The Role Of Cash Holdings, Working Capital, Dividend Payout On Capital Investment

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ABSTRACT

An objective of this paper is to investigate the relationship between firms' capital investment spending, cash holdings, and working capital in an expanding Asian financial market. A sample of publicly traded manufacturing firms on the Hong Kong Stock Exchange was examined during the period 2005-2014. The empirical results provide strong and statistically significant evidence on the effect of cash flow on investment. Working capital also exhibits significant relationship with capital investment spending, though the relationship is not as strong and significant as that with cash flow and cash holding. Firms with low dividend payout policy over the sample period depended heavily on cash flow, changes in cash flow and, to a lesser extent, on working capital to finance spending on fixed plant and equipment. These results suggest that the effect of capital investment spending financed by internal cash flow on firm value may depend on a firm's dividend payout.

Keywords: Capital Investment; Cash Holdings; Working Capital; Dividend Payout

INTRODUCTION

Both private and public firms have non-operating assets such as cash on their books. Besides holding cash, firms with large cash balances invest in near-cash investments such as short-term government securities, commercial paper, or other marketable and low-risk investments. Firms also invest in equities and bonds of other firms for investment and/or strategic reasons. Why do some firms hold a large balance of cash and cash equivalents in their assets when there is an opportunity cost in holding these non-operating assets? According to Keynes (1936), firms hold cash for transactions as a precaution against unanticipated future expenses or hedge for uncertain and unspecified contingencies. Another reason suggested by Keynes (1936) is the transactions motive in which firms use cash to pay for operational needs without having to liquidating assets. Miller and Orr (1966) develop a model for finding the optimal operating cash balance as a function of the opportunity cost of holding cash and cash requirements for operations. Their model shows that firms are induced to hold more liquid assets in order to save transaction costs. Myers and Majluf (1984) argued from an asymmetric information perspective that it is optimal for firms to maintain a certain level of cash for investment expenditures because the firms find it more costly to use external financing than internally generated funds when external investors have less information about the potential payoffs compared with the firms.

An incentive for firms (or the managers in these firms) to accumulate cash results from the separation of management and stockholders at publicly traded companies. In perfect capital markets which are accessible with no transactions costs, firm level investment should not be related to internally generated cash flows. Firms could raise additional cash when needed to finance new projects or investments. Firms do not, however, operate in such a perfect capital market. A variety of external constraints restrict management's capacity to raise cash from external capital markets. Failure to raise cash runs the risk of turning away even worthwhile investments. Internally generated cash may belong to the stockholders, but management decides whether it should be returned to stockholders in the form of dividends and stock repurchases or retained by the firm. Furthermore, transaction costs associated with monitoring management are incurred to ensure that cash flow is indeed distributed to external capital markets. In equilibrium, a positive relation between investment expenditure and cash flow is expected for firms operating under these capital market frictions (Hubbard, 1998). Jensen (1986) and Stulz (1990) introduced the agency cost explanation which suggests that

management will squander internally generated cash flow in excess of that required to maintain existing assets in place on new negative net present value projects (Blanchard, Lopez-de-Silanes & Shleifer, 1994; Opler, Pinkowitz, Stulz & Williamson, 1999; 2001). Because of information asymmetry between management and external investors about the potential payoffs of investments, firms in businesses where investments payoffs are difficult to assess and monitor, are also expected to acquire and maintain larger cash balances because these firms will generally face far more difficulty raising capital at a fair price for investments (Myers & Majluf, 1984). Cash holdings are thus expected to be higher in firms that have substantial expenditures on less tangible form of investment such as research and development because both equity investors and creditors face difficulties in evaluating the possibility of success with these projects.

Prior research has collectively indicated the agency-based explanation supporting a strong influence of cash flow on firms' investment spending. No previous study, however, has provided a direct analysis of the link between firms' working capital (in addition to cash holding) and capital spending (fixed plant and equipment) from the perspective of an expanding capital market in Asia. An objective of this paper is to provide an analysis of and evidence on the relationship between firms' cash holding and working capital with investment using manufacturing firms listed on the Hong Kong Stock Exchange. The context of cash flow and working capital as important determinants of investment spending is also examined given the hypothesis that firms waste free cash flow because of excessive costs of external financing created by asymmetric information (Jensen, 1986).

The paper examines whether publicly traded manufacturing firms in Hong Kong with high- and low-dividend payout policies exhibit differential relationship between cash flow and investment spending and between working capital and investment spending. Empirically, the relationship should support the hypotheses in both Jensen (1986) and Myers and Majluf (1984). The empirical results provide strong and statistically significant relationship between capital investment and cash flow. Working capital also exhibits significant relationship with capital spending, though the relationship is not as strong and significant as that with cash flow and cash holding. Firms with low dividend payout policy over the sample period depended heavily on cash flow and changes in cash to finance spending on fixed plant and equipment. These results suggest that the effect of capital investment spending financed by internal cash flow on firm value may depend on dividend behavior of firms in the long run.

The reminder of this paper is organized as follows. The next section presents the data and statistical models used in the empirical analysis. The third section reports the empirical results about the relationship between capital investment spending and cash flow and working capital. The fourth section summarizes the findings and suggests avenues for further research.

DATA AND MODELS

The data used in this study come from Mergent Online database. The sample consists of forty-five Hong Kong manufacturing firms (with SIC codes between 2000 and 3999) for which complete data from the years 2005 to 2014 with 450 firm-year observations are available. Financial institutions (SIC codes between 6000 and 6999) are excluded from the analysis because the demarcation between operating, investing, and financing activities is ambiguous for these firms.

A reduced-form model is estimated for testing the empirical significance of cash flow. The proportion of capital investment spending to beginning-of-period total asset (I/TA)[1] is modeled as a function of operating cash flow divided by beginning-of-period total asset (OCF/TA), the change in a firm's cash from the balance sheet divided by beginning-of-period total asset (DCASH/TA), and sales divided by beginning-of-period total asset (SALES/TA).

A two-stage least squares model is needed to estimate the change in cash variable (DCASH/TA) since it is an endogenous variable. DCASH/TA is first estimated as a function of several instruments: the beginning-of-period cash from the balance sheet ($CASH_{t-1}$/TA), operating cash flow divided by beginning-of-period total asset (OCF/TA), and sales divided by beginning-of-period total asset (SALES/TA). The second stage of the estimation involves a fixed-

[1] This serves as a weighting scheme to allow comparisons relative to firm size. Gross plant and equipment is used as an alternate weight but generates essentially the same results.

effect model to allow for time-specific and firm-specific intercepts. That is, firm investment spending is modeled using cross-sectional time series data with fixed time and firm effects. Intercepts are eliminated by centering the data on their time-series and cross-sectional means:[2]

$$(I/TA)_{i,t} = \beta_1(OCF/TA)_{i,t} + \beta_2(DC\hat{A}SH/TA_{i,t} + \beta_3 SALES/TA_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t} \quad (1)$$

$DC\hat{A}SH/TA_{i,t}$: The predicted value of DCASH/TA from the first-stage estimation
μ_i : Firm-specific fixed effects
τ_t : Time-specific fixed effects
i and *t* : Indexes for time and time, respectively

A lagged cash flow variable, $OCF/TA_{i,t-1}$, is included in the regressions to control for possible lagged effects.

A two-stage least squares model is similarly estimated for the change in working capital variable (DWC/TA). DWC/TA is first estimated as a function of several instruments: the beginning-of-period working capital from the balance sheet as the difference between current assets and current liabilities (WC_{t-1}/TA), operating cash flow divided by beginning-of-period total asset (OCF/TA), and sales divided by beginning-of-period total asset (SALES/TA).

The second stage of the estimation for working capital is similar to equation (1):

$$(I/TA)_{i,t} = \beta_1(OCF/TA)_{i,t} + \beta_2(D\hat{W}C/TA_{i,t} + \beta_3(SALES/TA)_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t} \quad (2)$$

$D\hat{W}C/TA_{i,t}$: The predicted value of DWC/TA from the first-stage estimation
μ_i : Firm-specific fixed effects
τ_t : Time-specific fixed effects
i and *t* : Indexes for time and time, respectively

Firms with average dividend/income ratio of greater than 0.4 are defined as having high dividend payouts whereas firms with the same ratio of lower than 0.4 are defined as having low dividend payouts. A cutoff of 0.4 is chosen to maintain a reasonable balance in sample sizes across the high- and low-dividend payout groups (190 and 260 observations, respectively). The results reported in the tables are robust to alternative cut-off points.

EMPIRICAL RESULTS

Table 1 presents summary statistics of the aggregate data and data disaggregated by dividend-payout behavior. Firms with low dividend payout have larger levels of capital spending (0.2622 versus 0.2498). This description on manufacturing firms in Hong Kong is consistent with the theories in both Jensen (1986) and Myers and Majluf (1984).

[2] A discussion of the technique can be found in Deilman (1983) or in any standard statistics references.

Table 1. Descriptive Statistics

Variable	Aggregate Sample	High Dividend Payout	Low Dividend Payout
Payout (Dividends/Income)	0.3021 (0.05)	0.6208 (0.07)	0.0691 (0.03)
Investment (I/TA)	0.2551 (0.01)	0.2498 (0.01)	0.2622 (0.02)
Cash Flow (OCF/TA)	0.0147 (0.01)	0.0200 (0.01)	0.0110 (0.01)
Sales (SALES/TA)	0.9562 (0.06)	0.8682 (0.05)	1.0204 (0.09)
Total Assets (in millions)	670.10 (101.23)	871.99 (171.78)	393.83 (40.26)
Asset Growth	0.1210 (0.03)	0.1142 (0.04)	0.1302 (0.04)
Cash (CASH/TA)	0.1529 (0.01)	0.1444 (0.01)	0.1591 (0.01)
Working Capital (WC/TA)	0.1509 (0.03)	0.2003 (0.02)	0.1617 (0.16)
Number of observations	450	190	260

Standard deviations are in parenthesis.

The results under the aggregate sample column in Table 2 show the regression estimates of equation (1). Both OCF/TA and DCÂSH/TA exhibit strong and significant impact on capital investment. The negative coefficient of DCÂSH/TA (-0.1734) indicates that firms in Hong Kong generally rely on cumulated cash holdings to finance additional capital investment. The positive and significant parameter estimate on SALES/TA is consistent with the accelerator theory of investment (increases in firm investments as demand or income increases in an economy).

The sample Hong Kong manufacturing firms are separated by the average dividend-payout policy. Firms with average dividend/income ratio of greater than 0.4 are defined as having high dividend payouts whereas firms with the same ratio of lower than 0.4 are defined as having low dividend payouts. The results under high dividend payout and low dividend payout in Table 2 show the regression estimates of the equation by dividend policy. The coefficient estimates on OCF/TA and DCÂSH/TA have the same (and proper) sign as those for the aggregate sample. The parameter estimates are also statistically significant, indicating the strong and significant impact of the variables on capital investment spending.

The coefficient estimate on OCF/TA for the low dividend payout firms is higher than that for the high dividend payout firms (0.0501 versus 0.0249). This indicates that the magnitude of the parameter estimates increases as the long-run dividend payout rate decreases. This is consistent with extant theory that firms with profitable investment opportunities will exhibit low dividend payout policy in order to conserve cash flow. That is, the results reported in Table 2 support the hypothesis that low dividend payout firms should exhibit a stronger relationship between cash flow and capital investment.

Table 2. Two-Stage Least Squares Estimation of equation for Aggregate Sample and Dividend Payout Policies

$(I/TA)_{i,t} = \beta_1(OCF/TA)_{i,t} + \beta_2(DC\hat{A}SH/TA)_{i,t} + \beta_3(SALES/TA)_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t}$

Variable	Aggregate Sample	High Dividend Payout	Low Dividend Payout
OCF/TA	0.0309* (2.95)	0.0249** (2.07)	0.0501** (2.37)
DCÂSH/TA	-0.1734* (-4.23)	-0.1464* (-3.18)	-0.2513* (-2.88)
SALES/TA	0.0051** (2.16)	0.0048** (2.03)	0.0071** (2.09)
Adjusted R^2	0.1349	0.1353	
Regression F	15.0717	9.8282	
Number of observations	450	190	260

* Significant at the 1% level
** Significant at the 5% level
T-statistics are in parentheses. Adjusted R-square statistic is for the centered data.
The fixed effects (μ_i and τ_t) are removed by subtracting cross-sectional and time-series means.
Dummy variable interactions correspond to the high- and low-dividend payout firms in the aggregate sample are used in the estimation for differentiating firms with the two dividend payouts.
Firms with average dividend/income ratio of greater than 0.4 are defined as having high dividend payouts whereas firms with the same ratio of lower than 0.4 are defined as having low dividend payouts. The results reported are robust to alternative cut-off points.

Table 3 presents the results when lagged cash flow variable $OCF/TA_{i,t-1}$ is included in the regressions to control for possible lagged effects in addition to contemporaneous cash flow effects. The lagged cash flow marginally increases the regression r-square (from 0.1349 in table 2 to 0.1352 in table 3) and reduces the magnitude of the coefficient estimate on contemporaneous cash flow (0.0262 in table 3 versus 0.0309 in table 2). However, including the lagged cash flow variable in the regressions does not change the inferences obtained from the regressions reported in Table 2.

Table 3. Two-Stage Least Squares Estimation of equation (including lagged cash flow) for Aggregate Sample and Dividend Payout Policies

$(I/TA)_{i,t} = \beta_1(OCF/TA)_{i,t} + \beta_2(DC\hat{A}SH/TA)_{i,t} + \beta_3(SALES/TA)_{i,t} + \beta_4(OCF/TA)_{i,t-1} + \mu_i + \tau_t + \varepsilon_{i,t}$

Variable	Aggregate Sample	High Dividend Payout	Low Dividend Payout
OCF/TA	0.0262* (2.29)	0.0229** (1.71)	0.0385*** (1.72)
DCÂSH/TA	-0.1651* (-3.95)	-0.1409* (-2.96)	-0.2487 (-2.85)
SALES/TA	0.0042** (1.70)	0.0034 (1.09)	0.0060 (1.44)
Lagged OCF/TA	0.0132 (1.04)	0.0062 (0.38)	0.0317 (1.56)
Adjusted R^2	0.1352	0.1364	
Regression F	12.7431	8.1308	
Number of observations	450	190	260

* Significant at the 1% level
** Significant at the 5% level
*** Significant at the 10% level
T-statistics are in parentheses. Adjusted R-square statistic is for the centered data.
The fixed effects (μ_i and τ_t) are removed by subtracting cross-sectional and time-series means.
Dummy variable interactions correspond to the high- and low-dividend payout firms in the aggregate sample are used in the estimation for differentiating firms with the two dividend payouts.
Firms with average dividend/income ratio of greater than 0.4 are defined as having high dividend payouts whereas firms with the same ratio of lower than 0.4 are defined as having low dividend payouts. The results reported are robust to alternative cut-off points.

The results under the aggregate sample column in Table 4 show the regression estimates of equation (2). OCF/TA still exhibit strong and significant impact on capital investment. The magnitude of the parameter estimate on DWC/TA (the predicted value of DWC/TA from the first-stage estimation) is much smaller than that on DCASH/TA (-0.0048 for DWC/TA in table 4 versus -0.1734 for DCASH/TA in table 2). However, the significantly negative coefficient of DWC/TA (-0.0048) nevertheless indicates that manufacturing firms in Hong Kong rely to a certain extent on cumulated working capital as well as cash holdings (results reported in table 2) to finance additional capital investment. The parameter estimate on SALES/TA is no longer statistically significant (as compared with the parameter estimate in tables 2 and 3), which suggests that inclusion of the working capital variable reduces the importance of the sales variable in the context of the accelerator theory of investment.

Table 4. Two-Stage Least Squares Estimation of equation for Aggregate Sample and Dividend Payout Policies

$(I/TA)_{i,t} = \beta_1(OCF/TA)_{i,t} + \beta_2(D\hat{W}C/TA)_{i,t} + \beta_3(SALES/TA)_{i,t} + \mu_i + \tau_t + \varepsilon_{i,t}$

Variable	Aggregate Sample	High Dividend Payout	Low Dividend Payout
OCF/TA	0.0254** (2.36)	0.0250** (2.33)	0.0274* (2.56)
DŴC/TA	-0.0048*** (-1.87)	-0.0042*** (-1.67)	-0.0052** (-2.06)
SALES/TA	0.0009 (0.40)	0.0007 (0.34)	0.0010 (0.45)
Adjusted R^2	0.1072	0.1226	
Regression F	11.8313	7.7180	
Number of observations	450	190	260

* Significant at the 1% level
** Significant at the 5% level
*** Significant at the 10% level
T-statistics are in parentheses. Adjusted R-square statistic is for the centered data.
The fixed effects (μ_i and τ_t) are removed by subtracting cross-sectional and time-series means.
Dummy variable interactions correspond to the high- and low-dividend payout firms in the aggregate sample are used in the estimation for differentiating firms with the two dividend payouts.
Firms with average dividend/income ratio of greater than 0.4 are defined as having high dividend payouts whereas firms with the same ratio of lower than 0.4 are defined as having low dividend payouts. The results reported are robust to alternative cut-off points.

CONCLUSION

Empirical evidence indicates that internally generated funds are the primary way firms finance investment expenditures (Himmelberg & Petersen, 1994; Oliner & Rudebusch 1992). The adverse selection problem identified by Myers and Majluf (1984) causes firms with positive net present value investment opportunities to forgo profitable projects because of excessive cost of external financing. The free cash flow hypothesis by Jensen (1986) argues that managers overinvest free cash flow in unprofitable investment projects rather than paying out the funds to shareholders in the form of dividends and share repurchases. This paper provides evidence on the relationship between firms' capital investment spending (on fixed plant and equipment) and cash holding and working capital using financial statement data from manufacturing firms listed on the Hong Kong Stock Exchange.

A two-stage least squares model is estimated for testing the empirical significance of cash flow and working capital with capital investment spending using a sample of 45 publicly traded manufacturing firms in Hong Kong. The empirical results provide strong and statistically significant relationship between capital investment and cash flow. Working capital also exhibits significant relationship with capital spending, though the relationship is not as significant as that with cash flow. Firms with low dividend payout policy over the sample period depended heavily on cash flow and changes in cash to finance spending on fixed plant and equipment. These results suggest that the effect of capital investment spending financed by internal cash flow on firm value may depend on dividend behavior of firms in the long run.

An extension of the study is to examine expenditures on intangible form of investment spending such as research and development. Due to its intangible and uncertain risk and return nature, research and development spending should

be more susceptible to asymmetric information effects than capital (plant and equipment) spending. This is particularly relevant to firms in high technology industries because cash flow should be the critical source of financing for research and development due to liquidity constraints resulting from asymmetric information between firm management and capital markets. However, few manufacturing firms in Hong Kong have invested significant amount on research and development. A further extension of the study is to partition the sample according to asset growth or asset size of firms. Small firms should subject to more liquidity constraints arising from asymmetric information. As such, the relationship between firms' capital investment spending and cash flow and working capital is conjectured to be stronger for small firms.

AUTHOR BIOGRAPHY

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