., et al. Inflation, operating cycle, and cash holdings. China Journal of Accounting Research (2013), http://dx.doi.org/10.1016/j.cjar.2013.07.001.