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A STUDY ON DIVIDEND DETERMINANTS FOR KOREA'S INFORMATION TECHNOLOGY FIRMS

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ABSTRACT

In this study, we analyse the determinants of dividend policies of information technology (IT) firms listed on the Korean stock market and use a logit regression model to examine Korean IT firms' propensity to pay dividends based on the life-cycle hypothesis. The analysis yields several findings: first, the firms pay relatively small dividends in the growth stage, which increase over time as their businesses mature. Second, profitability shows a positive correlation with propensity to pay dividends. Third, firms that paid out more dividends in the past continue to pay relatively more dividends. Meanwhile, dividend policies do not show a significant correlation with firm size or growth opportunities. In addition, dividend policies have no relation to the catering incentive (investor fads for dividends) or risk. These observations suggest that Korean IT firms' propensity to pay dividends is supported by the life-cycle hypothesis and that the declining dividends from the mid-2000s can be attributed to deteriorating profits.

Keywords: life-cycle hypothesis, dividend policies, IT firms, profitability, growth opportunities

INTRODUCTION

Since the mid-2000s, Korea's information technology (IT) businesses have cut back on their dividends. In 2002, 55.6% of IT firms paid out dividends, but in 2006, the ratio fell more than 10% to 45.2% and further dropped to 43.3% in 2010, as described in Figure 1.

The decline in dividends could be attributed to growing investment opportunities, or possibly, there could be other reasons. Many finance scholars advocate a dividend premium hypothesis, which states that a company's dividend policy is affected by investors' needs (Fama & French, 2001; Baker & Wurgler, 2004). According to finance scholars, when a company pays out dividends in a slow stock market, it hints at a dividend premium or the possibility of a rising share price. A dividend premium induces companies to pay out more dividends,

and investor trends for dividends help to explain the dividend policy changes of managers. However, among Korean IT firms, cumulative returns on stocks began to decline four months after dividend payments, as described in Figure 2. The decline was more pronounced than the decline of non–payers. This suggests that dividends might not be positive signals for Korean IT firms, refuting the aforementioned hypothesis.

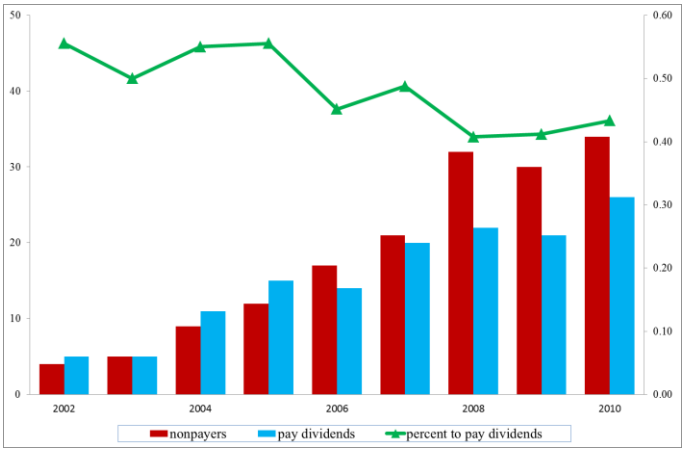

Figure 1. Proportion of dividend-paying IT firms in Korea

Note: The percentage indicates the ratio of dividend payers among all of the IT companies, showing a downward trend.

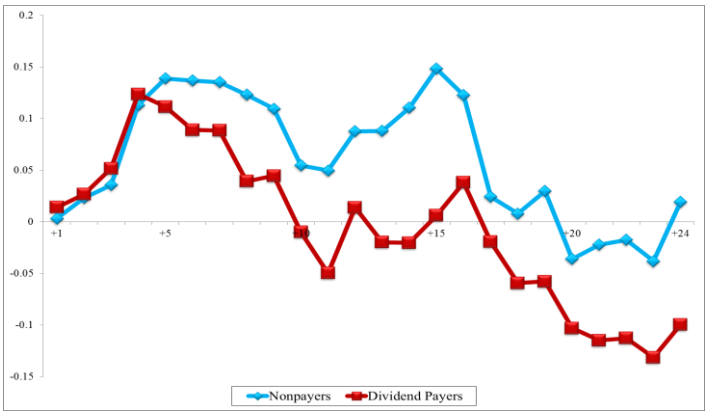

Figure 2. Cumulative returns of dividend payers vs. non-payers

Note: R_{t+h} denotes cumulative monthly returns from t+1 through t+h; the time period is from 1 month to 24 month. Cumulate monthly returns of dividend payers peak at the fourth month and begin to decline afterward. Their decline is more pronounced than non-payers, indicating that dividend payment does not send a positive signal in the stock market.

In Korea, the IT industry has grown along a rather unpredictable, irregular path. It experienced compressed growth over a short period of time, followed by a crash at the end of the boom. Many of the Korean IT firms prospered during the late-1990s, but when the bubble burst in the early 2000s, their growth slowed down significantly. Numerous IT businesses sprouted following the Asian financial crisis, led by a wild wave of "dot-com" businesses. Many of these dot-coms are listed on the KOSDAQ－the Korean equivalent of the NASDAQ. However, their prosperity was short-lived and ended by the early 2010s.

From the mid-2000s, IT firms' dividends also declined. Was this due to increasing investment opportunities, decreasing investor demand for dividends, or reduced profits from poor business performance? The life-cycle hypothesis could be a good starting point to seek an answer (DeAngelo, DeAngelo, & Stulz, 2006). According to the hypothesis, a company's optimal dividend policy is determined by the free cash flow demand. During the growth stage of a business, a company accumulates retained earnings rather than paying out dividends, but once the business matures, dividends payments are likely to increase due to less investment opportunities and accumulated profits. Against this background, this paper examines the dividend trends of Korean IT firms based on the life-cycle hypothesis and identifies factors that determine dividends.

Previous Studies

There were distinct changes in the propensity to pay dividends between 1963 and 2000 in US firms. The propensity to pay dividends increased from 1963 through 1966–1968 and decreased from 1967–1969 through 1972–1974; this trend reversed from 1973–1975 through 1977. Since 1978, the propensity to pay dividends has shown a steady decline. Such changes in a manager's dividend policy are connected to a corresponding fluctuation in catering incentives, stock market dividend premiums. These trends imply that the propensity to pay dividends decreases when dividend premiums decline. When an investor's demand for payment of dividends is high and stock price premiums in the market are expected, firms may cater, which helps to explain the aggregate rate of dividend initiation and omission (Baker & Wurgler, 2004). Since the study of the original catering theory, which pertains to dividends, was suggested by Baker and Wurgler (2004), further studies extended to other corporate decisions, such as the choice of IPOs, investment levels, sales growth and profit margins of firms, and market's time varying repurchase premium, have been presented (Aghion & Stein, 2008; Baker, Greenwood, & Wurgler, 2009; Polk & Sapienza, 2009; Jiang, Kim, Lie, & Yang, 2013).

As mentioned earlier, Fama and French (2001), Grullon, Michaely and Swaminathan (2002) and DeAngelo et al. (2006) support the life-cycle hypothesis reflecting a financial life-cycle in which young firms face relatively abundant investment opportunities. Thus abundant investment opportunities lead to the preference of young firms to retain earnings rather than dividends. On the contrary, mature firms tend to pay more dividends because they have higher profitability and fewer positive net present value (NPV) investment opportunities. In light of the life-cycle hypothesis, Denis and Osobov (2008) conducted an empirical analysis of company dividend policies and showed a correlation among the firm size, profitability, growth opportunities, and ratio of retained earnings to equity. The results showed that for a majority of companies based in advanced countries other than the US, larger businesses with higher profitability pay out more dividends. Other than these factors, Malkiel and Xu (2003) claim that an increase in non-systematic risks expands opportunities for future investment, which in turn, leads to smaller dividends. Firms with greater risk are reluctant to distribute more cash to stockholders because risky firms may be thrust into a phase of crisis by this type of decrease in operating cash flow. Similarly, Allen and Michaely (2003) and Hoberg and Prabhala (2009) demonstrated a significant and negative correlation between a company's risk level and dividends. In addition, a manager's conservatism regarding the dividends policy helps to explain the decreased cash distribution in the case of increased risk. Managers are reluctant to increase dividends because of an investor's penalty for decreasing dividends in the future (Litner, 1956; Hoberg & Prabhala, 2009).

Meanwhile, high-tech firms with an abundance of investment opportunities that face dynamic market conditions have a relatively short life-cycle, have to devote capital to new investment projects actively and have a strong incentive to hold cash to maintain their competitive position. To increase profits from intense competition, high-tech firms devote limited resources to new investment projects and are obliged to distribute less cash to stockholders (Carpenter & Petersen, 2002; Chen & Chuang, 2009). Recently, Kim (2013) found that most IT firms in the growth stage have abundant positive investment opportunities and are very short on operating cash flow, such that external financing is required. Since the 1990s, during the time that a high-tech firm's initial public offerings (IPO) increased because of more precautionary cash holding incentives, the average cash ratio of high-tech firms has been higher than the average cash ratio of manufacturing firms (Bates et al., 2009).

Taking these findings into consideration, this research identifies the firm size, profitability, growth opportunities, ratio of retained earnings to equity and level of risk as potential factors that determine IT firms' dividend policies. Furthermore, our study will contribute to academic development in that it examines the findings of Fama and French (2001), Grullon et al. (2002), and

DeAngelo et al. (2006) and supports the life-cycle hypothesis from the position of high-tech firms, unlike previous literature.

DATA AND METHODOLOGY

Data

The analysis is conducted for the period between 2002 and 2010 for 112 KOSDAQ-listed Korean IT firms. Data on their assets, retained earnings and cash flows are collected from the Korea Listed Companies Association and FnGuide. KOSDAQ is composed of IT firms and non-IT firms. We use the industry classification developed by the Korea Stock Exchange. KOSDAQ IT is composed of the issues related to the IT industry. We exclude the firms in the financial sector, firms that are impaired of capital, and non-IT firms. We also exclude the firms for which the fiscal year does not end in December.

Table 1 describes main variables that are likely to affect dividend policies. As the adopted variables, return on asset (ROA) representing profitability, asset growth (AG), market-to-book ratio (MB) meaning corporate value, cash, percentile representing a firm's size, and the level of risk (systematic risk and idiosyncratic risk) are adopted. Managers tend to take a conservative dividend policy and are reluctant to raise dividends that may have to be reversed in the future. Thus, risk is a factor that should be seriously considered in the dividend policy of managers (Lintner, 1956; Hoberg & Prabhala, 2009). A manager's conservative dividend policy has a negative relationship between dividends and risk. Dividend Premium (DP) represents investor demand for dividends and calculates the spread of the log of the market-to-book ratio (M/B) between dividend payers and non-payers. Baker and Wurgler (2004) showed that there is a positive relationship between the propensity to pay dividends and DP.

The explanation also covers the ratio of retained earnings to the book value of common stocks or equity (RTE) as a proxy variable for the life-cycle hypothesis. DeAngelo et al. (2006) argue that RTE is an appropriate measure of a proxy for life-cycle stage because firms with low RTE tend to be in the capital infusion stage and firms with high RTE tend to be in the more mature stage. Additionally, RTE measures the extent to which the firms are self-financing or externally financing.

Table 1
Definition of variables

Variable	Definition
Profitability (ROA)	Earnings before extraordinary items plus interest expense plus income statement deferred taxes divided by assets.
Annual asset growth rate (AG)	Percent growth in assets from year t − 1 to year t.
Dividend Premium (DP)	The difference in log book-value-weighted average market-to-book ratio (M/B) for dividend payers and for non-payers as of the December of the year t − 1.
MB (market-to-book ratio)	Book assets minus book equity plus market equity all divided by book assets.
Percentile	KOSDAQ IT market capitalisation percentile, i.e., the fraction of KOSDAQ IT firms having equal or smaller capitalisation than firm i in year t.
Cash	Cash plus cash equivalent to total assets.
RTE	Earned equity (retained earnings) relative to total common equity. RTE measures the life cycle stage of a given firm as the extent to which that firm's equity is earned or contributed. Of course, a firm cannot have a high RE/TE ratio without substantial prior earnings, so RE/TE to some degree reflects profitability.
Systematic risk (Srisk)	A firm's systematic risk is the standard deviation of the predicted value from a regression of its monthly excess stock return on Fama-French 3 factor model (Fama & French, 1993). One firm-year observation of systematic risk is computed using firm-specific monthly stock returns from one calendar year.
Idiosyncratic risk (Irisk)	A firm's idiosyncratic risk is the standard deviation of residuals from a regression of its monthly excess stock return on Fama-French 3 factor model (Fama & French, 1993).

Model

The logit model (see equation [1]) is used to analyse the categorised variables. For the dependent variable $DD_{i,t}$, 1 is assigned to companies that are dividend payers and 0 to non-payers. $ROA_{i,t}$ is the earnings before interests and taxes (EBIT), an indicator of profitability. $AG_{i,t}$ is an indicator of growth opportunities and it is measured as the change in total assets from the previous period. $DP_{i,t}$ is a dividend premium, and market-to-book ratio ($MB_{i,t}$) shows the corporate value in the market and it is regarded as growth opportunities with $AG_{i,t}$. $Percentile_{i,t}$ shows the status of the company in the KOSDAQ market in terms of the aggregate value of listed stocks. It is used to estimate the firm size, and it is based on the previous research by Hoberg and Prabhala (2009). $Cash_{i,t}$ is the ratio of cash and cash equivalent in total assets. $RTE_{i,t}$ is a variable to determine the stages of a company's life-cycle, which is used to examine the impact of retained

earnings on dividend propensity. If the estimated parameter shows a positive value at a significant level, it can be surmised that the life-cycle hypothesis effectively explains the dividend propensity of Korean IT firms. Lastly, $Srisk_{i,t}$ and $Irisk_{i,t}$ each indicates systemic risk and idiosyncratic risk.

$$DD_{i,t} = \lambda_i + \alpha_1 ROA_{i,t} + \alpha_2 AG_{i,t} + \alpha_3 DP_{i,t} + \alpha_4 MB_{i,t} + \alpha_5 Percentile_{i,t} + \alpha_6 Cash_{i,t} + \alpha_7 RTE_{i,t} + \alpha_8 Srisk_{i,t} + \alpha_9 Irisk_{i,t} + \varepsilon_{i,t} \quad (1)$$

ANALYSIS RESULTS

Descriptive Statistics

Table 2 shows the basic statistics of the main variables. The RTE, an indicator for IT firms' life-cycle, ranges between –1.67 and 1.02, with an average value of 0.19. The dividend premium is a difference of MB between companies that pay out dividends and those that do not, and its average value is –0.02, suggesting that the dividend policy is hardly determined by the dividend premium.

Table 2
Descriptive statistics

Variables	Number	Mean	Median	Standard deviation	Minimum	Maximum
RTE	303	0.19	0.31	0.51	–1.67	1.02
MB	303	1.13	1.00	0.53	0.37	3.99
AG	303	0.13	0.10	0.50	–1.93	2.36
ROA	303	0.02	0.03	0.10	-0.41	0.29
Percentile	303	0.51	0.52	0.29	0.02	1.00
DP	303	–0.02	0.01	0.30	–0.73	0.31
Cash	303	0.08	0.06	0.07	0.00	0.32
Srisk	298	0.12	0.08	0.14	0.00	1.20
Irisk	298	0.06	0.04	0.07	0.00	0.60

Empirical Analysis

Table 3 shows the results of a t-test on whether there are significant differences in main variables between companies that pay out dividends and those that do not. Main variables include RTE to estimate a company's life-cycle, MB to measure corporate value, AG to show asset growth from the previous period, ROA to

show profitability, percentile to show firm size, Cash to show the level of cash flow and risk to show the level of risk. The RTE, ROA, percentile, Srisk, and Irisk show significant differences. In the case of RTE, the difference is 0.5045, at a significance level of 1%. The difference between dividend payers and non-payers is significant for profitability and firm size as well as the level of idiosyncratic risk and systematic risk. Finally, dividend payers of IT firms have a greater life-cycle, more profitability, larger size, and less risk than non-payers of IT firms. Next, Table 4 shows the analysis results based on the logit model for determinants of IT firms' dividend policies. As for DD, 1 is assigned to dividend payers, 0 to non-payers. The analysis is performed for each case of controlling lag DD, DP, RTE, Cash, Srisk, and Irisk. The standard error of parenthesis is tested with the Wald chi-square. The variance inflation factor (VIF) is used to verify that there is no multi-collinearity between the independent variables in the logit model.

Table 3
The t-test results between dividend payers and non-payers of IT firms

Variable	Non-payers	Dividend payers	T-test (dividend payers – non-payers)	
RTE	–0.0427	0.4618	0.5045*	(9.94)
MB	1.1257	1.1367	0.011	(0.85)
AG	0.0938	0.1729	0.0791	(0.16)
ROA	–0.0135	0.0696	0.0831*	(8.23)
Percentile	0.4691	0.5688	0.0997*	(3.03)
Cash	0.0754	0.0895	0.0141	(1.72)
Srisk	0.1444	0.0931	–0.0513*	(3.31)
Irisk	0.0720	0.0464	–0.0256*	(3.30)

Note: *Significance at the 1% level

Table 4
The logit analysis of the determinants of IT firm's dividends

Variable	Dependent variable = DD					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Intercept	–0.1312	–1.7029	–2.5434	–2.5592*	–2.6654*	–2.6664*
	(0.3324)	*(0.4476)	(0.5367)	(0.5394)	(0.5905)	(0.5902)
MB	–0.4918	0.0536	0.3849	0.4012	0.3206	0.3196
	(0.3042)	(0.3763)	(0.3973)	(0.3995)	(0.4190)	(0.4190)
AG	–0.0458	0.3263	0.2723	0.2788	0.3043	0.3046
	(0.2693)	(0.3120)	(0.3143)	(0.3160)	(0.3497)	(0.3497)
ROA	12.4076*	10.9198*	5.9865*	6.0388*	6.0269*	6.0317*
	(1.9390)	(2.1853)	(2.4418)	(2.4516)	(2.5296)	(2.5300)

(*continued on next page*)

Table 4 *(continued)*

Variable	Dependent variable = DD					
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6
Percentile	0.2583 (0.5616)	–0.1384 (0.6823)	0.1396 (0.7132)	0.1232 (0.7148)	0.2464 (0.7424)	0.2464 (0.7424)
Lag DD		2.5700* (0.3207)	2.2659* (0.3339)	2.2637* (0.3339)	2.3611* (0.3461)	2.3615* (0.3461)
DP				–0.1591 (0.5475)	–0.0929 (0.5562)	–0.0928 (0.5562)
RTE			2.2815* (0.5804)	2.2841* (0.5807)	2.2836* (0.5977)	2.2844* (0.5978)
Cash					0.0313 (2.3957)	0.0311 (2.3956)
Srisk					0.4496 (1.3269)	
Irisk						0.9288 (2.6519)
Observations	303	303	303	298	298	298
Pseudo R^2	0.16	0.35	0.39	0.39	0.40	0.40

Note: *Significance at the 1% level

Model 1 shows the results in the case of not controlling any variable. The estimate parameter of ROA shows a positive value at a significance level of 1%. Model 2 controls the dividends paid out in the past, and ROA again is an influential factor in dividend policy. The higher the IT firms' profitability, the more they pay out in dividends. The estimate parameter of lag DD is positive at a significance level of 1%, verifying the arguments of DeAngelo et al. (2006) and Ferris et al. (2009).

The RTE is controlled in Models 3–6, and again, profitability is an influential determinant of dividend policies. The significance and the movement of the ROA remain the same in the cases of Model 1 and Model 2. The estimate parameter of RTE is positive at a significance level of 1%, suggesting that a firm paid out more dividends as its life-cycle advanced. In Model 3, including RTE, pseudo R2 increased from 0.35 to 0.39. These results imply that the life-cycle is a crucial dividend determinant for IT firms. The results of the analysis show that the life-cycle hypothesis explains Korean IT firms' dividend propensity effectively.

The cases of Model 4 through Model 6 control additional variables, dividend premiums for Model 4; dividend premiums, cash flow and Srisk for Model 5; and dividend premiums, cash flow, and Irisk for Model 6. Unlike the expectations, the amount of cash did not show a significant correlation with dividend propensity. This contradicts the findings of DeAngelo et al. (2006), who argued that a company's retained earnings have a negative correlation with dividends if the company operates to secure funds for future growth.

In all cases, MB, AG and percentile do not show a significant difference. In other words, the recent trend of the declining dividends of IT firms can be largely attributed to falling profits. Thus, it can be surmised that the theory of Denis and Osbov (2008) does not apply to Korea's IT firms, which argues that differences in firm size and growth opportunities affect dividend propensity.

CONCLUDING REMARKS

The study applies the life-cycle hypothesis and conducts an empirical analysis on the determinants of the dividend policies of IT firms listed on the KOSDAQ. In recent years, because IT firms are placed in a situation of intensive competition and because of the volatility of technological innovation, firms with a relatively short life-cycle in the growth stage of a business follow conservative dividend policies through which the firms' managers are obliged to choose retained earnings rather than distribution. In a multivariate logit analysis, some of the main findings include: (1) according to a company's life-cycle, IT firms pay relatively smaller dividends during the growth stage and increase the amount once the business matures sufficiently; (2) more profitable IT firms pay greater dividends; (3) companies that paid more dividends in the past continue to pay relatively more dividends; and (4) firm size and growth opportunities do not show a significant correlation with IT firms' dividend propensity. Additionally, catering incentives (investor fads for dividends) and risk do not address dividend policies of IT firms. Recently, there was an increased dividend policy in Apple that has shown great growth since its founding, which is a type of dividend policy shift, so that some investors are concerned that the Apple's growth may slow down in the future. Indeed, Microsoft that had paid a lot of dividend has maintained in a low growth rate, 8% in a year, and its stock price has been faltering since 2003. A firm's dividend policies for investors are a crucial investment decision and are an important issue to IT firms that have constantly been shown to need free cash flow and a variety of investment opportunities. However, recently, despite the increased interest of investors for IT firms, there is very little research associated with these themes. We contribute to developing the academic field on the dividend policy of corporate finance in that this study suggests implications based on the significant evidence of the dividend policies

of IT firms in terms of the life-cycle hypothesis. However, we also acknowledge that this study has limitation in terms of its methodology; we only used the ratio of retained earnings to the book value of common stocks or equity (RTE) as a proxy variable representing a firm's life-cycle stage, but we additionally need to consider other proxy variables to support the test results more strongly. In addition, we suggest further studies regarding dividend policy changes, such as initiation and omission.

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