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**The Impact of Financial Ratios and Risk Factors toward Corporate Cash Holdings Decision**

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**The Impact of Financial Ratios and Risk Factors toward Corporate Cash Holdings Decision**

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*Working paper not to be quoted*

**Abstract**

*This paper investigates the impact of financial ratios and risk factors towards cash holdings.*

*The results of panel regression, without considering the lagged effect of exogenous variables on the current stage, show that the liquidity ratio and repayment ability factor significantly impact the cash-holding decision. The results of this objective report that most of the external risk factors are significant for low cash holding firms in Bursa Malaysia (in fixed-effect regression and GMM estimation) and high cash holding firms in KOSE (in GMM estimation).*

**Key words**: Cash holdings, financial ratios, risk factors

1. Introduction

This paper is about cash holdings propensity of two samples respectively of listed companies in Korean and Malaysian stock exchanges. Specifically the paper identifies the correlation of financial ratios and risk factors on cash holdings of firms in both countries. Theory suggests that cash holdings results from top management’s concern about having discretionary funds to pursue their objectives as well their concern to avoid likely technical bankruptcy if a firm has insufficient funds to meet cash demands on the firm. This study aims to investigate the impact of financial ratios and risk factors towards cash holdings. The motivation for this research is based on a number of reasons. Our aim is to add findings relevant to the risk management literature by providing evidence of risk factors that influence the level of cash holdings in two yet studied economies, namely Korea and Malaysia. The connection among financial ratios and cash holdings is also important, so this study is motivated to find what factors are correlated with cash holding activities of firms in two diverse economies, one developed and one developing.

Both economies have advanced institutional and regulatory frameworks in that the accounting standards are well developed, standards of supervision of securities markets are advanced, as are trading practices. Both economies are relatively affluent economies, though Korea has joined the ranks of developed economies some years back while Malaysia hopes to do so by the year 20120 with its current per capita income close to US$ 10,000, which is somewhat below the income level needed to qualify for classification as developed economy. The similarity in standards of regulations and supervision make these two cases to be compared in this paper. The findings could also serve as reference for shareholders to understand the purpose of management to increase cash holdings.

The rest of the paper is organized into the following section. In section 2 one could find a summary of review of literature on cash holdings. Section 3 provides a summary of discussion how an appropriate advanced methodology is selected to study this aspect: this paper uses production efficiency measures as preferred method over using financial ratios. The findings are reported in Section 4 while the paper ends in Section 5 with a conclusion.

**2.0 Review of Literature**

Risk factors usually denote discrepancy in a firm’s performance or point to results that cannot be predicted before an incident occurs. The source of the risk could stem from external and internal factors that impact a firm’s performance such as profitability, management, liquidity, and others, in which the firm’s operations could be exposed to certain indeterminate environmental components. This term of risk tallies with that used by researchers in strategy management that apply the variance or standard deviation of performance variables over the fiscal accounting year (Miller, 1992).

 The decision on a cash-holding policy is based on several risk factors, and the level of risk that corporations experience, especially credit risk that directly impacts a firm’s performance and market value. In general, the corporation with higher cash holdings should be safer and face lower credit risk. However, Acharya et al. (2011) remarked that the optimal cash reserves is actually significant and positively related to the risk spread, and their findings showed stronger evidence toward lower credit ratings. They developed a regression model of the firm’s endogenous cash policy in the existence of expensive defaults and with limited access to external finance. They stated that a company with lower credit ratings that is holding more cash is riskier than other higher rated firms, as they require higher cash levels as a precautionary motive. On the other hand, spreads are negatively associated with cash-holding determinants, which are independent of credit risk factors. They thus concluded that corporate liquidity positively responds to both credit spreads and the probability of long-term default. Thus higher cash holdings are explained by a higher credit risk. Firms with a higher requirement for precautionary savings are expected to tolerate a higher risk compared with others and also to face a higher probability of default.

Besides, as revealed in one of the latest studies by Arnold (2014) concerning the role of cash holdings and bankruptcy risk, cash can help in deferring bankruptcy by providing a firm with sufficient liquidity to buffer against insolvency during difficult periods. However, cash may make a financial condition worse when a lower number of shareholders are willing to offer external funding to a firm; this may be due to the availability of cash-holding readiness, thus increasing the risk of bankruptcy. The impact of cash holdings on bankruptcy risk depends on the characteristics of the firm and industry that influence the relative significance of these two reactions. Other than credit risk, the cash-holding level is influenced by cost of capital that is incurred when there are insufficient liquid assets to finance a firm’s obligations. The increase in cost of capital burdens the cash flow, and may lead to a higher liquidity risk due to the uncertainty of cash outflow in the future. Therefore the rise in liquidity risk will lead to a higher need for holding more cash (Guldimann, 1994).

Mamdouh Medhata (2014) studied the default levels and financing constraints for firms, as liquidity and solvency factors have already been investigated. He concluded that leveraged firms tend to minimize liquidity risk by controlling their cash holdings; default caused by liquidity risk is due to lack of liquidity in covering coupon payments that were due. The cash balance held to eliminate liquidity risk follows the trade-off theory, which measures the costs and benefits of holding cash. Cash holdings will decrease for less solvent firms as they practise with lesser earnings-shortfalls, and therefore have a lower demand for cash levels. From his study, solvency and liquidity risks are positively related to cash holdings. Furthermore, high-cash firms perform better than low-cash firms if solvency decreases.

**3.0 Data and Methodology**

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 To achieve the third objective of this study, a panel-regression approach is conducted by regressing cash holdings with financial ratio and risk factors. The cash level, similar with the previous objective, is measured by cash and its equivalents over total assets minus cash. A dynamic panel-data model is required to examine the relationship between cash holdings, financial ratio and risk factors in order to associate them with the potential dynamic nature of cash holdings.

A lot of work has been done on determinants of cash holdings. However, the elements found to relate to cash holdings are unable to mitigate the exposure of a firm to certain risks and fail to contribute to a firm’s risk management, whether towards financial ratios and risk factors. Managing risk is one of the primary objectives of firms operating internationally (Ghoshal, 1987). Cash holdings might be affected by the changes in certain financial ratio and risk factors, and risk is the main issue that leads to varying outcomes of expected results. Therefore the models in Objective 3 tend to link cash, financial ratio and risk factors together as they are all related in determining firm’s performance and efficiency.

Panel regression is separated into two models which indicate the effects of financial ratio and risk factors on cash holdings over the fiscal year. The equation in Model 3.1 regresses cash holdings on internal factors, including liquidity factor (LF), repayment ability factor (RAF) and solvency factor (SF). The macroeconomic risk factors such as inflation risk (InfR) and currency risk (CR) are added into Model 3.2. The function of cash holdings and control variables can be written in simple general forms as follows:

Cash ratio = f (LF, RAF, SF) (Model 3.1)

Cash ratio = f (LF, RAF, SF, InfR, CR) (Model 3.2)

The justification and expected signs of each financial ratios and risk factor are clarified here. The use of the GMM estimator by Arellano & Bond (1991) is practical, and a general method used in solving the dilemma related to the dynamic panel data model, where there exist some precise estimation problems due to the presence of lagged dependent variables on the right hand side of the equation; this problem has a high probability of occurring when examining the objectives of this study. The potential problems might lead to an upward bias of the estimates of the OLS regression analysis, where the error term by definition is corrected with one of the regressors (Bond, 2002).

The method for measuring instrumental variables is appropriate in dealing with the bias problem as it excludes certain related individual effects and allows control for endogeneity. Besides, the GMM estimator does not necessitate any particular distributions of the error term, even estimating the unknown parameters.

 The GMM model is given as below:

= +++…………………………………………….. (1)

where,

(i). is the dependent variable given at *N* cross-sectional observations and *T* time series observation

(ii). is the intercept or constant

Additionally, the parameter estimates on restricted conditions are based on the assumption that the coefficients of all lagged variables in the regression are not different from zero. According to this assumption, the lagged exogenous variables will become meaningless on current adjustments. This kind of analysis econometrically interprets the short-run determinants of corporate cash holdings. For this reason, GMM is chosen in this study to furnish the long run factors that impact corporate cash holdings.

Furthermore, the GMM estimator has its advantages because it permits the existence of heteroscedasticity across firms, and adjusts for possible correlation of the disturbances over time in a dynamic framework. Given the assumption that the disturbances are not correlated, εit is estimated to be orthogonal to the lagged values of X and Y variables. Yet, one important assumption under the GMM estimation contains a particular condition that must be fulfilled on the instrumental variables to ensure the validity of the components. Under the assumption, the instrumental variable must be uncorrelated with the error term, or it should be orthogonally fulfilled in the sample. On the other hand, the instrumental variables must strongly correlate with the regressors of the model.

 Therefore, the GMM estimation regression is:

C i,t = β0 Ci,t-1 + β΄Xi,t + νi + εi,t…………………………………………. (2)

where i = 1, ..., *N*, and t = 1, ..., *T*. α and the (*K×1*) vector *ß* are K+1 parameters to be examined. Xi,t is a (*K × 1*) vector of strictly exogenous variables, which is justified in the next section. νi are the random effects that are independent and identically distributed (i.i.d.) over the firms, and the disturbances εi, t are the i.i.d. over the whole sample.

**3.1 Financial Ratio Factors**

Since little if not, no research has studied the relationship between factors and cash holdings; thus literature to support the signs of factors is limited. Liquidity factor is measured by liquid assets over total assets ratio, also known as justification for short-term liquidity risk for daily transactions. Solvency factor is estimated using equity over total assets, which is also known as long-term liquidity for long-term debt obligations. The two measurements are used in Ariff et al. (2013) and expect positive regression with cumulative abnormal return. Since cash holdings aid in reducing the pressure of increased liquidity risk, it is believed that liquidity and solvency risk factors will be positively related to cash holdings.

The repayment ability factor is calculated to measure the ability of a firm to repay the interest on debt. Therefore the proxy for interest risk is earnings before interest, taxes and depreciation (EBITD), divided by interest expenses, also known as the interest coverage ratio. A firm with an interest coverage ratio of less than one is assumed to be financially distressed (Desai & Jain, 1999). Firms will increase cash on hand to ensure that cash is sufficient to meet interest obligations in order to avoid becoming financially distressed. Hence, the repayment ability factor is expected to be positively significant with cash holdings.

**3.2 Macroeconomic Risk Factors**

 Macroeconomic risk factors are a broad concept encompassing fluctuations in the level of economic activity and prices (Oxelheim & Wihlborg, 1987). Inflation will increase the general price, including the prices of inputs (such as raw materials or labour) and consumer goods. The movements in inflation and exchange rate will affect the purchasing power of firms, thus, resulting in aggregate production and general costing on daily business transactions. As firm’s value and market capitalization are closely tied up with the movement’s in stock exchanges, fluctuations in the stock market will affect a firm’s decision on investment, financing and performance.

Inflation and currency risk factors are measured by the standard deviation of changes in monthly data for a particular fiscal year. Firms are exposed to macroeconomic risks; these corporate risk exposures tend to be multifaceted as to challenge any attempt at analytical modeling in a pro-forma statement (Bartram, 2000). Rita (1980) concluded that the appreciation in currencies will lead to an increase in cash holdings and marketable securities. Thus currency risk and cash holdings are expected to move in the same direction and positively relate to cash holdings.

Inflation risk is predicted to have a negative relationship with cash holdings for low-cash-firms, but is positively related with high-cash firms. Firms with exposure to relatively high inflation rates in their cost base might find it tougher to contest on price, thus increasing the challenge of business with a higher chance of defaulting. Higher inflation risk will lead to greater volatility in all financial markets. Therefore firms might hold on to more cash to makes it easier to perform current investments and buy other investments at declining prices (Refer to Chang, Hsieh & Lai, 2000; Dotsey & Sarte, 2000). However, some firms may prefer to invest in valuable property that continues to appreciate, rather than holding on to cash, in order to reduce the loss of value in cash during periods of high inflation.

1. **Findings**

**4.1 Descriptive Statistics for Cash Ratio, Financial Ratios and Risk Factors**

The objective of this research is to investigate the effect of financial ratios and macroeconomic risk factors on firm cash ratio for developed and developing Asian countries. As the first two objectives are related to and discuss the role and value of corporate cash holdings, the third objective attempts to cover financial ratios and risk factors impacting corporate cash holdings, in order to further complete and provide comprehensive findings for this study of corporate cash holdings. Many studies have been conducted on the determination of cash holdings by involving firm-specific and macroeconomics variables. However, none of these provide evidence regarding financial ratios and risk factors that significantly affect the changes in firm cash ratio. Therefore, the third objective seeks to fill in this gap in the study of cash literature, and attempt to complete the explanation of cash-related findings in the other two objectives.

The descriptive statistics for financial ratios and macroeconomics risk factors as well as the cash ratio are shown in Table 1. The top part of the table gives the descriptive statistics for the listed firms in KOSE, while the bottom is for the listed firms in Bursa Malaysia. Among financial ratios, the listed firms in KOSE face a comparatively higher repayment ability factor, whereas the listed firms in Bursa Malaysia experience a higher liquidity and solvency factors, which mainly focus on sufficient liquidity to meet short-term and long-term obligations. These criteria could be further explained by the firm-specific characteristics. The macroeconomic risk factors, which include currency, and inflation risk factors are greater for the listed firms in KOSE than for Bursa Malaysia. The volatility of macroeconomic elements in Malaysia is slightly lower than the fluctuation of exchange rates and inflation risk in South Korea.

The mean and standard deviation of cash ratio are about the same for both stock exchanges, which show the mean of 0.1232 and standard deviation of 0.1124 for the listed firms in KOSE, and the mean of 0.1273 and standard deviation of 0.1313 for the listed firms in Bursa Malaysia. The previous section reports a higher standard deviation of the change in interest expenses for KOSE relative to the listed firms in Bursa Malaysia. The higher mean and standard deviation of the change in interest expenses show that the listed firms in KOSE are paying a relatively higher payment on interest charges. As a result, the interest risk for the listed firms in KOSE is greater than in Bursa Malaysia.

**Table 1: Descriptive statistics for KOSE and Bursa Malaysia starting from 2001 to 2012**

|  |  |  |  |
| --- | --- | --- | --- |
| **KOSE** | All | High cash | Low cash |
| Variable | Mean | Std. dev. | Mean | Std. dev. | Mean | Std. dev. |
|  |  |  |  |  |  |  |
| Cash ratio | 0.1232 | 0.1124 | 0.3293 | 0.1389 | 0.1017 | 0.0840 |
| Repayment ability | 9.9415 | 34.1960 | 32.4102 | 80.1360 | 8.2737 | 27.2145 |
| Liquidity factor | 1.7963 | 1.6345 | 4.1667 | 2.8734 | 1.5512 | 1.2062 |
| Solvency factor | 11.9879 | 16.4386 | 23.9792 | 24.7571 | 11.4161 | 15.7121 |
| Currency risk | 0.0278 | 0.0136 |  |  |  |  |
| Inflation risk | 0.0040 | 0.0008 |  |  |  |  |
|   |   |   |   |   |   |   |

|  |  |  |  |
| --- | --- | --- | --- |
| **Bursa Malaysia** | All | High cash | Low cash |
| Variable | Mean | Std. dev. | Mean | Std. dev. | Mean | Std. dev. |
|  |  |  |  |  |  |  |
| Cash ratio | 0.1273 | 0.1313 | 0.3470 | 0.1728 | 0.1015 | 0.0971 |
| Repayment ability | 8.2508 | 19.8297 | 14.8846 | 28.2104 | 7.8121 | 19.0697 |
| Liquidity factor | 2.2798 | 1.8595 | 3.8944 | 2.3490 | 2.1165 | 1.7205 |
| Solvency factor | 13.6371 | 17.8790 | 16.6535 | 21.2195 | 13.4472 | 17.6335 |
| Currency risk | 0.0116 | 0.0102 |  |  |  |  |
| Inflation risk | 0.0030 | 0.0031 |  |  |  |  |
|   |   |   |   |   |   |   |

Source: Datastream

Liquidity and solvency factors correspond to the liquidity conditions and financial health of firms in both short and long terms. Liquidity factor refers to the probability of facing losses when disposing of or selling assets to meet short-term obligations. Highly liquid assets can be sold easily and with little loss at no additional cost and with minimal chance of illiquidity. Besides, the management of funding sources and the overall monitoring of market conditions also play an important role in affecting the ability to liquidate the assets of the firms with good value. Too little cash forces the firms to liquidate productive assets; holding too much cash will reduce profitability. Long-term solvency factor concerns are not affected by external funding costs; therefore cash holdings become moderately unimportant. Firms will turn insolvent as they fail to meet maturing obligations on the due dates of long-term obligations (after disposal of their assets). Since cash holdings are the most liquid assets in the short term, it is expected that the liquidity factor is significant in explaining the ratio of cash that a firm holds. But, the relationship between solvency factor and cash ratios is perceived to be weaker or not significant. These two financial ratios are lower for the listed firms in KOSE, which eventually portray the weakness of these firms in terms of liquidity and solvency management.

Financial risk and risk factor trends of low cash holding firms and high cash holding firms are similar for both stock exchanges. High cash holding firms experience higher means of all variables. Overall, the status of financial ratios and higher risk factors might be the key motive to encourage firms to hold more cash in order to have sufficient liquidity and flexibility to overcome the uncertainties of the future.

1. **Diagnostic Check for GMM Estimation for KOSE and Bursa Malaysia**

There are two diagnostics that are part of the GMM in testing the appropriateness of the instruments used. The Sargan test is used to identify the restrictions under the null hypothesis on the validity of the instruments (Arellano et al., 1991; 2003). The test concludes with the null hypothesis that mentions that all IVs are uncorrelated or that the model is not over-identifying restrictions. If the statistical value shows that there is enough evidence to reject the null hypothesis, then at least some of the IVs are not exogenous. In order to continue with the GMM estimations, the Sargan test must show that the model is not over-identifying restrictions.

**Table 2: GMM post-estimation diagnostic checking for KOSE and Bursa Malaysia**

|  |  |  |  |
| --- | --- | --- | --- |
| Variable/ model | Sargan test | AR 1 | AR 2 |
| **KOSE**All | Model 1 | 65.0768 | -5.3324 | 0.9870 |
| (0.1235) | (0.0000)\*\*\* | (0.3237) |
| Model 2 | 63.5036 | -5.3067 | 1.0369 |
| (0.2887) | (0.0000)\*\*\* | (0.2998) |
| High cash  | Model 1 | 23.6004 | -2.5851 | 0.7974 |
| (0.8860) | (0.0097)\*\*\* | (0.4252) |
| Model 2 | 30.8503 | -2.5316 | 0.8390 |
| (0.9742) | (0.0114)\*\*\* | (0.4015) |
| Low cash | Model 1 | 63.3947 | -6.5809 | 0.3507 |
| (0.1553) | (0.0000)\*\*\* | (0.7259) |
| Model 2 | 63.8806 | -6.5234 | 0.4049 |
| (0.2776) | (0.0000)\*\*\* | (0.6856) |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Bursa Malaysia**All | Model 1 | 69.8309 | -6.4058 | 0.4916 |
| (0.1373) | (0.0000)\*\*\* | (0.6230) |
| Model 2 | 50.9692 | -6.2191 | 0.9167 |
| (0.0778) | (0.0000)\*\*\* | (0.3593) |
| High cash  | Model 1 | 34.6623 | -2.0164 | -0.5695 |
| (0.3885) | (0.0438)\*\* | (0.5690) |
| Model 2 | 37.9771 | -1.9844 | -0.6060 |
| (0.4705) | (0.0472)\*\* | (0.5445) |
| Low cash | Model 1 | 61.0121 | -6.4094 | 0.9566 |
| (0.2101) | (0.0000)\*\*\* | (0.3388) |
| Model 2 | 86.3219 | -6.6833 | 1.1798 |
| (0.0662) | (0.0000)\*\*\* | (0.2381) |

Note: Sargan test is to test over-identifying restrictions in a statistical mode. Arellano-bond tests 1 and 2 are used to detect the existence of autocorrelation.

\*\*\* Significance at 0.01 confidence level, \*\* significance at 0.05 confidence level, \* significance at 0.1 confidence level, p-values are in parentheses

The results for the Sargan test in Table 2 show that them to be not statistically significant. With respect to the Sargan test of over-identifying restrictions, the high p-value suggests insufficient data in rejecting the null hypothesis that the set of instruments are appropriate. The second diagnostic test is a check of the first-order and second-order serial correlations in the first different residuals, stated as asymptotically standard normal distribution values. As required, the test for the first-order correlation AR (1) in the GMM estimation must reject the null hypothesis that the autocorrelation exists in the data set, and the second-order correlation AR (2) must fail to reject the null hypothesis. The statistical reports of the p-value of AR (1) and AR (2) are fulfilling the requirement. Thus the validity of GMM is supported in this model.

1. **Results for GMM Estimation of Financial Ratio and Risk Factors on Cash Ratio for KOSE**

As mentioned earlier, a GMM estimation which consists of lagged variables as the regressors can aid in improving results by allowing the significance of the previous exogenous variables to be reflected in current adjustments. Therefore the findings of the dynamic relationship of corporate cash holdings with the financial ratios and risk factors might be improved by including the effect of lagged variables. The results for the GMM estimation for listed firms in KOSE are presented in Table 3.

The total number of listed firms involved is 864; 10.8% of the total is high cash holding firms, and the balance of 770 firms is low cash holding firms. The horizontal arrangement makes it easy to compare the findings from row to row across each category. The data are estimated using a two-year moving average as the number of years for the sample is not long enough to conduct a 3-year or 5-year moving average. The results for KOSE are shown in Table 3.

**Table 3: GMM estimation of impact of firm-level and macroeconomic factors on cash holdings ratio for listed firms in KOSE starting from 2001 to 2012 using two-year moving average**

This table presents the results of the dynamic effect of cash ratio in the entire sample and the two subsamples of high cash holding firms and low cash holding firms. Model 1 regresses the cash ratio with lagged cash ratio and financial ratio factors; macroeconomic risk factors are added to Model 2. Liquidity factor is measured by liquid assets over total assets ratio, solvency factor is estimated using equity over total assets, and repayment ability factor is calculated using EBITD over interest expenses. Inflation and currency risk factors are measured by the standard deviation of changes in monthly data for particular fiscal year.

|  |  |  |
| --- | --- | --- |
|   |   | Dependent variable: cash ratio |
|  |  | All | High cash | Low cash |
| Variable |   | Model 1 | Model 2 | Model 1 | Model 2 | Model 1 | Model 2 |
| Constant | a | -0.0056 | 0.0205 | 0.3519 | 0.0778 | -0.0070 | 0.0124 |
|  | b | (-0.5000) | (1.1200) | (4.1800\*\*\*) | (0.9100) | (-0.6600) | (0.7100) |
|  | c | (0.6190) | (0.2620) | (0.0000) | (0.3610) | (0.5100) | (0.4760) |
| L. Cash Ratio | 0.3164 | 0.3110 | 0.2737 | 0.1304 | 0.3413 | 0.3228 |
|  |  | (5.8300\*\*\*) | (5.7500\*\*\*) | (2.6900\*\*) | (2.2200\*\*) | (6.7700\*\*\*) | (6.4200\*\*\*) |
|  |  | (0.0000) | (0.0000) | (0.0070) | (0.0270) | (0.0000) | (0.0000) |
| Liquidity Risk | 0.0185 | 0.0190 | 0.0053 | 0.0091 | 0.0200 | 0.0213 |
|  |  | (5.9200\*\*\*) | (5.5300\*\*\*) | (2.3400\*\*) | (1.9600\*\*) | (7.1100\*\*\*) | (6.7400\*\*\*) |
|  |  | (0.0000) | (0.0000) | (0.0190) | (0.0500) | (0.0000) | (0.0000) |
| Repayment ability factor | 0.0006 | 0.0006 | 0.0010 | 0.0005 | 0.0007 | 0.0007 |
| (3.2400\*\*\*) | (3.2300\*\*\*) | (1.8100\*) | (2.2200\*\*) | (4.5500\*\*\*) | (4.5500\*\*\*) |
|  |  | (0.0010) | (0.0010) | (0.0700) | (0.0260) | (0.0000) | (0.0000) |
| Solvency factor | 0.0003 | 0.0003 | 0.0007 | 0.0004 | 0.0005 | 0.0004 |
|  |  | (1.4100) | (1.5200) | (2.4500\*\*) | (1.4800) | (1.9800\*\*) | (1.8800\*) |
|  |  | (0.1580) | (0.1290) | (0.0140) | (0.1390) | (0.0470) | (0.0600) |
| Inflation Risk |  | -5.5697 |  | -13.4356 |  | -3.7371 |
|  |  |  | (-1.9900\*\*) |  | (-2.4000\*\*) |  | (-1.4400) |
|  |  |  | (0.0470) |  | (0.0160) |  | (0.1510) |
| Currency Risk |  | -0.2597 |  | 4.3455 |  | -0.0976 |
|  |  |  | (-1.1600) |  | (5.9100\*\*\*) |  | (-0.4600) |
|  |  |  | (0.2470) |  | (0.0000) |  | (0.6450) |
|   |   |   |   |   |   |   |   |
| Wald chi  |  | 158.3100 | 163.9600 | 389.0200 | 382.3000 | 217.6400 | 232.2300 |
| p-value |  | (0.0000\*\*\*) | (0.0000\*\*\*) | (0.0000\*\*\*) | (0.0000\*\*\*) | (0.0000\*\*\*) | (0.0000\*\*\*) |
|  |  |  |  |  |  |  |

Note: a =coefficients, b = t-statistics, c = p-values, significant at 0.01(\*), 0.05(\*\*), 0.001(\*\*\*) level.

The statistics indicate that the coefficient of lagged cash ratio is positively significant to dependent variables in that it supports the dynamic relationship of the dependent variable existing in this model. The cash-holding level relative to total assets in previous periods do generate a positive impact on the current cash ratio, and the impact of the lagged cash reserves has more of an effect on low cash holding firms than high cash holding firms, shown by the coefficient of 0.3228 compared with 0.1304 in model 2.

The listed firms in KOSE, including high cash holding firms and low cash holding firms, the liquidity (tally with the finding in Mamdouh, 2014) and repayment ability factors are positively significant to cash holdings. The coefficients for the results of the GMM estimation showing that low cash holding firms have a higher coefficient for liquidity factor while the coefficient for the repayment ability factor is almost the same for both high cash holding firms and low cash holding firms. Low cash holding firms have a higher coefficient of 0.0321 for the liquidity risk factor, which is almost double compared with the coefficient of 0.0147 for high cash holding firms. This shows that the cash ratio of low cash holding firms is greatly responsive to changes in liquidity risk. Firms have access to two types of external financing which are debt and equity. When internal cash holdings are insufficient to cover a firm's daily payments, the firm might need to issue equity to cover the deficit. If shareholders are no longer keen to pump in additional capital, the firm defaults (Chen, 2010). Therefore, low cash holding firms with relatively weak internal cash reserves are more sensitive to changes in the liquidity risk factor. As firms need more cash to pay off the increase in daily transactional needs and short term obligations, the cash ratio of a particular firm has to be adjusted to a higher proportion. Since high cash holding firms always have a higher amount of ready funds on hand, the response of the cash ratio towards the rise in liquidity risk is lower.

 The coefficients of the repayment ability factor are quite similar for high cash holding firms and low cash holding firms, which are 0.0010 and 0.0007 in model 1 respectively. The coefficients of repayment ability factor for high cash holding firms is decreasing to 0.0005 in Model 2, after including the effect of macroeconomic risk factors. Therefore the significance of the repayment ability factor in explaining the cash ratio in high cash holding firms is subject to changes in macroeconomic risk factors. High cash holding firms would be concerned about the changes in interest rate, and the amount of interest payments may burden their cash flow when they experience an unexpected need for cash reserves during bad economic times, a situation that is out of their control.

 The change of macroeconomic risk factors might increase the probability of high cash holding firms to increase their debt and leverage. Furthermore, the uncertainty in inflation and currency risk factors might negatively impact on the revenue of the firms which used in serving the interest payment. However, the cash ratio of low cash holding firms is always sensitive to interest rate, no matter how bad the economic conditions are. As they rely on debt in financing their short-term and long-term obligations, cash ratio of low cash holding firms are adjusting according to the remain certain level of repayment ability. Any changes in interest payment will turn them into default when they fail to cover their interest payments. Therefore, the awareness of cash ratio on interest expenses obligation is very strong for low cash holding firms.

The solvency factor is significant related with cash ratio. As mentioned in the previous portion, since solvency risk is measured by long-term assets and liability, cash holdings, which are seen as part of current liquid assets, hardly contribute to any explanation of the cash ratio as tested in the other panel regression (as shown in appendix). Thus the significance of solvency risk in the GMM estimation shows that solvency risks do provide some explanation of cash ratio, and the impact of the lagged cash ratio plays an important role in enhancing this evidence. Solvency factor is measured by equity over-total-assets, issuance new equity which seen as source of external funding has a stronger explanation of cash holding for low cash holding firms. However, the significance of solvency factor is very weak for high cash holding firms which are less likely to obtain the external funding through equity issuance.

High cash holding firms are more likely to be explained by macroeconomic risk factors which are currency and inflation risk factors. This evidence shows that high cash holding firms in KOSE are likely to be greatly exposed to changes in macroeconomic risk. The coefficient of inflation risk which is 13.4356 with a negative sign shows that high cash holding firms will keep less cash reserves when inflation risk increases, in order to avoid depreciation on cash holding value. High inflation erodes the purchasing power of the cash on hand. Firms with high cash holing are rather to invest on assets or investment to shelter cash reserve from inflation. This finding tallies with those of Kim et al. (1998) and Natke (2001). The cash ratio of low cash holding firms are unexplainable by inflation risk because the cash on hand is only sufficient for daily transactions. Therefore the need of adjusting cash ratio according to the change in inflation risk do not existed for low cash holding firms.

Generally firms with high cash holding have higher efficiency in internal management than in firm with low cash holding. The better in internal control on assets for firms with high cash holing aids in accumulating cash holding. Therefore firm with high cash are easier in increasing cash on hand relatively to firm with low-cash holding. This finding is consistent with the capital flight theory, indicating that the appreciation in currency will increase the holdings of cash and marketable securities. The currency risk is significant with a positive coefficient of 4.3455 for high cash holding firms shows that firms are keeping more cash holding when the currency risk increases. As mentioned in the study of Rita (1980), the liquid fund will move in the same direction as trends in the exchange markets. However, the currency risk is insignificant for low cash holding firm due to restrictions in liquidity management. Firms with low cash holding are unable to increase and adjust the cash ratio immediately as the firm’s liquidity tie up with other component such as inventory and account receivables.

Macroeconomic risk factors might be the main reason or source of risk that encourages high cash holding firms to hold higher liquidity in order to manage unexpected changes; however, macroeconomic risk is usually out of their control.[[1]](#footnote-1) Yet the effects of those risk factors have been restricted in the fixed-effect regression; the explanation of the variables in the previous period on the current exogenous variable has been ignored. Therefore it can only reflect that it is significant after including the effect of lagged exogenous variables. The F-statistics for all models in Table 3 are significant at 0.01.

1. **Results for GMM Estimation of Financial Ratio and Risk Factors on Cash Ratio for Bursa Malaysia**

The results in Table 4 summarize all findings of the GMM estimation for the listed firms in Bursa Malaysia, which show that the lagged cash ratio is part of the endogenous variables in this model, and is statistically significant at 0.1 with a positive sign. It shows that a dynamic relationship exists in this model; therefore the GMM estimation aids in enhancing the estimation of this regression. The coefficient of the lagged cash ratio for the listed firms in Bursa Malaysia is slightly higher compared will the listed firms in KOSE, exhibiting that the cash ratios for the listed firms in Bursa Malaysia are more likely to be affected by the lagged cash ratio, and in a relatively higher proportion.

 The liquidity and interest risk factors of the listed firms in Bursa Malaysia are statistically significant for all categories with a positive sign. Higher-cash firms have a higher coefficient of 0.0334 for the liquidity risk factor compared with the coefficient of low cash holding firms at 0.0055 in Bursa Malaysia. Relatively, high cash holding firms in Bursa Malaysia behave in a more risk-adverse manner than high cash holding firms in KOSE; the conservatism practice leads to a high response toward the increase of liquidity risk. As discussed in the earlier section, the coefficient of the liquidity factor indicates the response of firms towards the adjustment on cash ratio. The sensitivities of high cash holding firms and low cash holding firms toward liquidity factor are dissimilar with firms in KOSE. Somehow, high cash holding firms are seen as more capable in increasing cash by supportive cash management practices in their organization; thus the coefficient of the liquidity factor is higher for high cash holding firms that act conservative toward the possible damage for firms with high cash holding in Bursa Malaysia.

**Table 4: GMM estimation of impact of firm-level and macroeconomic factors on cash holdings ratio for listed firms in Bursa Malaysia starting from 2001 to 2012 using two-year moving average**

This table presents the results of the dynamic effect of cash ratio in the entire sample and the two subsamples of high cash holding firms and low cash holding firms. Model 1 regresses the cash ratio with lagged cash ratio and financial ratio factors; macroeconomic risk factors are added to Model 2. Liquidity factor is measured by liquid assets over total assets ratio, solvency factor is estimated using equity over total assets, and repayment ability factor is calculated using EBITD over interest expenses. Inflation and currency risk factors are measured by the standard deviation of changes in monthly data for particular fiscal year.

|  |  |  |
| --- | --- | --- |
|   |   | Dependent variable: cash ratio |
|  |  | All | High cash | Low cash |
| Variable |   | Model 1 | Model 2 | Model 1 | Model 2 | Model 1 | Model 2 |
| Constant | a | 0.0014 | 0.0112 | 0.1045 | 0.1044 | 0.0754 | 0.0160 |
|  | b | (0.1400) | (1.0300) | (7.0400\*\*\*) | (0.4700) | (6.0600\*\*\*) | (1.5800) |
|  | c | (0.8910) | (0.3010) | (0.0000) | (0.6410) | (0.0000) | (0.1130) |
| L. cash ratio | 0.5742 | 0.5082 | 0.3265 | 0.3200 | 0.4567 | 0.4646 |
|  |  | (3.7200\*\*\*) | (3.3000\*\*\*) | (5.8500\*\*\*) | (4.9200\*\*\*) | (3.7100\*\*\*) | (4.3300\*\*\*) |
|  |  | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) | (0.0000) |
| Liquidity factor | 0.0083 | 0.0056 | 0.0293 | 0.0334 | 0.0066 | 0.0055 |
|  |  | (2.4900\*\*) | (1.8200\*) | (5.3400\*\*\*) | (3.4300\*\*\*) | (2.0200\*\*) | (1.8200\*) |
|  |  | (0.0130) | (0.0690) | (0.0000) | (0.0000) | (0.0430) | (0.0690) |
| Repayment ability factor | 0.0012 | 0.0004 | 0.0014 | 0.0014 | 0.0004 | 0.0007 |
| (3.0600\*\*) | (1.0400) | (4.1600\*\*\*) | (3.7600\*\*\*) | (0.8500) | (1.7700\*) |
|  |  | (0.0020) | (0.2970) | (0.0000) | (0.0000) | (0.3950) | (0.0760) |
| Solvency factor | 0.0000 | 0.0001 | 0.0001 | 0.0002 | 0.0005 | 0.0001 |
|  |  | (0.0200) | (0.4600) | (0.3400) | (0.4300) | (1.7500\*) | (0.4600) |
|  |  | (0.9840) | (0.6490) | (0.7340) | (0.6680) | (0.0800) | (0.6420) |
| Inflation risk |  | -2.258 |  | -1.4907 |  | -2.3637 |
|  |  |  | (-4.5200\*\*\*) |  | (-1.2600) |  | (-4.7800\*\*\*) |
|  |  |  | (0.0000) |  | (0.2090) |  | (0.0000) |
| Currency risk |  | 1.1034 |  | 0.0648 |  | 1.1436 |
|  |  |  | (3.5000\*\*\*) |  | (0.0900) |  | (3.0300\*\*\*) |
|  |  |  | (0.0000) |  | (0.9290) |  | (0.0000) |
|   |   |   |   |   |   |   |   |
| Wald chi  |  | 295.5300 | 347.8500 | 396.4300 | 414.8700 | 263.6300 | 306.8700 |
| p-value |  | (0.0000\*\*\*) | (0.0000\*\*\*) | (0.0000\*\*\*) | (0.0000\*\*\*) | (0.0000\*\*\*) | (0.0000\*\*\*) |
|   |   |   |   |   |   |   |   |

Note: a =coefficients, b = t-statistics, c = p-values, significant at 0.01(\*), 0.05(\*\*), 0.001(\*\*\*) level.

Repayment ability is positively significant with cash ratio of listed firms in Bursa Malaysia, which is consistent with the findings in the KOSE sample. The trend of coefficients for repayment ability factor of high cash holding firms and low cash holding firms in Bursa Malaysia are not alike with listed firms in KOSE. The coefficients of repayment ability for firms with low cash holding are decreasing from 0.0004 (model 1) to 0.0007 (model 2) after including the effect of macroeconomic risk factors. The changes of cash ratio in low cash holding firms might due to the risk-adverse and conservatism practice in listed firms of Bursa Malaysia. Generally the fluctuations of inflation and currency are associated with interest rate changes. Firms with low cash holding are adjusting their repayment ability according to the changes in inflation and currency risk factors to avoid failure in fulfill interest expenses obligations which might turn them into default. Whereas the coefficients of repayment ability factor are consistent in model 1 and model 2 for firms with high cash holding in Bursa Malaysia. The unchanged coefficients for repayment ability factor in high cash holing firms in model 1 and model 2 might explained by sufficient liquid to meet the interest expenses obligations. Furthermore, firms with high cash holding usually involved in lesser debt and low interest payments therefore needless to adjust according to changes in macroeconomic risk factor.

Unlike the findings in KOSE, low-cash holding firms are statistically significant to macroeconomic risk factors, inflation and currency risk factors. While there is no evidence found for high cash holding firms. The cash ratio of high cash holding firms in Bursa Malaysia is less likely to be affected by its macroeconomic risk factors as the listed firms in Bursa Malaysia practice conservatism in cash management. The coefficient of 1.2102 for inflation risk is significant with a negative sign at 0.01 for low cash holding firms which show same sign compared with the inflation risk factors for high cash holding firms in KOSE. When the inflation risk is greater, low cash holding firms will further reduce the cash holdings to mitigate the loss of a drop in the value of cash and purchasing power.

The coefficient of 1.0299 with a positive sign for currency risk of low cash holding firms indicates that firms will hold more cash when the volatility of the exchange rate or the change of value in local currency is greater. Also, low cash holding firms expect local currency to depreciate; thus, the conversion of payment for import from other countries in foreign currency will be relatively expensive. Thus low cash holding firms will keep more cash holdings as a preparation for the unanticipated increase in daily transactions and obligations. The F-statistics are significant at 0.0001 for all models in Table 4.

**4.0 Conclusion**

This study attempts to identify the impact of financial ratios and risk factors on cash holdings, which is similar between KOSE and Bursa Malaysia. The results of panel regression, without considering the lagged effect of exogenous variables on the current stage, show that the liquidity ratio and repayment ability factor significantly impact the cash-holding decision. The results of this objective report that most of the external risk factors are significant for low cash holding firms in Bursa Malaysia (in fixed-effect regression and GMM estimation) and high cash holding firms in KOSE (in GMM estimation).

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1. The importance of macroeconomic risk factors in explaining the cash ratio of high cash holding firms are hinted at in the fixed-effect regression, shown by the increase in the adjusted R-square in the results of fixed-effect regression from Model 1 to Model 2 after including macroeconomic risk factors, as shown in appendix. [↑](#footnote-ref-1)