

Empirical Analysis on Cash Holding Motive of KOSDAQ-listed SMEs in Preparation for Economic Changes in the Post COVID-19 Era

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코로나19 이후의 경제적 변화에 대비한 코스닥 상장 국내 중소기업들의 현금보유 동기에 대한 실증적 분석

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Abstract This study addresses an empirical analysis of cash holdings motives by KOSDAQ-listed small and medium enterprises (SMEs) given the possible economic or financial changes after the COVID-19 pandemic ends. Previous studies in the literature about SMEs may have drawn relatively little attention so far, in comparison with those for large enterprises (LEs). Furthermore, empirical investigations into cash holdings motives in terms of financial default risk need to be analyzed against any spillover effects in association with the COVID-19 pandemic. In the first hypothesis, empirical tests are conducted to identify speculative motives for cash holdings of SMEs where the results are compared to LEs. In the subsequent hypothesis, the precautionary motive is also tested for both sample groups. SMEs were found to maintain cash liquidity for speculative purposes, but it was not statistically accepted that cash holdings are used as a precautionary motive for either of the two groups to reduce financial default risks. In testing the hypothesis, SMEs with higher cash liquidity levels than the median were found overall to have a significant difference from their counterparts with lower levels in terms of financial factors, such as growth potential, firm size, market-value-based debt ratio, and corporate establishment history. Based on the results of the study, KOSDAQ-listed SMEs may not hold cash liquidity as a precautionary motive against economic changes or spillover in the post-COVID-19 period, where results are expected to be considered by policymakers at the macro- and micro-levels.

요약 본 논문은 현재 진행 중인 코로나19 시기 이후의 경제적 혹은 금융 분야의 변화에 대비한 국내 코스닥 상장 중소기업들에 대한 현금유동성 보유 동기에 대한 실증적 분석에 대한 연구이다. 특히, 국내 중소기업들에 대한 선행연구들은 대기업들과 비교하여 상대적으로 미미하다고 할 수 있으며, 기업의 채무불이행 위험과 연관되는 현금보유 동기에 대한 분석이 코로나19 이후의 변화를 대비하여 추가 심층 분석될 필요가 있다고 판단된다. 첫 번째 가설에서는 기업의 현금보유 동기 중, 코스닥 상장 중소기업들과 비교 그룹인 대기업들의 적극적 현금보유 동기에 대한 검정이 시행되며, 둘째 가설에서는 양 표본기업군들의 예방적 현금보유 동기에 대하여 실증분석이 수행된다. 국내 중소기업들은 일반적으로 적극적 동기로서의 현금유동성은 보유한다고 검정되었으나, 채무불이행 위험에 대비한 예방적 동기로서의 현금유동성은 보유하지 않은 것으로 판명되었다. 추가 가설에서는 중앙값보다 높은 현금유동성 수준을 보유하는 중소기업군들은 성장성, 기업규모, 부채비율 그리고 기업연혁을 대변하는 변수들에서 비교 기업군과의 유의미한 차이를 나타냈다. 본 연구 결과를 기준으로, 코스닥 상장 중소기업들의 경우, 코로나19 시기 이후의 경제적 변화 혹은 여파에 대비한 예방적 차원에서의 보유는 상대적으로 미미한 것으로 판명되었으므로, 이에 대한 거시적 그리고 미시적 차원에서의 정책적 고려가 필요할 것으로 판단된다.

Keywords : Cash Holding, COVID-19, Korean Capital Market, Motive, Small and Medium Enterprise

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1. Introduction

This study aims at investigating one of the contemporary issues on debate in the field of modern finance. In other words, it is to empirically examine corporate motives of cash holdings for the small and medium enterprises (henceforth, the SMEs) listed on KOSDAQ (Korea Securities Dealers Automated Quotation) exchange in the domestic capital market. In particular, results obtained from the study is expected to be theoretically and practically applied to the SMEs which seem to be in the weaker financial conditions inclusive of cash holdings than the counterparts of the large enterprises (the LEs). Given the possibility of economic downturn associated with the ongoing COVID-19 pandemic, the results are expected to be effectively used as financial catalysts for the domestic SMEs to mitigate bankruptcy or default risk by attaining their optimal level of cash holdings.

Major motivations to implement the study are presented as follows: First, as presented in the next section, most previous researches or public announcement tend to have focused on the investigations on the LEs in terms of intensity of corporate cash holdings, in comparison with those for the SMEs in the domestic capital market. To exemplify, it was reported that the amount of cash holdings reserved by Samsung Electronics, Co., one of the largest global electronic firms, whose main lines of business produce semiconductor and cellular phones, was projected as KRW 104.1 trillion at the end of the fiscal year 2018. The amount increased by 24.5% based on the amount in the year 2017, whose main motive for cash holdings is to prepare for future M&A transactions in high-tech industries. [1] However, relatively little attention seems to be paid so far to the research on the level of cash holdings for the SMEs in terms of academic and practical viewpoints. As an extension of the study

done by Kim [2], further investigation on the subject for the SMEs is the major reason to conduct the present study in which the sample observations is set to be the SMEs listed on KOSDAQ exchange. Second, more importantly, the motives of cash savings maintained by the SMEs are empirically tested by postulating each relevant hypothesis in the present study. As presented in Gill and Shah [3], there are three motives to hold cash reserves from corporate perspective. These include transactional, precautionary and speculative motives. Beside the transactional one to keep cash holdings to settle daily routine payments, the precautionary one refers to keep cash or liquidity to prepare for unforeseen fluctuations of ongoing business operation. The last motive as the speculative one means that firm may hold cash balance to take advantage of any bargain purchases inclusive of financing future valuable investment opportunities. In this study, a primary motive of corporate cash holdings between the precautionary and the speculative ones, is empirically tested to be further identified for the sample of KOSDAQ-listed SMEs, which has been rarely tested in the preceding researches from the international and domestic perspectives. Lastly, assuming the global and domestic economic or financial changes arising from the ongoing COVID-19 pandemic, the results derived from the study may be effectively used to prevent the SMEs from undesirable financial downturn. That is, based on the output derived from the current study, the SMEs may take preemptive measures such as attaining a higher level of cash reserves, as described later.

2. Literature Review

By employing the sample data from BRICS areas (Brazil, Russia, India, and China) as emerging capital markets and from the US and

the UK as advanced markets, Al-Najjar [4] tested proxy variables to determine the level of cash holdings for the sample firms in each respective nation. That is, along with employing time variables, five variables were adopted to represent profitability, leverage, dividend payout, size, and liquidity, respectively. Other than the profitability, the other variables overall showed statistically significant impacts on the intensity of cash holdings when applying two stage least squares model. The author argued that firm value may be maximized by attaining optimal level of cash reserves in terms of the tradeoff theory between the marginal costs and benefits of corporate cash savings. As other test for firms located in an emerging capital markets, Farinha and Prego [5] tested financial variables for the firms headquartered in Portugal, which may suffer from recent European financial turmoil. By using a dynamic pane data model, the study found that there was a positive and persistent linkage to the dependent variable of cash holdings and its one-period lagged dependent variable in the model. Moreover, other significant relationships were found for the financial variables of cash flow and its variability in relation to cash liquidity.

From corporate perspective, theoretical advantages by holding cash savings were explained in the study of Lian *et al.*[6]. They include increase of financial flexibility in corporate capital structure, financing investment opportunities, and corporate reputation in capital market. By adopting the sample dataset of Chinese domestic firms, the authors found that financial variables such as Tobin's Q, less degree of financial unconstraint and occurrence of the global financial turmoil, may have statistically pronounced impact on the intensity of cash holdings for Chinese sample domestic firms. Moreover, a positive association between corporate size and another proxy variable defined by a change of cash holdings divided by

total assets, may, in large part, arise from the firms in early stage of business. Subramaniam *et al.* [7] tested a relationship of firm structure to the level of cash holdings, based on the diversified and the focused firms. The authors theorized that firms in the diversified type may, on average, have a lower levels of cash holdings than that of the counterparts in the type of the focused ones. Moreover, three hypotheses were posited as a complementary growth hypothesis, asset sales one and the influence one, which may statistically separate the levels of cash holdings for the diversified and the focused firms. A majority of financial variables such as Corporate size, financial leverage, Tobin's Q, R&D spending, corporate investments, accounting working capital, cash flow, dividend payment, corporate bond rating, and volatility of cash-flow were overall found to be statistical significance to determine industry-adjusted cash holdings for the U.S. sample dataset. The study conducted by Kim [2] investigated financial determinants to affect the level of cash holdings for the chaebols in Korean capital markets. By employing various empirical models, the proxy variables of cash flow, the ratio of the market-valued over the book-valued total assets, the amount of reinvestments, and agency costs showed pronounced effects on the level of cash holdings for the chaebols during the post global economic turmoil era. In the another study by Kim [8], financial factors of the cash holding intensity were statistically detected for the U.S. and Korean large firms. Factors such as corporate leverage and Toin's Q were found to importantly and commonly influence on the dependent variable of cash liquidity for the sample firms located in both the capital markets. Moreover, in terms of cash liquidity, statistical differences between the two capital markets were found in the majority of proxy variables which represent cash flow, agency cots, firm size, financial leverage and Tobin's Q.

3. Empirical Research Setting

3.1 Sampling Criteria and Proposed Variables

In the section, a general description on the empirical research setting is presented as follows: First, on the data sampling process, KOSDAQ-listed SMEs during the sample period covering from 2010 to 2018 are adopted to conduct the study. Detailed process to select final dataset is reported in Table 1.

Table 1. Criteria for sampling firms listed on KOSDAQ Exchange in the post global economic crisis period

1. Financial data for variables are available for at least 9 years to cover from the year 2010 to 2018.
2. Firms are listed on KOSDAQ Exchange as of the end of the fiscal year of 2018.
3. Financial data are used from consolidated financial statements, if available.
4. Data are in the population of the database of Kis-Value compiled by the NICE.
5. Firms are classified into two samples such as small & medium enterprises (SMEs) and larger enterprises (LEs) at the end of the fiscal year 2019, as classified by the Kis-Value database.
6. Firms in the financial and regulated industries are excluded in the final sample dataset.

Second, empirical research setting of this study is analogous to those of the previous research such as Kim[2] and Kim[8] for the purposes of comparability and validity. According to the aforementioned criteria, total number of the sample firms is counted as 837 firms, each of which belonged to one of the 25 domestic industries. They are composed of 349 large enterprises (LEs) and 488 small and medium enterprises (SMEs) during the sample period. Moreover, the criteria to define the subsample of the SMEs was based on the regulation of "Enforcement Decree of the Framework Act on Small and Medium Enterprises" established by the Korean government. Definitions and measurement for the proxy variables (including regressors and regressand) are listed in Table 2 that are applied to each relevant hypothesis, as described later.

Table 2. Definition and measurement of variables

Definition	Symbol	Measurement
Cash holding	CHOLD	Cash and cash equivalents / Total Assets
Profitability	PROF	EBIT (=Earnings before interest and taxes) / Total Assets
Business risk	FRISK	3.3 (EBIT / Total Assets) + 1.0 (Sales / Total Assets) + 1.4 (Net Income / Total Assets) + 0.6 (Market Value of Equity + Book Value of Preferred Equity) / (Book Value of Equity)
Market-value based leverage	MLEVER	Total Liabilities / (Book-value based Liabilities + Book-value based Preferred Equity + Market Value of Common Equity)
Growth opportunities	GROWTH	Earnings per common share / Price per common share
Firm size	SIZE	Natural Logarithm of Sales Amount
Change in tangible assets	TASSET	(Tangible Assets _t - Tangible Assets _{t-1}) / Total Assets _{t-1})
Agency cost	AGENCY	(R&D Expenses + Advertising Expenses) / Sales
Foreign ownership	FOS	Proportion of Foreign Ownership in Common Equity
Non-debt tax shield	NDTS	(Depreciation + Amortization) / Total Assets
History of corporate history	ESTAB	Corporate Establishment Year

In addition to these proxy variables, firm value which is used as a dependent variable in each model is the definitions of Tobin's Q, as also used by Martinez-Sola, *et al.* [9]. It is defined as the ratio of [book-value based liabilities plus book-value based preferred equity plus market value of common equity] scaled by total assets. Besides industry qualitative indicators, interaction variables between the level of cash holdings and R&D intensity (INTERRND), and a proportion of tangible assets (INTERTAN) are employed to test for each relevant hypothesis.

Lastly, 3 lagged variables (i.e. Lag_CHOLD1, Lag_CHOLD2, Lag_CHOLD3) in relation to CHOLD that include the first, second and third preceding fiscal year, are also employed in the models to test for lagged effects of corporate cash holdings on the dependent variable.

3.2 Hypothesis Postulation and Econometric Methodologies

In the section, three primary (alternative) hypotheses are postulated to test for the subject of corporate motivation to reserve cash holdings for the sample dataset of KOSDAQ listed SMEs.

H1: In preparation of economic or financial changes in the post COVID-19 period, the SMEs listed on KOSDAQ Exchange may maintain cash holdings for a speculative motive to support future investment opportunities during the sample period..

To identify whether or not the speculative motive is a major cash holding motive of the sample group of the SMEs, an empirical model is set to detect a relationship between the explanatory variable of the intensity of cash holdings (CHOLD) and the dependent variable of firms value (i.e. Tobin's Q). Furthermore, the lagged variables of CHOLD are also employed in each model, along with other explanatory variable of FRISK in the models, which aims to eliminate the effect of business risk in association with the precautionary motive of cash holdings. To recap, if there exist any statistically significant relationship between the proxy variables in terms of cash holdings and firm value (FRISK) after excluding the effect of FRISK, it may be concluded that the major motive of the SMEs is, on average, to financially support investments opportunities, that is associated with the speculative motive. Meanwhile, the aforementioned hypothesis is also tested for the counterparts of KOSDAQ-listed LEs as a control group for the purposes of comparability and validity of the

results. On the other hand, the following hypothesis is posited to test for corporate motive for cash holdings as a precautionary one, which is to protect the SMEs from unforeseen business fluctuations in the post COVID-19 era. To test for the hypothesis, the explanatory variable of growth opportunities (GROWTH) substitutes FRISK adopted in the first hypothesis, in order to find a relationship of financial default risk to the dependent variable of Tobin's Q as firm value (FVALUE). Concerning the economic models to test the first and the second hypotheses, relatively robust methodologies such as static panel data, Tobit regression, robust regression and stepwise regression models are applied, respectively. Given the dependent variable to represent firm value (FVALUE) in the model is a type of a limited dependent model variable whose value is bounded from "0" to positive one, Tobit regression model may also be adopted, which is outlined below, as presented in Ramanathan [12].

If that sample data are not symmetrically distributed in value (i.e., between positive and negative numbers), the equation of Tobit model is formulated as follows:

$$Y_t = a + bX_t + U_t, \text{ if } Y_t > 0 \text{ or } Y_t = 0, \text{ if } Y_t < 0$$

For the estimation of the model, the index function, $I_t = a + bX_t + U_t$ is set to the value of "0", in the case of $I_t < 0$. Otherwise, the dependent variable in the function is I_t . The joint probability density function has a form as follows:

$$P_1 = P(1/\sigma) f[(Y_t - a - bX_t)/\sigma], \text{ if } Y_t > 0,$$

$$P_2 = P F[(-a - bX_t)/\sigma], \text{ if } Y_t < 0$$

Based on the likelihood function for the sample data of $L = P_1 \times P_2$, the coefficients in the model are individually estimated by the method of maximum likelihood (ML) estimation, which may maximize L for each parameter in the model.

H2: In relation to the post COVID-19 pandemic era, KOSDAQ-listed SMEs may reserve

cash holdings for a precautionary motive to prepare for unanticipated business fluctuations.

Lastly, the motive of cash holdings is empirically tested on a relative basis. In other words, financial components proposed to determine the level of cash holdings are statistically compared between the two subsets of the SMEs that are divided by the median of the level during the sample period. By deriving the outcome utilizing limited dependent variable models such as logit, probit, and complementary-log-log (CLOG) regressions, the motive of cash holdings for each sample is identified from a statistical perspective.

H3: Being associated with the post COVID-19 era, KOSDAQ-listed SMEs whose levels of cash liquidity are higher than the median, may have a different motive of cash reserves (between the precautionary and the speculative motives) from the counterparts of the SMEs with lower levels less than the median during the sample period.

The underlying rationale on the model of the probit regression is generalized as follows [12].

$$Y_t = 1, \text{ if } \alpha + \beta X_t + U_t > 0$$

$$Y_t = 0, \text{ if } \alpha + \beta X_t + U_t \leq 0$$

If $F(z)$ indicates a cumulative distribution function of normal distribution as $F(z) = P(Z \leq z)$,

$$P(Y_t = 1) = P(U_t > -\alpha - \beta X_t) = 1 - F((- \alpha - \beta X_t)/\sigma)$$

$$P(Y_t = 0) = P(U_t \leq -\alpha - \beta X_t) = F((- \alpha - \beta X_t)/\sigma)$$

,where $P(Y_t = 1)$ is a probability that the sample firm is classified into the subset of KOSDAQ-listed SMEs, whose level of cash holdings is larger than the median value.

4. Analysis and Discussion

4.1 Results of the first hypothesis

With respect to the analysis of the outcome obtained from the first hypothesis test, it is presented in Table 3 for KOSDAQ-listed SMEs and in Table 4 for the LEs, respectively.

Table 3. Results of testing a speculative motive of cash holdings for KOSDAQ-listed SMEs during the investigated period.

IDV	Estimated coefficient (Random effects model)	Estimated coefficient (Tobit reg. model)	Estimated coefficient (Stepwise reg. model)
Intercept	-0.026	-0.038	<N.A>
CHOLD	-3.297*	-3.223*	<N.A>
Lag_CHOLD1	2.184	2.068	<N.A>
Lag_CHOLD2	-1.830	-1.676	<N.A>
Lag_CHOLD3	2.710*	2.738*	<N.A>
FRISK	0.795*	0.794*	0.794*
INTERRND1	4.000	4.892	<N.A>
INTERRND2	2.681	3.148	<N.A>
INTERRND3	-2.324	-2.209	<N.A>
INTERRND4	-0.247	-0.459	<N.A>

<Note> * denotes a statistical significance at the 5% level. <N.A> denotes an insignificant estimated coefficient at the 5% entry and deletion levels, respectively.

On the analysis of the cash holding motive for KOSDAQ-listed SMEs, it was found that, across all the models (inclusive of random effects, pooled OLS models, TOBIT, robust regression and stepwise regression models), FRISK which is related to the precautionary motive, showed a positively significant impact on the dependent variable of FVALUE. After controlling for the effect of FRISK the explanatory variables to represent corporate cash holdings such as CHOLD and Lag_CHOLD3 did show statistical importance to account for the firm value in the majority of the models. Moreover, there were no statistically significant influence of the interaction term between corporate cash holdings and R&D intensity in all models, as reported in Table 3. Meanwhile, results from only two models such as random effects and pooled OLS ones are estimated (except the fixed effects model), due to time invariant characteristics of industry indicator variables in terms of static panel data model. Given the baseline industry is set to be the food & beverage one among the domestic sample industries, no industry indicator (or dummy) variables showed to be correlated

with FVALUE for the SMEs from a statistical viewpoint, whose results are unreported in this paper). In contrast, for subsample of the LEs as reported in Table 4, industry variables such as IND5 (pharmaceutical), IND8 (machinery), IND10 (medical Precision), IND16 (educational Service), IND17 (publishing, media, broadcasting telecommunication and informational service) and IND19 (art, sports and leisure service) revealed statistical importance to positively influence FVALUE in all or the majority of the models, as described later.

Table 4. Results of testing a speculative motive of cash holdings for KOSDAQ-listed LEs

IDV	Estimated coefficient (Random effects model)	Estimated coefficient (Tobit reg. model)	Estimated coefficient (Stepwise reg. model)
Intercept	0.150	0.215*	0.292*
CHOLD	-0.154	-0.208	<N.A.>
Lag_CHOLD1	-0.191	-0.230	-0.365*
Lag_CHOLD2	0.122	0.117	<N.A.>
Lag_CHOLD3	-0.133	-0.077	<N.A.>
FRISK	0.475*	0.446*	0.444*
INTERRND1	8.293*	13.047*	11.541*
INTERRND2	-1.827	-2.340	<N.A.>
INTERRND3	2.993	6.130*	4.825*
INTERRND4	-0.546	-0.602	<N.A.>

<Note> Denotations indicated in the note of Table 3 are applied to this table.

Moreover, across all or most models, it was found that FRISK, INTERRND1 and INTERRND3 showed positive correlations with the dependent variable. To specify, the effects of cross-product variables between cash holdings and R&D activity in the first and third prior years (i.e. INTERRND1 and INTERRND3) had positively pronounced effects to increase firm value measured by Tobin's Q, after the precautionary motive represented by the variable of FRISK was controlled.

4.2 Results of the second hypothesis

In the second hypothesis, other motive of corporate cash holdings as the precautionary one is tested, whose results are reported in Table 5 and Table 6 for the subsamples of the SMEs and the LEs, respectively. As previously illustrated, significance of the variables for cash holdings in relation to firm value (FVALUE) was tested to detect a precautionary motive after controlling the investment opportunities (GROWTH).

Table 5. Results of testing a precautionary motive of cash holdings for KOSDAQ-listed SMEs

IDV	Estimated coefficient (Random effects model)	Estimated coefficient (Tobit reg. model)	Estimated coefficient (Stepwise reg. model)
Intercept	1.555	1.557	2.062*
CHOLD	0.040	0.083	<N.A.>
Lag_CHOLD1	-1.501	-1.514	<N.A.>
Lag_CHOLD2	5.092	5.111	<N.A.>
Lag_CHOLD3	-3.326	-3.357	<N.A.>
GROWTH	0.180	0.171	<N.A.>
INTERTAN1	0.075	0.147	<N.A.>
INTERTAN2	-4.118	-4.139	<N.A.>
INTERTAN3	-21.059	-21.176	<N.A.>
INTERTAN4	7.500	7.413	<N.A.>

<Note> * denotes a statistical significance at the 5% level. <N.A.> denotes an insignificant estimated coefficient at the 5% entry and deletion levels, respectively.

Concerning the results for the sample of the SMEs reported in Table 5, it is interesting or even surprising that none of the explanatory variables were found to have significant relationship with the dependent variable of FVALUE at the 5% level of significance. Therefore, the precautionary motive may not be a primary one for the SMEs to hold cash reserves that affect firm value during the sample period. Moreover, even if the outcome is not reported in this paper, there seems to be no industry influence in the majority of the models to affect the dependent variable. On the other hand, for the subsample of the LEs, the control variable to represent firm's growth

opportunities (GROWTH) defined by the earnings-price ratio, showed a negatively significant impact on corporate value (FVALUE), as in Table 6. After controlling for the variable, significant relationship between corporate cash holdings and FVALUE were not detected in most models, whose results are consistent with the findings of the SMEs. This phenomenon may indicate that the both the SMEs and the LEs did not overall reserve cash liquidity for the purpose of the precautionary motive in preparation for the post COVID-19 pandemic era. As for the industry effect to affect the dependent variable, the aforementioned IND5, IND10, IND16 and IND17 were positively important, while IND11 showed its negatively significant effect among the 23 domestic sample industries for the subset of the LEs.

Table 6. Results of testing a precautionary motive of cash holdings for KOSDAQ-listed LEs

IDV	Estimated coefficient (Random effects model)	Estimated coefficient (Tobit reg. model)	Estimated coefficient (Stepwise reg. model)
Intercept	1.153*	1.149*	1.233*
CHOLD	0.097	0.645	0.700*
Lag_CHOLD1	-0.421	-0.342	<N.A.>
Lag_CHOLD2	-0.049	0.400	<N.A.>
Lag_CHOLD3	0.071	0.054	<N.A.>
GROWTH	-0.100*	-0.164*	-0.180*
INTERTAN1	1.925	0.341	<N.A.>
INTERTAN2	-0.511	-0.431	-1.619*
INTERTAN3	0.384	-0.997	<N.A.>
INTERTAN4	-0.949	-0.980	<N.A.>

<Note> Denotations indicated in the note of Table 5 are applied to this table.

4.3 Results of the third hypothesis

As for the last hypothesis to test for a major motive of corporate cash holdings for the SMEs, a relative analysis was performed by applying the limited dependent variable models (i.e. binary choice models), whose output is presented in Table 7. For the SMEs whose levels of cash

holdings are larger than the median value of 0.0970 in the distribution of the entire sample observations are statistically compared with the counterparts with less than the median during the investigated period.

Table 7. Results of the binary choice models to identify cash holding motive for the sample of the SMEs

IDV	Logit	Probit	CLOG
Intercept	-46.372*	-28.545*	-33.655*
PROF	0.294	0.371	0.117
FRISK	-0.006	-0.004	-0.005
MLEVER	-3.386*	-2.078*	-2.357*
SIZE	0.217*	0.132*	0.148*
GROWTH	0.818*	0.317*	0.821*
TASSET	-0.004	-0.002	-0.003
AGENCY	0.668	0.414*	0.388*
FOS	0.783	0.417	0.285
NDTS	-3.380	-2.190	-0.910
ESTAB	0.021*	0.013*	0.015*
Goodness of Fit	668.917*	663.691*	664.099*

<Note> * denotes a significance at the 5% level in the chi-square test. coefficient was estimated by the method of maximum likelihood. The test for overall goodness of fit was conducted by the likelihood ratio test and the Wald test was used to measure significance of each coefficient.

Given the probability modeled is set to be "1" for the sample of the SMEs whose value is larger than 0.0970 by utilizing SAS program (9.4 version), the variables such as MLEVER, SIZE, GROWTH and ESTAB were found to be statistically significant components to divide the subset of the SMEs by the median of the level of cash holdings. To specify, GROWTH to represent corporate investment opportunities revealed positive importance from a statistical perspective. It may indicate that the probability to be classified into the subset of the SMEs with having value larger than the median (=0.0970) increases, as GROWTH becomes larger. In contrast, FRISK as a proxy for business or financial default risk in relation to the precautionary motive, did not have any discriminating power between the two subsets of

the SMEs during the sample period. Meanwhile, even if the output is not reported in the table, industry effect that may significantly discriminate between the subsets were found in only three industries among the entire sample industries, such as IND14 (retail), IND21 (other manufacturing) and IND22 (business facilities management and supporting service) with a positive sign.

4.4 Discussion

Concerning the results obtained from the first hypothesis to test a motive of cash holding for speculative purpose, it was interesting to empirically detect that CHOLD and Lag_CHOLD3 showed negative and positive relationships with the dependent variable of FVALUE for the SMEs, as previously described. In other words, KOSDAQ-listed SMEs overall seem to reserve cash holdings for the purpose to support upcoming investment opportunities, but only cash holdings reserved at current fiscal year (CHOLD) and in the three years ago (Lag_CHOLD3), had significant effects on firm value. The latter variable had a positive correlation with FVALUE, indicating that there is, on average, a 3 year duration between cash holdings and increase of firm value for KOSDAQ-listed SMEs in the domestic capital market. In contrast, it was found that, in relation to change in firms value, cash holdings reserved for the purpose of the speculation may not exist for the counterparts of the LEs across most models as reported in Table 4. However, there seems to be a statistically significant and positive relationship between FVALUE and the interaction term (i.e. INTERRND1 and INTERRND3) between cash holdings and R&D activity for the LEs. The phenomenon may imply that cash liquidity primarily supporting corporate R&D investments is positively associated with firm value, but excess cash savings kept by the incumbent management may possibly cause the agency cost

of equity arising from its moral hazard, as presented by Jensen [10]. Moreover, the following industries such as IND5 (pharmaceutical), IND8 (machinery), IND10 (medical precision), IND16 (educational service), IND17 (publishing, media, broadcasting telecommunication and informational service) and IND19 (art, sports and leisure service) were estimated to have significantly higher market- to book-valued asset ratios (Tobin's Q) than that of the baseline industry as IND1 (food & beverage industry). According to the modern finance theory, the phenomenon seems to be reasonably anticipated that these industries are conventionally classified into a high-tech sector wherein large proportion of the market value of equity consists of growth opportunities.

Pertaining to the second hypothesis that tests the precautionary motive of corporate cash holdings, it was found that none of the variables to proxy corporate cash holdings for a precautionary motive were found to be statistically pronounced for the sample of the SMEs, as previously presented. Based on the results, it is of concern that the SMEs need to reserve more cash liquidity to prevent or mitigate spillover effects arising from possible economic or financial changes in the post COVID-19 pandemic era. To recap, the findings in the second hypothesis test are likely to be in contrast to that of the first hypothesis test, in that KOSDAQ-listed SMEs are willing to take advantage of future investment opportunities by reserving cash holdings as a speculative motive, but need to maintain more cash liquidity for a precautionary one to reduce unforeseen business fluctuations. Likewise, as presented in Table 6, the counterparts of the LEs were also found to reserve cash holdings whose main motive was not precautionary. As a conclusion, the estimated coefficients of the proxy variables for corporate cash holdings did not show importance to affect Tobin's Q. Meanwhile, the aforementioned

industries in the high-tech sector such as IND5, IND10, IND16 and IND17 had positive correlation with firm value for the LEs, whereas only one industry (IND11 as the transportation equipment business one) showed a negatively significant effect on the dependent variable. Overall, concerning the descriptive statistics of the variables employed in the study are summarized as follows: Among total proxy variables to be tested as proposed ones of cash holding motives, the statistics of mean and standard deviation for the statistically significant variables such as CHOLD and Lag_CHOLD3 in the subsample of KOSDAQ-listed SMEs, are found to be 0.1407 and 0.1247 for the former variable and 0.1202 and 0.1140 for the latter one. Moreover, the significant variables for the LEs such as FRISK, INTERRAND1 and GROWTH were 2.1584 and 1.0422, 0.0027 and 0.0096, and 0.0409 and 0.2707, respectively.

Finally, based on the outcome obtained from the last hypothesis test, the proxy variable (GROWTH) in relation to corporate investment opportunities, that is also defined as the ratio of earnings to market price, revealed its significant discriminating power between the two comparison groups divided by the value of median ($=0.0970$). In other words, the probability to be included in the SMEs whose value is larger than the median, increases as GROWTH gets bigger. The phenomenon may suggest that the SMEs have excess cash holdings to support investment opportunities (as a speculative motive) by considering the positive coefficient of the variable for the earnings-market price ratio (GROWTH) as presented in Table 7. Therefore, it is plausible to conclude that KOSDAQ-listed SMEs may not attain to the optimal level of cash holdings during the investigated period. Moreover, given that FRISK was found to be insignificant across all models, it may be financially interpreted that the SMEs may not reserve cash liquidity in terms of the

precautionary motive, whose results are generally compatible with the findings in the second hypothesis test. Meanwhile, MLEVER with a negative sign of its estimated coefficient showed that the SMEs to reserve cash holdings below the level of the median, may, on average, have a higher market-value based debt ratio during the sample period. The result can be financially interpreted by Myers' pecking order theory theorizing that firms may prefer using internal financing (inclusive of cash reserves) over external debt financing due to asymmetric information in the capital market. It was also found that, as firm size increases, the sample firms reserve a higher level of cash reserves, as indicated by positively significant sign of the coefficient of the variable of SIZE. The result is contradictory to the finding done by the study of Kawase *et al.*[11], which presented that the tendency of cash holdings strengthens as firm size becomes smaller. Therefore, it may be interpreted that KOSDAQ-listed SMEs seem to hold more liquidity to support investment opportunities as size becomes larger. Finally, ESTAB that represents history of corporate establishment (in years) was found to be positively significant across all models. Therefore, the SMEs seem to have more financial flexibility to reserve cash savings, as the stage of business changes to mature one with stable cash flow, according to the modern management theory.

5. Concluding Remarks

This study addresses one of the conventional, but still controversial issues in modern finance, to which more attention may need to be drawn for academics and practitioners. In other words, KOSDAQ-listed SMEs are empirically analyzed to identify a primary motive for corporate cash holdings between the speculative and

precautionary motives in the study. It seems to be of concern to identify the *status quo* motive for the sample dataset of the SMEs to prevent themselves from possible spillover effects associated with unforeseen fluctuations of economic or financial circumstances in the post COVID-19 pandemic era. KOSDAQ-listed SMEs were found to have the speculative motive of cash reserves to support future investment opportunities in the majority of the models, while there may not exist the motive for the sample of the LEs. Even if the present study may suffer from legitimate limitations associated with empirical research settings that are different from those in the previous studies, the results are expected to be considered by the government or corporate policy makers in Korean capital market. As a virtuous cycle, it may need to reserve more cash holdings as a precautionary motive for KOSDAQ-listed SMEs to prepare for unforeseen economic or business fluctuations in the period of the post COVID-19 pandemic.

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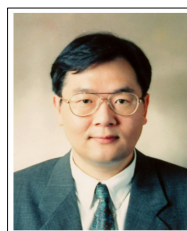
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