

국내 재벌기업들의 현금성자산 수준의 결정요인들에 대한 추가적 심층 분석

Further Investigations on the Financial Characteristics of Cash Reserves for the Chaebol Firms in the Korean Capital Markets

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요약

본 논문의 논제는 국내 기업들, 특히 재벌계열사들 중심의 최근의 재무적 현안이 되고 있는, 현금유동성 수준에 대한 재무적 결정요인들에 대한 분석이다. 연구의 특징은 재벌소속 계열사들의 동 유동성에 대한 재무적 결정요인들에 대한 기존 연구(김한준 (2015))에 관한 확장, 심층적 연구이며, 이를 통하여 기존의 검증된 결정요인들에 대한 다양한 계량 경제적 모형들을 활용한 강건성 확인이 연구목적이라고 할 수 있다. 다양한 연구방법들이 검증에 응용되었으며 (정적, 동적 패널자료모형, 변수선택법, 파마-맥베스 모형 등) 연구결과 관련, 유의성있는 재무적 결정요인들로서는 현금흐름, 시가대비 장부가, 대리인비용, 그리고 추가적 설비투자비용 등이 판명되었다. 이는 기존의 연구결과와도 일관성이 있는 것으로 판단된다. 본 연구를 위하여 추가 투입된 잠재변수들 중, 현금전환기간과 산업더비변수들 (음식료업, 화학업, 건설업 등)이 종속 변수에 대한 영향력에서 통계적 유의성을 보였다. 본 연구결과가 해당기업들의 적정 현금유동성 수준의 정책적 결정에 실증적 기준을 제공하여, 국내 자본시장의 선진자본시장으로의 진입 가능성에도 일조할 수 있기를 기대한다.

■ 중심어 : | 현금유동성 | 재벌계열사 | 재무적 결정요인 | 동적 패널자료모형 | 파마-맥베스 회기모형 |

Abstract

This study examined one of the contemporary financial aspects, the level of corporate cash holdings for the firms belonging to the chaebols in the Korean capital markets. Being accompanied by various alternative econometric methodologies such as static and dynamic panel data model, stepwise OLS, and Fama-Macbeth modelm this research extended the preceding Kim's study (2015) in anticipation of validating the results to identify any financial factors which may significantly affect the chaebol firms' cash reserves. Several financial characteristics such as CASHFLOW, MVBV, REINVEST, and AGENCY, were found to be statistically significant factors on the level corporate liquidity, along with CCC as cash conversion cycle in the models. It may be plausible that any outcomes of this study may be applied to enhance the efficiency of financial strategies of the chaebol firms on cash holdings, thereby expediting the development of the domestic capital markets status quo toward the advanced one in the market classification.

■ keyword : | Cash Holdings | Chaebol Firms | Financial Determinants | Dynamic Panel Data Model | Fama- MacBeth Regression

I. Introduction

Given the on-going progress through the debates or controversies between the decision makers at the domestic government and corporate levels on the policy of optimal level of cash holdings for the domestic firms, primary issues between the relatively polarized opinions of the interested parties, may be explicated by the stereo-type rationale in modern finance: the trade-off, Myers' pecking order, and agency costs theories as described in Gill & Shah[1]. According to the argument supporting the first theory, the level of corporate cash holdings may be determined by the trade-off rationale arising from its marginal costs and benefits. The marginal costs accompanied by holding cash-related liquidity include the 'cost of carry' related to the difference between earnings generated and interest expenses paid to the lenders, while the marginal benefits may be associated with transaction and precautionary motives, as presented in [2]. The second postulation was connected with the priority of a firm's financing theorized by [3], suggesting that internal financing tends to be favored over the external financing as a orderly sequence of debt and equity. Lastly, Jensen [4] argued that higher level of corporate free cash flow may result in occurrence of agency costs incurred by a firm's manager who may not be in the best interest of shareholders, e.g., moral hazard. Based upon the aforementioned theoretical hypotheses which may affect the level of corporate cash holdings, this study examined any financial characteristics or determinants on the level for the subsidiaries belonging to the chaebols (i.e., the chaebol firms, onward) in the domestic capital markets. In particular, it may not be deniable that on-going debates to control the level of cash reserves seems to be relatively exacerbated or unreconciled between the

two interested parties such as government policy maker and the chaebol firm's manager possessing lavish cash flow, to date. The main objectives implementing this study may be explicated as follows: Assuming that any identification of financial determinants of corporate cash holdings is one of the foremost theoretical or practical issues to be solved to boost a stagnant persistence of domestic economy, the results obtained from this study may be effectively utilized or proved to search for a firm's optimal level of cash savings or liquidity. Specifically, in line with the previous research performed to investigate the financial profile of cash holdings for the chaebol firms in [5], any outcome of the study may be compared and validate the previous counterparts toward enhancing legitimate consistency and robustness. That is, this study sought to extend Kim's study [5] in anticipation of reinforcing the preceding results by utilizing various estimation methodologies toward validity. Moreover, relatively little attention had been drawn on the financial components of cash holdings for the chaebol firms, while more extensive researches across advanced and emerging capital markets, had been performed in volume and depth in the international context, as outlined later. Therefore, it may be plausible to apply any obtained consequences of this study to increase the efficiency and effectiveness of the domestic firms, thereby enhancing the development of the domestic capital markets *status quo* toward advanced markets. Given the persistent and successful multinational trade agreements inclusive of the financial service industry through the vehicles of FTAs (Free Trade Agreements) and TPPs (Trans Pacific Partnerships), it is expected that any outcomes may be beneficial for foreign and domestic institutional investors as well, when contemplating external or internal investment strategies through the type of either FDI or indirect

portfolio diversifications as presented in [5]. To recap, major contributions of the present study may be to explore any possible reconciliations or resolutions on the current financial issues related to the optimal level of cash hoarding for the chaebol firms with robustness, thus inducing active foreign direct investments and/or indirect portfolio investments in the domestic capital market.

This paper is organized as follows: Following the introduction, previous literature on the related subject of corporate cash holdings were chronologically reviewed in international context. Introducing the criteria for the data collection and proxy or control variables, which had also been utilized in the previous study of [5], econometric estimation techniques were outlined and implemented on the postulated hypothesis of inquiry, following its analyses and interpretations. Lastly, concluding remarks were presented with the area of further research anticipated in the field of modern finance.

II. Literature Review

Gill and Shah [1] investigated the determinants of corporate cash holdings for the 166 Canadian firms listed in Toronto Stock Exchange for the period, 2008 - 2012. They tested the relationships between the dependent variable of cash holdings and relatively large number of independent variables supported by alterative theories in finance, such as market-to-book value ratio, cash flow to net asset ratio, net working capital-to-asset ratio, leverage, firm size, dividends as well as board size, CEO duality, and industry dummy. Subsequent to the comprehensive review on the previous literature on corporate cash reserves, they regressed the cash holdings ratio on the aforementioned variables, in which positive

relationships were found between cash holdings and market-to-book ratio, net working capital, and board size for the Canadian manufacturing industry, whereas negative associations were detected between the dependent variable and market-to-book ratio, net working capital, and firm size in the service industry through the OLS regression analysis. They argued that domestic firms in Canada may use an optimal size of board depending on firm size, supporting the agency theory in modern finance.

Horioka and Terada-Hagiwara [6] investigated the primary motivations to save in the form of liquid assets instead of capital formation or shareholder distributions for the firms headquartered in 11 Asian nations for the period of 2002 to 2011. They analyzed that firms generally increased their cash savings during the sample period across developed and developing countries, where those in the latter category, in particular, saved more as against developed ones during the period 2004-2006. Moreover, they theoretically argued that cash flow sensitivity of cash of financially constrained firms may show a positive sign to prepare for the increase of future investment. By employing several primary exogenous variables such as the ratio of cash flow to total assets, Tobin's Q, and firm size, coupled with the dependent variable of the ratio of the change in cash holdings to total assets, the results provided evidence that cash flow were overall positively related to the endogenous variable indicating that the income effect may be more important to the substitution effect arising from a high productivity shock. The market-to-book-value ratio proxied for Tobin's Q showed its positive association with the dependent variable, while firm size effect was stronger on the increase of the cash reserves for smaller size firms than that of larger size counterparts. Based on the results tested in the study,

it was suggested that positive cash-flow sensitivity of cash was more pronounced in the case of smaller and presumably more constrained firms in both developed and emerging markets.

Lian *et al.* [7] summarized the anticipated benefits of reserving cash from a company's point of view such in term of providing more certainty (or financial flexibility), reputation, and investment opportunities. They tested proposed financial characteristics to examine cash holdings of Chinese firms during the period, 1999 - 2009 inclusive of the global financial crisis time, which tended to make liquidity management conservative, coupled with more financial constraints. On the results of the exogenous variables (as regressors) tested for the regressand of cash holdings for the Chinese firms during the sample period, Tobin's Q, the status as a financially unconstrained firm not by paying dividend and the event of financial crisis, showed their statistically significant impacts on the dependent variable, while firm size, leverage, net working capital, and capital expenditures, negatively affected the level of cash holdings. As for the financial determinants of another cash reserves defined by the changes in cash holdings divided by total assets, the independent variables such as cash flow, interaction term of cash flow and financial crisis and Tobin's Q, revealed their statistical significance, whereas firm size had a positive linkage to the dependent variable. They described that the positive relationship between size and the changes in cash reserves, which may not be opposite to the general expectation in finance theory, may attributed to relative cash scarcity of small firms, most of which were in their start-up or early stages of business cycle. As a conclusion, they argued that domestic firms in China may maintain their cash holdings as precautionary motive as in those in the U.S.

Subramaniam *et al.* [8] tested the relationship between firm structure and its cash holdings in terms of a diversified vs. a focused firm. They theorized that firms with more than one segment (i.e., diversified firm) should have lower levels of cash holdings as against focused ones. In other words, the presence of investment opportunities for growth imperfectly correlated across segments, the higher possibility for non-core asset sales, and higher agency costs among diversified firms had statistically significant and negative relationship with the level of case reserves. In particular, they hypothesized three postulations such as the complementary growth hypothesis, the asset sales one, and the influence one which may discriminate the level of cash holdings between diversified and focused firms. Empirically, two dependent variables such as industry-adjusted and unadjusted cash scaled by total assets were employed to measure for the levels of the cashing holdings of the firms categorized by the aforementioned two groups during the sample period of 1988 to 2006. Firm size, leverage, Tobin's Q, R&D expenditures, investment, working capital, cash-flow, dividend payment, bond rating, and volatility of cash-flow as the explanatory variables, overall showed their statistical significance to affect the level of industry-adjusted cash holdings of the U.S. sample firms. Moreover, they found that firm structure variable to discern between diversified and focused firms did not have its strong impact on the dependent variable after controlling for the aforementioned theoretical facts such as complementarities in growth, asset sales, and influence cost ones. Out of these three hypotheses, complementary growth seemed to be the most economically significant determinants in determining cash holdings between the two investigated groups.

III. Data and Econometric Estimations

1. Data Collection

This study empirically employed the most updated time reference for the data to be investigated comprehending the post global financial turmoil from the year 2009 to 2013 (for 5 years). In line with common practices in the analysis of financial ratios, the five-year time coverage was particularly selected, taking into account the fact that the previous findings such as in [9] indicated that a firm's financial ratio (such as the leverage ratio which was one of the frequently proposed variables affecting the level of cash holdings in the majority of the previous literature), showed its tendency to move toward a firm's industry mean over the five-year period. The following table presented the primary criteria to sample the data employed in the study as an extended version of Kim's study [5] which had utilized the same sampling criteria., as previously mentioned.

Table 1. Criteria to Select the Sample Chaebol Firms Listed on the Domestic Stock Exchange

1. All the data for the variables employed in each corresponding model were available for at least five years from 2009 to 2013, which was covering the post-era of the global financial turmoil.
2. The sample firms were listed on either the KOSPI or the KOSDAQ bourses during the studied period.
3. They were also included in the population of the database of New KisValue sourced by the NICE.
4. The criteria to classify a firm into being the chaebol one during the studied period, were set in accordance with the guidelines by the Fair Trade Commission (FTC) in the Republic of Korea, such that it was the one classified into a 'Large Business Group', subject to the ceiling limits on cross-shareholding mechanism.
5. Financial and regulated industries were not included in the final sample.

(Hypothesis Postulated)

H_0 : Firms belonging to the chaebols in the Korean capital markets, may not have any statistically significant components to influence on the level of

cash hoarding during the studied period of the study which is the extended one of Kim [5] to enhance validity.

Regarding the measurement for the dependent variable (DV) as a chaebol firm's cash holdings, this study employed two endogenous variables as follows, which were also utilized in [5]:

$$(1-1) DV1 = (\text{Cash}_t + \text{Cash Equivalents}_t + \text{Marketable Securities}_t) / \text{Total Assets}_t$$

$$(1-2) DV2 = DV1_t - DV1_{t-1} = \{(\text{Cash}_t + \text{Cash Equivalents}_t + \text{Marketable Securities}_t) / \text{Total Assets}_t\} - \{(\text{Cash}_{t-1} + \text{Cash Equivalents}_{t-1} + \text{Marketable Securities}_{t-1}) / \text{Total Assets}_{t-1}\}$$

The dependent variables in the model may suffer from any financial an 'endogeneity' problem over time period so that dynamic panel data analysis was also performed to look into any effect of the specific problem which may affect the significant contributions of the other explanatory variables, as presented later.

On the selection of explanatory or independent variables (IDVs) employed in the study included those tested in [5] along with additional proxy variables representing each corresponding hypothetical assumption as listed in [Table 2]. For reference, the followings were the IDVs employed in [5] to be tested: LIQUID, BPT, CASHFLOW, VOLATILITY, MVLEV, SIZE, MVBV, GROWTH, NETINVEST, AGENCY, FOS, and DPAYOUT. With the aim of verifying the results obtained from the previous study of [5] as one of the objectives conducting the study, several theoretical IDVs such as BLOAN, NWC, and DPAYOUTF, were added to enter into the models, in line with industry dummy variables for the chaebol firms, as presented in [Table 2].

Table 2. Definition for the Independent Variables

Definition of IDV	Symbol	Measurement of Proxy
Liquidity	LIQUID	$(\text{Current Assets} - \text{Cash} + \text{Cash Equivalents}) / \text{Current Liabilities}$
Cash Conversion Period	CCC	$(\text{Accounts Receivable} + \text{Inventory} - \text{Accounts Payable}) / \text{Sales}$
Profitability	BPT	$(\text{Earnings before Interest and Taxed} (=EBIT)) / \text{Total Assets}$
Cash Flow	CASHFLOW	$(\text{Net Income} + \text{Depreciation} + \text{Amortization}) / \text{Total Assets}$
Volatility of Cash Flow	VOLATILITY	$(\text{Deviations from the Mean Cash Flow}) / \text{Mean Cash Flow for a firm at fiscal year-end}$
Leverage	MVLEV	Book value of liabilities / [book value of liabilities plus book value of preferred equity plus market value of common equity]
Size	SIZE	Logarithm transformation of Total Assets at fiscal year-end
Market-to-book-value of Assets	MVBV	$(\text{Market value of equity} + \text{Book value of Liabilities}) / \text{Book value of Total Assets}$
Growth	GROWTH	$(\text{Sales}_t - \text{Sales}_{t-1}) / \text{Sales}_{t-1}$
Bank Relationship	BLOAN	$(\text{Long term loan} / \text{Total Liabilities})$
Investments	NETINVEST	$(\text{Tangible Assets}_t - \text{Tangible Assets}_{t-1}) / \text{Total Assets}_t$
Agency costs	AGENCY	$(\text{Research \& Development Expenses} + \text{Advertising Expenses} + \text{Total Assets}) / \text{Sales}$
Net Working Capital	NWC	$(\text{Current Assets} - \text{Cash} \& \text{Cash Equivalents}) - \text{Current Liabilities} / \text{Total Assets}$
Foreign ownership	FOS	Foreign ownership in common stock for each sample firm
Dividend Payout	DPAYOUT	$\text{Dividend per Share} / \text{Earnings per Share}$
Interaction Effect between Foreign Ownership and Dividend Payout	DPAYOUTF	$\text{FOS} \times \text{DPAYOUT}$

Industry Classification	IND	
		IND2 = 1 if industry = food, 0, otherwise. IND3= 1 if industry = chemical, 0, otherwise. IND4= 1 if industry = pharmaceutical, 0, otherwise. IND5=1 if industry = semiconductor, 0, otherwise. IND6 = 1 if industry = textile, 0, otherwise. IND7= 1 if industry = transportation, 0, otherwise. IND8 = 1 if industry = business service, 0, otherwise. IND9 = 1 if industry = construction, 0, otherwise. IND10 = 1 if industry = wholesale & retail, 0, otherwise. IND11 = 1 if industry = entertainment, 0, otherwise. IND12 = 1 if industry = information, 0, otherwise. IND13 = 1 if industry = utilities, 0, otherwise. IND14 = 1 if industry = accommodation, 0, otherwise. IND15 = 1 if industry = welfare, 0, otherwise. (Omitted category as IND1 = other manufacturing industry)

Cash conversion cycle denoted as CCC in [Table2] may be one of the measurement representing the inter-relationship between the current assets and the current liabilities in a firm's financial statement. [10]

For example, higher level of accounts receivable and inventory possessed by a corporate entity relative to its sales, may delay the conversion period paid in cash to the firm, while larger amount of accounts payable may contribute to maintaining higher level of cash holdings due to the delay of payment in the type of cash. Therefore, a firm with a longer period of CCC was expected to keep lower level of cash liquidity for the chaebol firms in the domestic

markets. Among the proxy variables adopted in each statistical estimation of this study, it was also interesting to test an association between a firm's reliable relationship with domestic banks and its need to save cash reserves for external financing. "A firm's relationship with its prime bank, e.g., its ability to borrow on short notice, may have a significant effect on its need for both demand deposits and marketable securities" as presented by [11]. So far, empirical Investigations on the relationship between these variables which may have been tested in few researches, may suggest a meaningful implication for the sample firms of this study. In other words, the chaebol firms may tend to maintain a reliable relationship with their prime banks for credit since they may historically resort to bank lending as a primary source for external financing. Therefore, it was anticipated that the proxy measuring the degree of bank lending, BLOAN, may possess an inverse linkage to the level of a firm's cash holdings. Moreover, as rarely tested in any of the previous literature, it was of concern to identify any simultaneous relationship between the degree of foreign ownership (FOS) and dividend payout (DPAYOUT), which may have its interacting effect on the level of cash holdings for the chaebol firms in the domestic markets.

Table 3. Descriptive Statistics for the Chaebol Firms during the Investigated Period

Variable	No.	Mean	Median	STD	Min.	Max.
DV1	157	0.08	0.06	0.09	0.00003	2.00
DV2	157	0.84	-0.04	13.01	-1.00	355.19
LIQUID	157	1.22	0.99	1.00	0.00	12.21
BPT	157	0.05	0.04	0.07	-0.35	1.00
CASHFLOW	157	0.04	0.04	0.18	-3.21	3.00
VOLATILITY	157	0.00	0.003	37.46	-852.80	444.49
SIZE	157	28.41	28.55	1.86	24.05	33.00
MVBV	157	1.21	1.02	0.90	0.33	20.98
GROWTH	157	0.61	0.07	11.02	-1.00	291.70
MVLEV	157	0.53	0.54	0.24	0.02	0.98
NETINVEST	157	-0.07	0.01	1.22	-29.14	0.69
AGENCY	157	1.30	1.16	1.07	0.18	23.93
DPAYOUT	157	19.58	11.00	40.87	0.00	597.00
FOS	157	0.15	0.11	0.15	0.00	0.65

2. Econometric Estimations

The current study also employed widely utilized statistical estimation techniques toward enhancing the validity of the results obtained, such as 'static' panel data model, Fama-MacBeth methodology, and stepwise OLS regression model. Along with the 'static' panel data model which was explicated and applied without new explanatory variables added to the present research, Fama-MacBeth technique was also employed to estimate the coefficients of the model as an alternative method to control for potential time-series correlation of estimated residuals as in [8]. The stepwise OLS model was accompanied as well by considering its advantage of deriving parsimonious results free of multi-collinearity and mitigating any econometric problems in terms of heteroscedasticity and autocorrelation as presented in [12] and [13].

Moreover, some of the previous literature on the financial determinants of a firm's cash holdings adopted a dynamic panel data model to account for the 'endogeneity' problem. Therefore, dynamic panel data model, as part of econometric estimations, was employed in the study to estimate each underlying coefficient in the model for validity. Accordingly, the study tested the model to perform the corresponding hypothesis test effectively with a longitudinal data format utilized in this study. As presented in Kim [14], primary feature of dynamic panel data model may allow any persistent effect to be accounted for in the model being involved in the possibility of autocorrelation of the endogenous variable adopted in the model. Major advantageous and unique characteristics of the dynamic model were explicated in [15]: First, for effective control of endogeneity and higher possibility to mitigate any possible collinearity among the exogenous variables. Second, to reduce a problem related to omitted variable and eliminate

Table 4. Results of Robustness Tests for DV1 by Employing Different Variables and Methodologies

IDV	OLS with Industry Dummy Variable	Static Panel Data Model with Industry Dummies (Random Effects Model)	Fama-MacBeth Model with Industry Dummies	Stepwise OLS Model with Industry Dummies
Constant	0.03 (0.69)	-0.04 (-0.53)	(N.A)	-0.06 * (9.51)
LIQUID	0.01 * (2.52)	0.001 (0.35)	0.001 (2.59)	
BPT	0.07 (1.38)	0.09 (1.79)	0.08 (2.59)	
CASHFLOW	0.11 * (6.37)	0.09 * (6.04)	0.02 (0.53)	0.12 * (8.56)
VOLATILITY	0.00002 (0.28)	6.37E-6 (0.16)	-0.00006 (-0.48)	
SIZE	0.00001 (0.01)	0.002 (0.60)	0.0004 (0.23)	
MVBV	0.02 * (4.95)	0.04 * (7.53)	0.02 (0.92)0	0.02 * (5.95)
GROWTH	0.0002 (0.79)	0.0001 (0.76)	0.00001 (0.69)	
MVLEV	0.02 (1.08)	0.06 * (3.28)	-0.02 (-0.59)	
NETINVEST	-0.03 * (-11.33)	-0.03 * (-10.58)	0.0002 (0.99)	-0.04 * (-14.11)
AGENCY	-0.01 * (-3.02)	-0.005 * (-2.27)	-0.002 (-1.20)	-0.01 * (-4.36)
DPAYOUT	0.00007 (0.70)	0.0001 (1.11)	0.0001 (1.06)	
FOS	0.008 (0.35)	-0.01 (-0.43)	0.01 (0.40)	
CCC	-0.05 * (-2.79)	-0.05 * (-2.22)	-0.06 * (-3.60)	-0.04 * (-2.48)
BLOAN	-0.03 (-1.44)	-0.04 (-1.92)	-0.03 (-1.89)	
DPAYOUTF	-0.0001 (-0.33)	-0.0002 (-0.66)	-0.0005 ((-0.71)	
IND2	S (-)		S (-)	S (-)
IND3	S (-)		S (-)	S (-)
IND4				
IND5				
IND6				
IND7				
IND8				
IND9	S (+)			S (+)
IND10				
IND11				
IND12			S (+)	
IND13	S (+)		S (+)	S (+)
IND14				
IND15	S (-)			

(Note 1) * denotes statistical significance at the 5% level and numeric number in parentheses indexes t-statistic for each estimated coefficient. S (+) and S (-) indicate that the estimated coefficient of each corresponding IDV was statistically significant with a positive or negative sign at the same level. (N.A.) = Not Applicable.
 (Note 2) Results of the estimated coefficients of the IDVs on the DV2, were not provided for parsimony considering the space limitations. However, they are available from the author upon request.

unobservable group effects. A conventional specification of the underlying model may be set as follows:

$$Y_{i,t} = a + bY_{i,t-1} + dX_{i,t} + E_{i,t} ,$$

$$E_{i,t} = V_i + U_{i,t}$$

, where $Y_{i,t}$ denotes the profitability index for firm i at time t . a is a constant and b is the coefficient of the one-period lagged dependent variable, ($Y_{i,t-1}$), functioned as an instrumental variable (IV). d is the vector of coefficients of a set of the exogenous variables ($X_{i,t}$). $E_{i,t}$ is a disturbance term separated by

V_i as an unobserved firm specific effect and $U_{i,t}$ as an idiosyncratic error. Dynamic panel model was estimated for each coefficient by using the two-step GMM (Generalized Method of Moments) after transformed into a first differenced equation, as presented in [16], assuming a possible bias (i.e., inconsistency) resulting from the inclusion of the unobserved firm effect in the disturbance and that a lagged dependent variable may accordingly create non-zero covariance argued by [17].

IV. Analysis and Discussion

1. Analysis

As an extended study of [5], the present study conducted various tests for robustness checks in terms of employing additional explanatory variables and new methodologies, whose results may be compared with the previous ones in anticipation of enhancing the validity of the test results. The results are presented in [Table 4]. To specify, coupled with the major IDVs utilized in Kim (2015), the present study used other variables such as BLOAN, CCC, and DPAYOUTF (i.e., the interaction term between DPAYOUT and FOS), which were also theoretically supported by the previous literature in line with the industry dummy variables categorizing each corresponding chaebol firm during the investigated period. Alternative econometric methodologies inclusive of Fama-Macbeth regression and a stepwise OLS model, were employed to detect any changes from the primary findings of [5] with the stepwise OLS regression accompanying its statistical level of 5% for entry and deletion.

A majority of the IDVs identified as statistically prominent components on the level of cash holdings, such as CASHFLOW, MVBV, NETINVEST, and AGENCY reported in [Table 4], had also been found to be significant components as [5] with their same signs of the coefficients. Moreover, out of the newly added explanatory variables, only CCC representing a firm's conversion cycle revealed its consistent effect on the dependent variable, DV1, along with the significant industry dummies of IND2 (the food industry), IND3 (chemical), IND9 (construction), and IND13 (utilities).

2. Discussion and Implications

The precedented findings of Kim's study [5]

provided an evidence that CASHFLOW, MVBV, AGENCY, and NETINVEST out of total twelve explanatory variables, showed their statistically significant impacts on the chaebol firms' level of cash holdings, with the positive relationships of the former two IDVs (i.e., CASHFLOW and MVBV) and the negative ones of the latter ones such as AGENCY and NETINVEST. The results reported in [Table 4] may validate those previous findings in a consistent manner. The following interpretations may suggest financial implications on each exogenous variable affecting the cash savings of the firm. First, Lian *et al.* [7] found the positive relationship between the cash flow and the dependent variable of cash holdings for the Chinese corporations, while Subramaniam *et al.* [8] demonstrated the inverse linkage between the proxies across various statistical methodologies testing for the U.S. sample firms. Subsequently, the motivation of the Korean chaebol firms to control corporate cash savings, seemed to be consistent with the financial strategies or practices of the former nation (i.e., the Chinese firms) to date, mainly due to their same or similar market conditions classified as 'emerging' capital markets, which may be burdened by more financial constraints than their counterparts belonging to the 'advanced' capital markets such as the U.S. companies. Concerning another positively pronounced factor, MVBV, it may be argued that a firm may not be necessary to increase its cash holdings (as a source for internal financing) in proportion to future opportunities of good investments, i.e., higher MVBV, assuming that all market participants stand in balance with symmetric information. However, there may be still room for development on the domestic capital markets *status quo* in terms of a firm's financing options (i.e., internal or external financing), which may be attributed by the possible information asymmetry, even if her stage seems to

move toward a 'strong' form of efficiency market theorized in modern finance, as described in [5]. Coupled with the proxy variable representing a firm's agency costs, AGENCY which was defined by the sum of research & development plus total assets, scaled sales in the study, Gill & Shah [1] also employed alternative proxy for measuring a firm's agency costs such as board size and CEO duality. Both measurement consistently showed their positive and statistically significant impacts on the cash holdings, so that larger number of directors on the board and CEO holding a dual position as a chairman of the board, may resolve or dilute the agency costs arising from the possible moral hazard which may have caused a lower level of a firm's cash savings. Therefore, the negative association of AGENCY with the level of cash holdings obtained from the present study, tends to be persistent with its theoretical rationale in finance with being corroborated with the previous empirical findings.

More importantly, the explanatory variable, REINVEST, showed its negatively pervasive and consistent prominent influence on the endogenous variable of a firm's cash holdings in [5] and this extended study. Theoretical rationale with a negative sign of coefficient representing a firm's capital expenditure, was corroborated by the study of [7], assuming the existing pre-cautious motive of cash holdings, which was also consistent with the results in [8]. This phenomenon may interpreted in terms of Myers' pecking order theory, indicating that the chaebol firms may reserve excess capital to support current investments with priority of internal financing retained in cash or its equivalents before exercising the other external financing, as described in [5].

Meanwhile, it was of particular interest and intriguing to further analyze the most pronounced and consistent independent variable, REINVEST, on the

level of corporate cash holdings, as mentioned above. Subsequently, this study implemented additional estimation through the 'dynamic' panel data model which was described in the prior section, taking into account a possibility of 'persistence' of dependent variable on the dependent variable. A one-period lagged dependent variable as an explanatory one was also accompanied by primary IDVs including NETINVEST, which were found to be important in the pre-determined level of significance in the previous models. The results from the 'dynamic' panel data model as an *a posteriori* test are reported in [Table 5].

Table 5. Results Employing Dynamic Panel Data Model for the DV1

Variable	Estimate	t-statistic	p-value
DV1_1	-0.65	-3.42 *	0.0007
CASHFLOW	2.28	2.95 *	0.0034
MVBV	-0.18	-1.62	0.1061
REINVEST	-0.01	-0.42	0.6773
AGENCY	-0.07	-1.60	0.1096

(Note) * denotes statistical significance at the 5% level.

To recap, one-period lagged variable as DV1_1 was utilized in the dynamic panel data model and provided as the most significant explanatory variable affecting the level of the chaebol firm's level of cash holdings. Overall, only two variables such as DV1_1 and CASHFLOW, were found to significantly affect the DV1 in terms of statistical context, while the importance of the other employed IDVs seemed to be dissipated in the dynamic model. In other words, the significant effect of the lagged dependant variable with a negative sign, may provide an evidence of its existence of yearly 'persistence' on the levels of cash holdings of the chaebol firms in an opposite direction. In accordance with the insignificant IDV of REINVEST, which had been found as the most important financial determinant in the static panel data analysis, one may assume that implementation of

investment decisions by the chaebol firms may, on average, be done on a conservative basis which may be delayed one year, considering the implication of the results that internal capital in the type of cash and its equivalents may be prepared in advance (i.e., in the previous year) before implementing their actual investments in the current fiscal year. Moreover, it may be plausible that the negative relationship between the lagged dependent variable, DV1_1, as a dependent one, DV1, may also be attributable the unstable earning streams for the domestic firms resulting, in large part, from the stagnant or sluggish global economic condition as described in [14]. However, other variables such as CASHFLOW and AGENCY, still showed their important implications on the cash holdings for the chaebol firms with the theoretically expected sign of each coefficient, even if the latter seemed to be barely significant at the 10% level as reported in [Table 5].

Turning to the previous findings in [Table 4] for robustness checks, CCC denoting a firm's cash conversion cycle was another factor found to be the most prominent one for the liquidity levels of the chaebol firms. Anjun & Malik [10] suggested that a negative CCC exists when the corporate management gets cash from its accounts receivable before paying to the creditors in return for its accounts payable or liquidating its assets, in line with their empirical results with a negative relation, which was consistent with the one obtained from the outcome of the present study. Finally, a firm's cash holdings were also evidenced to be statistically explained by several industry classifications such as IND2 for the food, IND3 for the chemical, IND9 for the construction, and IND13 for the utilities industry, as reported in [Table 4]. In general, it was expected that a firm in mature industry may have more stable earning streams than its counterpart belonging to the industry with a

higher growth rate. Moreover, the Korean chaebol firms belonging to the former industrial group comprising the food and the chemical sectors, overall, maintained higher levels of the book value based profitability ratio that their counterparts in other sample industries during the sample period comprehending the late 2000s [14]. Therefore, the negative and statistically significant effects of the IND2 and IND3 on the dependent variable, may be, to a larger extent, attributed to higher and more stable earning streams they may possessed, which enabled them to maintain lower levels of cash savings in terms of a firm's cost of cash holdings. Furthermore, the positive association between the IND9 (for the construction industry) and DV1, may be interpreted by the conventional wisdom that domestic firms in the construction sector may, on average, maintain the highest level of capital structure, which may deteriorate the amount of net income accounting for larger interest expenses, as also tested in [14]. Assuming that the chaebol firms were overall subject to the financial constraints discussed above, they may increase or stockpile cash reserves as internal capital for future investment opportunities or repayment of existing debt, rather than external financing burdened by a high cost of capital.

V. Concluding Remarks

This paper addresses the current business strategic issue on the level of corporate cash holdings, especially, for the firms belonging to the chaebols in the Korean capital markets. As recalled, the subject may be one of the essential or even imperative issues to be solved or reconciled by the interested parties inclusive or the domestic government policy makers and corporate managers to end up with a virtuous

business cycle on the national economy. Relatively little attention has been paid to the related topic of this study for the chaebol firms, to date, even if there seemed to be voluminous investigations on this aspect in the international domain of research. In anticipation of robustness and consistency, the present study as an extension of Kim's study [5], implemented various alternative econometric methodologies to identify any financial factors affecting the chaebol firms' cash savings, as described in the preceding section.

Several financial characteristics such as CASHFLOW, MVBV, REINVEST, and AGENCY, were identified to be statistically significant on the level corporate liquidity in the models, along with CCC as cash conversion cycle. Most of the results were consistent with those obtained in [5] in terms of the significance and signs of the estimated coefficients.

Even if the study may have the legitimate and redundant weakness suffering empirically from utilizing disparate sample data and time references, it may shed new essential vision on examining financial factors to approach or search for the optimal level of cash holdings for the chaebol firms at the government- and corporate-levels.

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