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Empirical Analysis on the Dividend Life-Cycle Theory: Evidence from Japan

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ABSTRACT

This paper aims to clarify a characteristic of the dividend policies of Japanese firms by verifying the dividend life-cycle theory. The analysis revealed that in Japan, growing firms choose further dividend increases compared to mature firms, and that such dividend increases by the growing firms are appreciated by the market more than those by the mature firms. These findings are not consistent with the prediction by the dividend life-cycle theory, but can be interpreted using the concept of corroboration effect.

JEL Classification: G14; G35; M41
Key Words: Dividend Life-Cycle Theory; Dividend Policy; Corroboration Effect; Signaling; Earnings Predictability

1. Introduction

The growing firms with abundant investment opportunities should prioritize retained earnings (RE) rather than return to shareholders in preparation for necessary investment for their future growth. On the other hand, it is preferable for the mature firms to return excess funds to shareholders in order to partly ease free cash flow problems (Jensen 1986). This idea is well known as the dividend life-cycle theory (Fama and French 2001; Grullon et al. 2002; Julio and Ikenberry 2004; DeAngelo and DeAngelo 2006; DeAngelo et al. 2006). In the US, there is evidence consistent with the theory. For example, DeAngelo et al. (2006) positions a RE ratio (= RE/book-value of equity) as a scale to express the stages of firm growth, and presents evidence that firms with high RE (mature firms) pay dividends.

Over the past two decades in the US, the percentage of firms with negative RE and that of ones with negative earnings has been increasing (Collins et al. 1997; Collins et al. 1999; DeAngelo

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et al. 2006). Furthermore, share repurchases have substituted for dividends (Grullon and Michaely 2002). Consequently, the ratio of firms paying dividends decreased drastically, and only about 20% of all firms paid dividends in 1999 (Fama and French 2001). On the other hand, the situation in Japan is considerably different from that in the US. Over the past 30 years in Japan, 70% or more of firms have constantly paid dividends. At least until now, the substitution of share repurchases for dividends is unpopular (Ishikawa 2007). Japanese firms have special feelings for paying dividends. In consideration of the facts stated above, in the US, it is important to compare dividend-paying firms with firms that do not pay dividends. However, in Japan where most firms pay dividends, the most important issue is comparisons between dividend-increasing firms (or dividend-decreasing firms) and stable dividend-paying firms.

This study empirically analyzes the dividend policies of Japanese firms from the viewpoint of the dividend life-cycle theory. First, I analyzed determining factors in selecting a dividend increase or decrease. Do the growing firms select RE (or a dividend decrease if more funds are demanded) rather than a dividend increase? Do the mature firms further select dividend increases? Second, I analyzed the market valuation of dividend increases and decreases. When the market accepts the dividend life-cycle theory at face value, dividend increases by the mature firms will be more appreciated and those by the growing firms will be less appreciated. Meanwhile, it is expected that dividend decreases by the mature firms are more depreciated, and on the contrary, those by the growing firms are less depreciated.

This paper is organized as follows. In the second section, I provide the research design used for determining factors in selecting a dividend increase or decrease. In the third section, I present the samples and descriptive statistics. In the fourth section, I conduct a logit regression analysis, and in the fifth section, I analyze the relationship between dividend increases (decreases) and stock prices. In the sixth section, I conduct an additional analysis to verify the ability of dividends to predict future earnings, and in the seventh section, I present the summary and conclusion.

2. Research Design

To analyze determining factors in selecting dividend increases or decreases, I collect samples of (a) dividend-increasing firms, (b) dividend-decreasing firms, and (c) stable dividend-paying firms. Logit regression analysis is then applied to a regression model of the equation (1) for the "dividend-increasing firm sample" consisting of (a) and (c) and the "dividend-decreasing firm sample" consisting of (b) and (c). The dependent variable for the dividend-increasing firm sample (incdiv) is given as 1 in case of the dividend-increasing firm, otherwise 0 (in case of the stable dividend-paying firm). For the dividend-decreasing firm sample, a dummy variable (decdiv) is similarly set.

$$\begin{aligned} \text{incdiv (decdiv)} = {} & a_0 + a_1 \cdot \text{GROWTH} + a_2 \cdot \text{ICF} + a_3 \cdot \text{RE} + a_4 \cdot \text{TE} + a_5 \cdot \text{CASH} \\ & + a_6 \cdot \text{ROA} + a_7 \cdot \text{incearn} + a_8 \cdot \text{DOE} + a_9 \cdot \text{REP} + a_{10} \cdot \ln(\text{MVE}) \\ & + a_{11} \cdot \text{BANK} + a_{12} \cdot \text{FOREIGN} + a_{13} \cdot \text{INDIVIDUAL} + \varepsilon. \end{aligned} \tag{1}$$

Independent variables are ones adopted in previous researches (DeAngelo et al. 2000; Lie 2000; DeAngelo et al. 2006; Damodaran 2006). The definition of independent variables, which explains the selection of dividend increases, and the explanation of the assumption on signs of their coefficients are as follows.[1]

[1] The assumption on signs of coefficients of the dividend-decreasing firm sample is the opposite. To avoid overlapping explanation, I will not refer to it hereafter. The ratio depending on flows (stocks) is calculated on the basis of data in the current term (at the end of previous term).

(1) Growth potential

Since firms with many opportunities for growth need investment funds under the dividend life-cycle theory, they may prefer RE (or dividend decreases if demanding more funds) to dividend increases. In this case, the expected sign of a coefficient of GROWTH is negative. In this study, I adopt either of the following: (1) sales growth ratio (SGR), (2) asset growth ratio (AGR), or (3) price-to-book ratio (PBR), as proxy variables of GROWTH.[2] (3) PBR presents the stock market's evaluation of growth potential of the firm. Growing firms are likely to have higher values of these variables.[3]

Meanwhile, it is presumable to comprehend the firm growth stage by measuring the relative size of investment cash flow (ICF). That is, it is assumed that the firm with a relatively large ICF is a growing firm. To make a consistent interpretation with the above, the ICF is multiplied by "–1",[4] and the scale deflated by the operating cash flow (except samples with operating cash flow at 0 or less), which is its basic resource, is used.[5] Furthermore, DeAngelo et al. (2006) focuses on the RE ratio as a ratio presenting firm growth stages. It is assumed that the mature firms have retained more earnings. Consequently, from the viewpoint of the life-cycle theory, the expected sign of the coefficient of RE is positive. RE may be simply proxy for capital and financial compositions. Thus, (2) book-value of equity to total assets ratio (TE) and (3) the excess fund balance are controlled.

(2) Capital structure

Firms with greater equity are likely to have greater ability to increase dividends. They may also have incentives to boost ROE by increasing dividends. On the contrary, it is not expected that firms with less equity will increase dividends while further deteriorating their own financial conditions. Meanwhile, supposing that a firm with high TE is a mature firm, the same hypothesis can also be established under the life-cycle theory, that is, the expected sign of the coefficient of TE is positive.

(3) Excess fund balance

The more the excess amount of funds, the larger is the ability for dividend increases. Such firms may have incentives to reduce agency costs by spending excess funds outside (the free cash flow theory). When we define a firm with abundant excess funds as a mature firm, the same hypothesis can also be established under the life-cycle theory. On the other hand, when it is assumed that a growing firm reserves excess funds in preparation for future investment for growth, the sign of coefficient of excess funds may be the opposite. In this study, I use the following: (a) ratio of liquidity on hand (CASH) and (b) net financial asset ratio (NETCASH) as proxy variables of excess funds.[6]

(4) Profitability

I adopt a return on asset (ROA) as a scale of profitability (DeAngelo et al. 2006). In general, a firm with high profitability has high extra ability for dividend increases. In this case, the expected

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[2] To grasp the long-term growth of the firm, it is possible to use long-term mean values of SGR and AGR (and ICF and ROA stated below). In that case, the essential result is the same.

[3] Meanwhile, in firms with negative values of SGR and AGR, not only mature but also declining firms may be included. Therefore, the analysis with limited samples meeting the requirement of [SGR, AGR≥0] was additionally conducted. While the analysis result is omitted here because of space limitations, the major conclusion of this study is not changed. As for PBR, it is difficult to set the threshold between the mature firms and the declining ones (same as RE stated below).

[4] Numerators of DOE and REP stated below are also multiplied by "–1".

[5] While I conduct the analysis excluding samples with negative ICF, the fundamental implication described below remains unchanged.

[6] The empirical result stated below was drawn using CASH. In case of using NETCASH, the result was almost the same.

sign of the coefficient of ROA is positive. However, if ROA is considered a proxy variable with regard to the quality of investment opportunity (i.e., a firm with high ROA is equal to a growing firm), the expected sign is the opposite.

(5) Vector of changes in earnings

In general, when earnings increase, firms increase dividends. On the other hand, when we consider earnings increasing firm as a growing firm, the opposite assumption is set under the life-cycle theory. In this study, dummy variables (incearn) are set, to which 1 is given in case of increased earnings in the current term, otherwise 0.

(6) The Latest Dividend on Equity

A firm originally with a high DOE has less capability to increase dividends. In this case, the sign of the coefficient of DOE is expected to be negative. In terms of market pressure to increase dividends (a firm with a lower DOE is more pressured to increase dividends), the sign is expected to be the same. On the other hand, if it is assumed that a firm with high dividends is originally eager to increase dividends, the expected sign may be the opposite. Consistent with the following definition of the share repurchase ratio (REP), dividend on the cash flow statement (dividend at the end of previous term + interim dividend for the current term) is used for the numerator of DOE.[7]

(7) Repurchase

Share repurchase, as well as dividends, is a major method of returning earnings to shareholders. If share repurchases are substituted for dividend increases (the substitution hypothesis),[8] the coefficient of the REP is assumed to be negative. Meanwhile, if a firm eager to increase dividends is concurrently repurchasing its own stock against the substitution hypothesis, the sign is expected to be the opposite.

(8) Firm size

A larger firm is likely to be a mature firm. From the viewpoint of the life-cycle theory, such a firm is likely to prefer dividend increases. Assuming that the firm size is a proxy variable presenting alternative fund raising ability, as large-sized firms with higher credit have alternative resources for fund raising, they do not need to reserve excess funds. In other words, larger the firm size, more possible are the dividend increases. Even on the basis of this hypothesis, the coefficient of ln(MVE) is positive.

(9) Shareholder composition

Sophisticated investors such as financial institutes and foreign investors are generally expected to prefer dividend increases to ease free cash flow problems, particularly where they have the nature of activist shareholders. While individual investors may also prefer dividend increases, there is a strong negative correlation on both a level basis and on a year-on-year basis between the foreign ownership ratio (FOREIGN) or the bank ownership ratio (BANK) and the individual ownership ratio (INDIVIDUAL),[9] so the coefficient of individual ownership may be negative.

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[7] Note that dependent variables (incdiv, decdiv) are set according to the difference between current DPS (current interim DPS + DPS at the end of current term) and DPS in the previous term. Even if DOE or dividend yields in the previous term are used, the result remains unchanged.

[8] In the US, there is evidence supporting the substitution hypothesis (Grullon and Michaely 2002).

[9] For example, the correlation coefficient of FOREIGN and INDIVIDUAL is –0.313 on a level basis (annual average from 1990 to 2007) and –0.357 on a year-on-year basis (same as above). The latest correlation coefficients are –0.485 and –0.356 respectively.

3. Sample and Descriptive Statistics

3.1 Sample Selection

Samples for the analysis of determining factors in selecting dividend increases or decreases consist of 3,008 firm-years ended in March, from 2002 to 2005, meeting the following conditions.

(i) From 1999 to 2007, the fiscal year must end in March. In the fourth section, I analyze the same samples as those in the financial profile analysis in the sixth section. In the sixth section, the relevant fiscal years of firms that changed dividends (dividend-increasing firm and dividend-decreasing firm) are defined as [t = 0], and the financial ratios of five fiscal years before and after the change in dividend ($-2 \leqq t \leqq 2$) are compared with those of the control firms with constant dividends (stable dividend-paying firms). For this purpose, in case of analysis for the first fiscal year ending in March 2002, complete data from the fiscal years ended in March from 2000 through 2004 must be available. The financial year ending in March 2000 is required because of the necessity for cash flow statements. Furthermore, since some financial ratios need year-on-year changes, the first fiscal year to extract data is the year that ended in March 1999.

(ii) From 1999 to 2007, each fiscal year ending in March must contain twelve months and meet the requirement of [0.8 < percentage change in total number of stock issued < 1.2]. In this study, incdiv (decdiv) of equation (1) is determined using a change in the dividend per share, the latter requirement is imposed to mitigate the effects from substantial dividend increases with stock splits. (iii) Dividends must be paid in the current and previous terms. In this study, firms which resume dividends, pay no dividend, and continuously don't pay dividend are excluded from the samples. (iv) Commemorative dividends (memorial dividends) should not be regarded as a change in dividends for the current term.[10] In other words, only ordinary dividends are analyzed in this study. (v) Stock prices and financial data required for the analysis can be collected from *Stock Price CD-ROM* (Toyo Keizai, Inc.) and *Nikkei NEEDS Financial Quest* (Nikkei Media Marketing, Inc.),[11] and it is possible to compute each financial ratio for all fiscal terms ended in March, from 1999 to 2007.[12]

I identified the following samples after excluding outliers in the top and the bottom 0.5% for each financial ratio in all nine relevant fiscal terms,[13] while meeting the above five requirements: 898 dividend-increasing firms (82, 154, 273, 389), 196 dividend-decreasing firms (104, 50, 28, 14), and 1,914 stable dividend-paying firms[14] (526, 549, 468, 371)[15] (Parenthetic figures are the numbers of firms in each fiscal term ended in March, from 2002 to 2005).

3.2 Univariate Analysis

First, for each independent variable in the equation (1), I examine whether there is a statistically significant difference between (a) the dividend-increasing firms and (c) the stable dividend-paying

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[10] For a comparison between commemorative dividends and ordinary dividends, see Ishikawa (2005).

[11] In this study, I basically used consolidated data. If there is no consolidated data, non-consolidated data of a parent company is used as a substitute for it. Retained earnings ratio is calculated on the basis of data of the parent company.

[12] To be more specific, requirements of [operating cash flow > 0] and [book-value of equity > 0] are imposed. The former (the latter) requirement is necessary for calculating an ICF (PBR, RE, DOE, and REP).

[13] To be exact, for TE, CASH, NETCASH, ln(MVE), and three ownership ratios in which extremely abnormal values do not occur, outliers are not processed. For DOE and REP (negative values are excluded) (both having 0 or more), the outliers only in the top are excluded.

[14] A stable dividend-paying firm is defined as a firm of which ordinary dividend per share for the current and previous term are same, and which does not pay any commemorative dividends in the current and previous term.

[15] In this study, I handle an identical firm in a different fiscal term as a different sample. Although analyses for each term ending in March, from 2002 to 2005, were conducted, the results are omitted because of space limitations.

Table 1: Descriptive Statistic and Test of Differences in Average/Median

variables [c]	(a) Dividend-Increasing Firm (n=898) [a]			(b) Dividend-Decreasing Firm (n=196) [a]			(c) Stable Dividend-Paying Firm (n=1,914) [a]			Hypothesis	Difference Test [b]: (a) - (c)		Hypothesis	Difference Test [b]: (b) - (c)	
	ave.	med.	std.	ave.	med.	std.	ave.	med.	std.	(a) - (c)	ave. t-value	med. z-value	(b) - (c)	t-value	z-value
SGR (GROWTH)	0.064	0.053	0.104	-0.055	-0.051	0.110	0.006	0.004	0.087	-	15.534***	17.488***	+	-9.043***	-9.023***
AGR (GROWTH)	0.037	0.031	0.084	-0.037	-0.041	0.082	-0.004	-0.007	0.069	-	13.748***	14.583***	+	-6.127***	-6.460***
PBR (GROWTH)	1.303	1.126	0.744	0.923	0.718	0.694	0.943	0.801	0.580	-	13.973***	14.519***	+	-0.463	-1.803
ICF	0.650	0.528	1.064	1.085	0.626	2.465	0.726	0.580	1.584	-	-1.311	-1.773	+	2.842**	1.590
RE	0.503	0.519	0.227	0.483	0.444	0.190	0.519	0.537	0.212	+	-1.900	-1.511	-	-2.313*	-2.792**
TE	0.501	0.489	0.202	0.460	0.427	0.202	0.471	0.464	0.199	+	3.719***	3.525***	-	-0.747	-0.944
CASH	0.152	0.123	0.113	0.129	0.111	0.084	0.133	0.110	0.099	+ / -	4.770***	4.271***	+ / -	-0.468	0.354
ROA	0.039	0.034	0.029	-0.005	0.003	0.031	0.017	0.016	0.021	+ / -	23.564***	22.805***	+ / -	-13.033***	-11.303***
incearn	0.839	–	–	0.260	–	–	0.553	–	–	+ / -	14.755***	–	+ / -	-7.812***	–
DOE	0.014	0.013	0.008	0.018	0.015	0.011	0.015	0.014	0.008	+ / -	-3.434***	-4.142***	+ / -	4.333***	2.703**
REP	0.007	0.000	0.016	0.005	0.000	0.012	0.005	0.000	0.012	+ / -	3.699***	3.970***	+ / -	-0.748	-1.584
ln(MVE)	24.308	24.143	1.883	23.736	23.399	1.815	23.789	23.567	1.749	+	7.148***	6.930***	-	-0.403	-0.687
BANK	0.292	0.283	0.151	0.273	0.242	0.168	0.275	0.247	0.158	+	2.745**	2.968**	-	-0.228	-0.248
FOREIGN	0.109	0.071	0.112	0.055	0.018	0.075	0.063	0.024	0.089	+	9.225***	9.592***	-	-0.355	-0.401
INDIVIDUAL	0.336	0.299	0.191	0.407	0.402	0.196	0.378	0.357	0.183	+ / -	-4.302***	-4.803***	+ / -	1.736	1.346

*, **, *** Singnificant at the 5%, 1%, and 0.1% levels (two-tailed test), respectivily.

Note: [a] Dividend-increasing firm is a firm that only increases ordinary dividends in the current term, and dividend-decreasing firm is a firm that only decreases ordinary dividends in the current term. Stable dividend-paying firm is a firm that does not change ordinary dividends in the current term. All these forms are limited to firms that paid dividends in the current and previous terms. Samples consist of firms with the fiscal year ending in March, from 2002 to 2005 (pooled sample).

[b] The t-test with independent samples is used to examine differences in average (if equal variances are not assumed), and the Mann-Whitney test with independent samples is used to examine differences in median. As for dummy variables (incearn), the ratio of samples allocated 1 and z-value obtained in the difference test are shown.

[c] SGR (AGR) = Current sales growth rate (current total assets growth rate), PBR = Price to book-value ratio at the end of the current term, ICF = Current ICF ratio [=Investment CF*(-1)/Operating CF (positive)], RE = Retained earnings ratio at the end of the previous term divided (=Retained earnings/book-value of equity (positive, and so forth)), TE = Equity to total assets ratio at the end of the previous term (=book-value of equity/total assets), CASH = Ratio of liquidity on hand at the end of the previous term (=liquidity on hand/total assets), ROA = Current ROA (=current net earnings/average total assets), incearn = Dummy variable in which 1 is given in case of increased earnings (on current net earnings basis) in the current term, otherwise 0. DOE = Current DOE [=the amount of dividend paid (on the basis of CF statements)*(-1)/book-value of equity], REP = Current Repurchase ratio (=expenditure because of acquisition of own shares (on the basis of CF statements)*(-1)/book-value of equity, ln (MVE) = Natural logarithm of the total market value at the end of the previous term, BANK = Bank ownership ratio at the end of the previous term (including securities companies), FOREIGN = Foreign ownership ratio at the end of the previous term, and INDIVIDUAL = Individual ownership ratio at the end of the previous term. I generally use consolidated data. If there is no consolidated data, non-consolidated data of parent company is used as a substitute for it.

firms, and between (b) the dividend-decreasing firms and (c). In Table 1, the average and median of (a) – (c) and the results of the test of those differences are summarized. Furthermore, t-test with independent samples is applied to examine the differences in average (if equal variances are not assumed), and the Mann-Whitney test with independent samples is applied to examine the differences in median.[16]

According to the comparison between (a) and (c) in Table 1, it is apparent that dividend-increasing firms have the following features that are statistically significant in comparison with stable dividend-paying firms: Higher GROWTH, higher TE, abundant excess funds (CASH), higher profitability (ROA), having a vector of increasing earnings (incearn), lower DOE, more active share repurchases (REP), larger firm size [ln(MVE)], higher BANK, higher FOREIGN, and lower INDIVIDUAL.[17]

Among them, the results of TE, CASH, and ln(MVE) are considered to be consistent with the prediction of the life-cycle theory when the firm with each great scale is regarded as a mature firm. However, it is possible to explain them with other hypotheses. For example, the firms with abundant equity capital and excess funds are not so much at a risk of deterioration in their financial conditions, even with dividend increases. The result of TE can be considered to be the result of corporate behavior to aim at improvement in capital efficiency. There may be a market pressure for dividend increases behind it. The result of excess funds is consistent with the prediction of the free cash flow theory. The result of firm size can be interpreted by considering the market pressure for dividend increases (large firms attract more attention from the market and are more pressured to increase dividends), as well as the ability of alternative fund raising (as large firms have resources to raise alternative funds, dividend increases are less constrained).

Meanwhile GROWTH, ROA, and incearn have the results opposite to that predicted by the life-cycle theory.[18] In fact, the firms expected to grow highly, such as firms with a high growth ratio in sales and total assets, those appreciated by the market because of their high growth, those with high profitability or quality of investment opportunities, and those with increasing earnings, probably prefer dividend increases to stable dividend payments.

Finally, we focus on the results of DOE and the stock ownership structure. There is a typical scenario that a firm with a relatively low DOE increases dividends as pressured for dividend increases by foreign investors including activist shareholders.[19] The result that more stable dividend-paying firms have a high individual ownership ratio compared to dividend-increasing firms is also interesting. It is unlikely that individual investors prefer stable dividends to dividend increases. Consequently, it is more natural to interpret this result as meaning that firms with a high individual ownership ratio are not pressured much for dividend increases by shareholders.

Next, according to the comparison between (b) and (c), it is apparent that dividend-decreasing firms have the following features that are statistically significant in comparison with stable dividend-paying firms: Lower GROWTH, higher ICF, lower RE, lower profitability (ROA), having no vector

[16] As for dummy variables (incearn), the ratio of samples allocated 1 (box of average) and z-value (box of t- value) obtained in the difference test are shown.

[17] Relative investment cash flow (ICF) has a sign consistent with that expected according to the dividend life-cycle theory, but its level of statistical significance is low. Meanwhile, the retained earnings ratio (RE) has a sign opposite to that expected according to the theory, but its level of significance is also low.

[18] In firms with negative ROA, not only mature firms but also declining ones may be included. Although I attempted the analysis excluding such firms, its result was basically the same as that of the one given in Table 1 (and Table 3 shown below).

[19] The result of REP that firms which increased dividends are active in share repurchase is quite interesting. This supports the fact that, at least during the analysis period of this study, the substitute hypothesis of share repurchases for dividends has not been proved yet in Japan.

Table 2: Correlation Coefficient [a]

Panel A: Dividend-Iincreasing Firm Sample

variables [b]	incdiv	SGR	ICF	RE	TE	CASH	ROA	incearn	DOE	REP	MVE	BANK	FRGN	INDI	AGR	PBR
incdiv	1.000														0.251	0.255
GROWTH	0.281	1.000													1.000	1.000
ICF	-0.025	0.013	1.000												0.107	0.010
RE	-0.036	-0.026	0.052	1.000											0.088	-0.158
TE	0.070	0.008	0.011	0.375	1.000										0.131	-0.195
CASH	0.090	-0.004	0.005	0.252	0.580	1.000									0.087	0.048
ROA	0.406	0.340	-0.045	0.166	0.295	0.298	1.000								0.408	0.401
incearn	0.278	0.271	-0.066	-0.078	-0.021	-0.016	0.323	1.000							0.190	0.118
DOE	-0.065	0.030	-0.032	-0.109	-0.242	-0.035	0.144	-0.026	1.000						0.012	0.441
REP	0.070	-0.019	-0.061	0.020	0.132	0.119	0.095	0.024	0.135	1.000					-0.075	0.065
ln(MVE)	0.134	0.059	-0.012	-0.051	-0.101	-0.043	0.148	0.014	0.146	0.133	1.000				0.031	0.511
BANK	0.052	0.016	-0.033	-0.167	-0.206	-0.145	-0.002	0.035	0.110	0.117	0.676	1.000			-0.049	0.312
FOREIGN	0.171	0.064	-0.005	0.070	0.119	0.193	0.208	0.043	0.031	0.106	0.651	0.411	1.000		0.074	0.356
INDIVIDUAL	-0.081	-0.051	0.000	-0.011	0.122	0.148	-0.092	-0.028	-0.017	-0.022	-0.589	-0.538	-0.471	1.000	-0.011	-0.284

Panel B: Dividend-Decreasing Firm Sample

variables [b]	decdiv	SGR	ICF	RE	TE	CASH	ROA	incearn	DOE	REP	MVE	BANK	FRGN	INDI	AGR	PBR
decdiv	1.000														-0.132	-0.010
GROWTH	-0.193	1.000													1.000	1.000
ICF	0.062	0.018	1.000												0.114	0.008
RE	-0.050	-0.012	0.061	1.000											0.099	-0.217
TE	-0.016	-0.028	-0.009	0.370	1.000										0.098	-0.292
CASH	-0.010	-0.024	0.001	0.234	0.567	1.000									0.050	-0.049
ROA	-0.273	0.275	-0.041	0.190	0.234	0.228	1.000								0.345	0.179
incearn	-0.170	0.257	-0.069	-0.063	-0.058	-0.046	0.297	1.000							0.157	0.044
DOE	0.094	0.026	-0.013	-0.180	-0.333	-0.106	0.047	-0.012	1.000						-0.018	0.485
REP	-0.016	-0.004	-0.041	0.026	0.131	0.116	0.061	0.002	0.134	1.000					-0.054	0.049
ln(MVE)	-0.009	0.002	-0.033	-0.123	-0.157	-0.108	0.041	-0.034	0.139	0.115	1.000				-0.032	0.513
BANK	-0.005	-0.013	-0.033	-0.210	-0.247	-0.173	-0.067	0.020	0.082	0.119	0.676	1.000			-0.081	0.305
FOREIGN	0.008	-0.001	-0.017	0.012	0.072	0.122	0.060	-0.020	-0.014	0.103	0.625	0.399	1.000		0.007	0.299
INDIVIDUAL	0.038	-0.009	0.005	0.045	0.161	0.180	-0.034	-0.016	0.005	-0.020	-0.545	-0.518	-0.446	1.000	0.036	-0.262

Note: [a] Panel A (Panel B) presents the Pearson product-moment correlation coefficients of dividend-increasing (decreasing) firm sample consisting of dividend-increasing (decreasing) firms and stable dividend-paying firms. The results in the case of adopting AGR or PBR as a variable of GROWTH instead of SGR are shown on the right side of the dotted lines.

[b] incdiv (decdiv) is a dummy variable. If the sample is a dividend-increasing (decreasing) firm, 1 is given, and if the sample is a firm paying stable dividends, 0 is given. For details of other variables and samples, see Table 1.

of increasing earnings (incearn), and higher DOE.[20]

Among them, while the results of ICF and RE are consistent with the prediction of the life-cycle theory, the interpretation focusing on business performance and financial conditions is available. When the main business deteriorates and operating cash flow shrinks (to the extent of positive value), ICF increases (given other conditions). Of course, as business performance worsen, RE would show a downward tendency. Rather than growing firms, firms with declining business performance and poor financial conditions may be selecting dividend decreases.

Meanwhile, GROWTH, ROA and incearn have the opposite results to the prediction of the life-cycle theory. This result is consistent with the result of dividend-increasing firms. In fact, it is highly possible that such low-growth firms, such as firms with low growth in sales and total assets, low profitability or quality of investment, and declining earnings, select dividend decreases.[21]

3.3 Correlation Coefficient

Panel A in Table 2 presents the correlation coefficients of the dividend-increasing firm sample consisting of (a) dividend-increasing firms and (c) stable dividend-paying firms. Panel B presents the correlation coefficients with regard to the dividend-decreasing firm sample consisting of (b) dividend-decreasing firms and (c). Correlation coefficients in case of adopting AGR or PBR as a variable of GROWTH in place of SGR are shown on the right side of the dotted lines in both panels.

Focusing on the correlation coefficients among independent variables, we find that some high correlation coefficients exceeding ±0.6 exist. In particular, the relationship between ln(MVE) and the ownership ratio is interesting. For example, in Panel A, while the correlation coefficient of ln(MVE) and FOREIGN is 0.651, that of ln(MVE) and INDIVIDUAL is –0.589. This result reveals that foreign investors concentrate on large-sized firms, and contrarily individual investors prefer small-sized firms. It is not difficult to imagine this correlation. Although I collaterally estimated a regression model excluding ln(MVE) from independent variables because of a concern about multicollinearity, the major conclusion of this study is unchanged.

Interestingly, the correlation coefficient of FOREIGN and INDIVIDUAL is –0.471, which is significantly negative. As for the correlation coefficients with ROA, INDIVIDUAL is negative (–0.092) and FOREIGN is positive (0.208). Also with SGR, the correlation coefficient of INDIVIDUAL is negative (–0.051) and FOREIGN is positive (0.064). These results conclude that foreign investors concentrate on firms with high profits and growth,[22] and at the time when stock prices increased to some extent (through their monitoring as well as explicit and implicit pressure for dividend increases), individual investors sell their stocks. As a result, the significantly negative correlation between the foreign ownership ratio and the individual ownership ratio has been realized.

Lastly, since the correlation coefficients with dependent variable (incdiv, decdiv) are consistent with the result of difference test in Table 1, it is not referred again. In any panel, it is characteristic that the level of correlation coefficients with GROWTH, ROA, and incearn are relatively high. However, the correlation coefficients just show the correlation between two variables. Consequently, even if other independent variables are given, it cannot be clarified whether the relationship between

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[20] It is necessary to note that the number of dividend-decreasing firm samples is smaller than that of dividend-increasing firm samples.

[21] It can be considered that the reason why firms with a relatively high DOE select dividend decreases is that firms which have room to decrease dividend (can keep paying some dividends even after dividend decrease) decrease dividend, or book-value of equity (denominator of DOE) of dividend-decreasing firms is relatively small.

[22] By focusing on incearn, AGR, and PBR, we can see similar tendencies.

each independent variable and incdiv or decdiv is perceived as expected in the hypothesis, until the estimated result of multivariate regression model of the equation (1) becomes available.

4. Logit Regression Analysis

Table 3 is the estimated result of the equation (1). Panel A is the estimated result of dividend-increasing firms (against stable dividend-paying firms), and panel B is the result of dividend-decreasing firms (against stable dividend-paying firms). Furthermore, (1) – (3) of each panel are results in case of using SGR, AGR, and PBR as proxy variables of GROWTH. Inequalities in square brackets under each variable present expected signs of coefficients. Estimated values of coefficients are on the upper stage of estimated results, and asymptotic t-values modified by White (1980) are in parentheses.

Firstly, according to panel A, it is found that GROWTH (SGR, AGR, PBR), retained earnings ratio (RE), equity to total assets ratio (TE), profitability (ROA), vector of increasing earnings (incearn), dividend on equity (DOE), share repurchase ratio (REP), and foreign ownership ratio (FOREIGN) are estimated to be statistically significant at the 5% level (two-tailed test, and so forth). Among them, since RE and TE have the results opposite to the hypotheses, it is difficult to interpret them.[23] The result of REP suggests that dividend-increasing firms are also active in share repurchases. This fact proves that the substitute hypothesis is not true in Japan.

Other results are consistent with Tables 1 and 2. That is, when growing highly, having high profitability or high quality investment opportunities, achieving an increase in earnings, having a low DOE, and a high foreign ownership ratio, firms prefer dividend increases to stable dividend payments. It is repeatedly suggested that foreign investors may crowd a firm that has high growth and profitability, while leaving DOE at a relatively low level, and that firm is likely to increase dividends because of those investors' explicit and implicit pressure for dividend increases.[24]

Second, according to panel B, for at least one of (1) – (3), it is found that SGR, investment cash flow ratio (ICF), TE, ROA, incearn, DOE, REP, and FOREIGN are estimated to be statistically significant at the 5% level. Among them, the result of TE cannot be interpreted easily like panel A. The result of ICF implies that firms with relatively larger investment cash flow decrease dividends. Although this result is consistent with predictions of the life-cycle theory, as stated before, there is a possibility that failing firms have no choice but to decrease dividends.

Results other than those stated above are consistent with the results in Table 1 and 2, and panel A of Table 3, and it is easy to interpret them. While having low growth; low profitability or low quality of investment opportunities; declining earnings; and a high DOE, such firms are likely to prefer dividend decreases to stable dividend payments. Focusing on the little correlation between decdiv and FOREIGN (panel B in Table 2), we may consider that firms with less pressure for dividend increases decrease dividends.

Finally, we discuss the dividend life-cycle theory. As stated above, the dividend life-cycle theory suggests that growing firms should choose RE or dividend decreases in preparation for investment for future growth, rather than for dividend increases. However, Table 3 presents no evidence positively

[23] Especially, the result of TE is not consistent with Table 1, which gained results consistent with the hypothesis. In consideration of the possibility that the numerator of TE becomes the denominator of RE, DOE, and REP, I estimated regression models excluding those variables, for example. However, the coefficient of TE is almost always estimated to be negative (while sometimes estimated to be insignificantly positive). This point cannot be interpreted easily, and is a future research.

[24] This is just a conjecture based on the result of correlative relationship. The verification of the causal relationship is a future research.

Table 3: Estimated Result of Equation (1) [a]

Panel A: Dividend-Increasing Firm Sample

Intercept [?]	GROWTH [-]	ICF [-]	RE [+]	TE [+]	CASH [+/-]	ROA [+/-]	incearn [+/-]	DOE [+/-]	REP [+/-]	ln(MVE) [+]	BANK [+]	FOREIGN [+]	INDI [+/-]	χ^2 value (p-value)	R^2
(1) GROWTH = SGR															
-1.583	1.370	0.006	-0.534	-0.698	0.442	23.862	0.414	-39.683	8.895	0.030	-0.069	1.035	0.042	907.5	0.258
(-2.525)*	(2.307)*	(0.253)	(-3.619)***	(-3.229)**	(1.217)	(7.670)***	(6.131)***	(-7.471)***	(3.721)***	(1.142)	(-0.266)	(2.482)*	(0.214)	(0.000)	
(2) GROWTH = AGR															
-1.551	1.379	-0.002	-0.573	-0.743	0.392	24.224	0.440	-39.804	9.334	0.031	-0.074	1.023	0.019	899.2	0.255
(-2.484)*	(2.916)*	(-0.072)	(-3.894)***	(-3.406)***	(1.092)	(7.673)***	(6.667)***	(-7.432)***	(3.911)***	(1.165)	(-0.283)	(2.456)*	(0.097)	(0.000)	
(3) GROWTH = PBR															
-0.835	0.283	0.002	-0.454	-0.499	0.120	23.129	0.461	-46.835	9.019	-0.014	-0.014	1.020	0.048	906.5	0.257
(-1.275)	(3.323)***	(0.074)	(-3.011)**	(-2.125)*	(1.217)	(7.130)***	(6.967)***	(-8.975)***	(3.711)***	(-0.491)	(-0.054)	(2.402)*	(0.244)	(0.000)	

Panel B: Dividend-Decreasing Firm Sample

Intercept [?]	GROWTH [+]	ICF [+]	RE [-]	TE [-]	CASH [+/-]	ROA [+/-]	incearn [+/-]	DOE [+/-]	REP [+/-]	ln(MVE) [-]	BANK [-]	FOREIGN [-]	INDI [+/-]	χ^2 value (p-value)	R^2
(1) GROWTH = SGR															
-1.097	-2.154	0.049	-0.221	0.517	-0.216	-14.902	-0.281	27.946	-4.916	-0.023	-0.079	0.966	0.353	246.5	0.189
(-1.229)	(-3.849)***	(2.622)**	(-1.012)	(1.784)	(-0.398)	(-7.503)***	(-2.890)**	(5.183)***	(-1.135)	(-0.604)	(-0.196)	(1.518)	(1.195)	(0.000)	
(2) GROWTH = AGR															
-1.061	-0.629	0.048	-0.228	0.581	-0.092	-15.565	-0.328	27.298	-4.411	-0.020	-0.101	0.919	0.318	229.5	0.176
(-1.176)	(-0.935)	(2.515)*	(-1.049)	(2.025)*	(-0.171)	(-7.439)***	(-3.490)**	(5.120)***	(-1.030)	(-0.524)	(-0.254)	(1.484)	(1.075)	(0.000)	
(3) GROWTH = PBR															
-1.209	-0.072	0.046	-0.259	0.553	-0.017	-16.014	-0.334	29.370	-4.234	-0.010	-0.107	0.907	0.299	229.1	0.176
(-1.246)	(-0.517)	(2.489)*	(-1.179)	(1.868)	(-0.032)	(-7.971)***	(-3.565)***	(4.578)***	(-0.995)	(-0.240)	(-0.264)	(1.456)	(1.012)	(0.000)	

*, **, *** Singnificant at the 5%, 1%, and 0.1% levels (two-tailed test), respectivily.

Note: [a] Inequalities in square brackets under each variable present expected signs of the coefficients. Estimated values of the coefficients are on the upper stage of estimated results, and asymptotic t-values modified by White (1980) are in parentheses. χ^2 presents likelihood rate test statistics, and values in parentheses below χ^2 present model p-values. The results of annual dummy variables are omitted because of limited space. For details of each variable and sample, see Tables 1 and 2.

supporting the theory at least. GROWTH has the result opposite to that expected according to the life-cycle theory.[25] Even focusing on other variables that are considered to be related to the dividend life-cycle theory, we find that RE and TE have results opposite to that expected according to the theory, and the estimated values of coefficients of CASH and ln(MVE) are not statistically significant. While only the result of ICF is consistent with that expected according to the theory, as shown before, there is scope for other interpretation.

Meanwhile, when a firm with high profitability (ROA) and increasing earnings (incearn) is considered to be a growing firm, the result of Table 3 is considered to suggest that firms with high growth increase dividends. It is much the same for dividend decreases. Firms with low growth (firms with low profitability and growth or with declining earnings) tend to decrease dividends. Such evidence is the opposite to the dividend life-cycle theory. At least under the research design and samples of this section, positive evidence to affirm the dividend life-cycle theory has not been obtained.

5. Stock Market's Valuation of Dividend Increases and Decreases

The results in the previous section prove that high-growing firms increase dividends and low-growing firms decrease dividends. This means that the dividend life-cycle theory has not been accepted by managers of Japanese firms. Then, how does the stock market evaluate the dividend life-cycle theory? In this section, I analyze the stock market's valuation of dividend increases and decreases of high-growing firms and low-growing firms.

5.1 Research Design and Sample

In this section, I analyze the stock market's evaluation of the dividend life-cycle theory by estimating a regression model of the equation (2) based on Ohlson (2001).

$$\begin{aligned} MVE_t = {} & a_0 + a_1 \cdot b_t + a_2 \cdot x_t + a_3 \cdot d_{t-1} + a_4 \cdot \Delta d_t^{+} + a_5 \cdot \Delta d_t^{-} + a_6 \cdot E_t[\Delta \tilde{x}_{t+1}] \\ & + a_7 \cdot D^{+} + a_8 \cdot D^{-} + a_9 \cdot [D_{low\_GROWTH} \times \Delta d_t^{+}] + a_{10} \cdot [D_{high\_GROWTH} \times \Delta d_t^{+}] \\ & + a_{11} \cdot [D_{low\_GROWTH} \times \Delta d_t^{-}] + a_{12} \cdot [D_{high\_GROWTH} \times \Delta d_t^{-}] \\ & + a_{13} \cdot [D_{low\_GROWTH} \times D^{+}] + a_{14} \cdot [D_{high\_GROWTH} \times D^{+}] \\ & + a_{15} \cdot [D_{low\_GROWTH} \times D^{-}] + a_{16} \cdot [D_{high\_GROWTH} \times D^{-}] + \varepsilon_t. \end{aligned} \quad (2)$$

Based on the Ohlson (2001) model, signs of coefficients of book-value of equity (b_t), current earnings (x_t), and earnings growth in the next term ($E_t[\Delta \tilde{x}_{t+1}]$) ($a_1$, a_2, a_6) are expected to be positive.

In the equation (2), points to be considered are as follows. First, while the current dividend (d_t) is used in the Ohlson (2001) model, I divide it into dividend in the previous term (d_{t-1}), current dividend increase (Δd_t^{+}), and current dividend decrease (Δd_t^{-}) in the equation (2). This is to verify information contents of dividend changes. In order to facilitate the interpretation of empirical results, I convert the current dividend decrease to a positive value by adding an absolute value to it. According to the Ohlson (2001) model, the expected sign of the coefficient of d_t is positive. Therefore, the coefficients of d_{t-1} and Δd_t^{+} (a_3, a_4) are expected to be positive, and the coefficient of Δd_t^{-} (a_5) is

[25] Even in the case that samples are limited to firms of which SGR and AGR are 0 or more, the coefficient of GROWTH is not significantly positive, except (2) in Panel A. In that exception, the coefficient of GROWTH (AGR) is significantly positive at the level of 1% (p = 0.005).

expected to be negative.

Second, if the dividend increase in the next term is forecasted, the dummy of dividend increase in the next term (D^+) is given as 1, otherwise 0.[26] The dummy of dividend decreases in the next term (D^-) is set in a similar manner. The Ohlson (2001) model consists of only book-value of equity, current earnings, dividends, and earnings growth in the next term. However, the hypothesis set in developing the Ohlson (2001) model is tightly constrained.[27] In fact, there is a high possibility that other value-relevant information that affects firm value exists. One of these candidates is the dividend forecast for the next term by managers, which is announced at the same time of earnings announcement. However, there is a multicollinear relationship between dividends in the next term and the current dividends. Therefore, the dummy of changes in dividends is reflected on the regression model. Further, even given the current earnings and the earnings growth in the next term, if dividend increases in the next term (dividend decreases in the next term) are additionally appreciated as managers' highly reliable private information on future expansion (decline) in earnings, the coefficients of D^+ and D^- (a_7, a_8) are expected to be positive and negative, respectively.[28]

Third, GROWTH appearing in from the ninth to sixteenth independent variables (excluding intercept) represents three patterns of proxy variables related to growing stages (price to book-value ratio (PBR), sales growth ratio (SGR), and ratio of ordinary income to sales (MARGIN)[29]). For example, in case of using PBR as GROWTH, $D_{low\_growth} \times \Delta d_t^+$ presents the interaction term obtained by multiplying Δd_t^+ by the dummy (low PBR dummy) to be given as 1 if falling into the lower 10% (per fiscal year) of PBR [=total market value at the end of June (stock price at the end of June, three months after the closing date × total number of shares issued at the end of term)/book-value of equity at the end of term], otherwise 0. Contrarily, D_{high_growth} is a dummy to be given as 1 if falling into the upper 10% (per fiscal year) of the PBR, otherwise 0.[30] It is much the same in case of using SGR and MARGIN, but samples are limited to firm-years with values of those scales at 0 or more.[31] As stated above, in cases where the market evaluates changes in dividends in a manner consistent with the life-cycle theory, the coefficient of mature firms' dividend increases (a_9, a_{13}) is expected to be positive, the coefficient of growing firms' dividend increases (a_{10}, a_{14}) is expected to be negative, the coefficient of mature firms' dividend decreases (a_{11}, a_{15}) is expected to be negative, and the coefficient of growing firms' dividend decreases (a_{12}, a_{16}) is expected to be positive.

Fourth, as factors other than opportunities for GROWTH, which influence the market's evaluation of changes in dividends, a vector of changes in earnings, excess funds, and a capital structure are controlled. To be more specific, 24 types of interaction terms obtained by multiplying dividend increases and decreases (Δd_t^+, Δd_t^-, D^+, D^-) by the following dummies are added:

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[26] As the dividend forecast for the next term (and all other estimated values for the next term), the forecast for the next term by managers is used. Almost every Japanese firm announces management forecasts for the next term, which are announced at the same time of the annual earnings announcement. D^+ and D^- are judged using the change in dividend per share in the next term. To ease effects from actual dividend increases due to stock split, etc., samples are limited to firm-years with a change in total numbers of stocks issued from the current term to the next term less than ±20%.

[27] For example, the rational expectation hypothesis of linear information dynamics (LID) that "other information" can be comprehended only with the forecasted abnormal earnings in the next term and the current abnormal earnings (see Ohlson (1995)).

[28] This hypothesis is based on the signaling theory. Furthermore, under the free cash flow theory, the announcement of forecasted dividend increases (decreases) is considered to have positive (negative) impacts on stock prices through the expectation of a reduction (increase) in agency costs.

[29] MARGIN is positioned as a proxy variable presenting quality of investment opportunities.

[30] Even in case of setting dummy variables at the lower and upper 20% of the PBR, I obtained almost similar results (the same for other interaction terms).

[31] Because there is a high possibility that mature and declining firms are included in firms with negative values of these scales. Meanwhile, as for the PB ratio, it is difficult to set threshold of mature and declining firms.

increasing earnings dummy ($D_{inc\_earnings}$), decreasing earnings dummy ($D_{dec\_earnings}$), low liquidity on hand ratio dummy (D_{low_cash}), high liquidity on hand dummy (D_{high_cash}), low equity to total assets ratio dummy (D_{low_equity}), and high equity to total assets dummy (D_{high_equity}).[32] For example, a signal of dividend increases at the time of an increase in earnings may be more appreciated because manager's confidence in future good performance is supported by the increase in earnings (corroboration effect, Kane et al. 1984). In addition, dividend increases by firms with abundant excess funds are considered to have positive impacts on stock prices through an effective reduction in agency costs (the free cash flow theory, Jensen 1986). Furthermore, when firms with excessively abundant equity capital increase dividends, the effect of increasing ROE is likely to create a favorable impression. Meanwhile, when firms with poor funds or excessively low equity increase dividends, the market may concern further deterioration of their financial conditions (the financial condition theory).[33]

Fifth, considering the fact that Japanese firms with the fiscal year ending in March, which are analyzed in this section, are used to announce the consolidated financial statements by the end of June, the total market value of equity (MVE_t) as a dependent variable is computed using stock prices at the end of June. To mitigate heteroscedasticity, each variable other than dummy variables is deflated with the total market value at the end of June in the previous year (MVE_{t-1}). Sixth, year dummies and β value are added to control fluctuations in stock prices according to time-series changes in general economic conditions varying by fiscal years as well as discount rates varying by the firm. Seventh, outliers in the upper and lower 0.5% are excluded for each fiscal year and variable (except dummy variables). However, all of dividends have positire values, outliers only in the upper 0.5% are excluded for dividends.

After adding some more requirements,[34] samples include 18,489 firm-years ending in March, from 1994 (1,061 firms) to 2007 (1,648 firms). In case of using SGR and MARGIN as GROWTH, samples are limited to firms with these values at 0 or more, and the numbers of samples are 11,530 and 17,205, respectively. Data of stock prices was extracted from *Stock Price CD-ROM* (Toyo Keizai, Inc.), financial data and managers' forecast data (consolidated data used, in principle) from *Nikkei NEEDS Financial Quest* (Nikkei Media Marketing, Inc.), and β value from *Nikkei NEEDS stock price/index data CD-ROM* (Nikkei Media Marketing, Inc.).

5.2 Market's Evaluation of the Dividend Life-Cycle Theory

Table 4 is the estimated result of the equation (2).[35] Consistent with the hypotheses, coefficients of Δd_t^+ and D^+ (a_4, a_7) are estimated to be significantly positive at the 5% level (two-tailed test), whereas those of Δd_t^- and D^- (a_5, a_8) are estimated to be significantly negative. These results suggest that, even given other value-relevant data, dividend increases (decreases) in the current and next terms are generally evaluated as an additional positive (negative) signal and are consistent with the results in the US market (Pettit 1972; Charest 1978; Aharony and Swary 1980; Asquith and Mullins

[32] For simplification, these variables are omitted in the equation (2). See note in Table 4 for details of definition of variables.

[33] When firms with increases (decreases) in earnings, those with low (high) liquidity on hand, and those with low (high) equity to total assets ratio are suggested to be growing (mature) firms, it is possible to set the same hypothetical signs based on the life-cycle theory.

[34] Apart from the requirements stated above, it is required that the firm be one with the fiscal year ending in March; not to change its accounting period in the previous, current, and next year; to have positive consolidated and non-consolidated equity in the current term; have the closing stock price at the end of June in each fiscal year, including the previous year; keep the face value of stock (former face value conversion) at 50 yen in the previous, current, and next term; and not to have had a period in which dividends were not paid for three straight fiscal terms. Since I am analyzing changes in dividends in this section, I impose the last requirement.

[35] Tables of basic statistic and correlation coefficients are omitted because of limited space. Focusing on correlation coefficients between independent variables, we find that the correlation coefficient of the current earnings (x_t) and changes in earnings in the next term ($E_t[\Delta\tilde{x}_{t+1}]$) is –0.818, and we are worring about multicollinearity. Therefore, in this section, I supplementarily estimate a regression model excluding any one of x_t and $E_t[\Delta\tilde{x}_{t+1}]$. However, the major conclusion in this section is unchanged.

1983; Bajaj and Vijh 1990; Michaely et al. 1995).

Now, how is the positive (negative) correlation between dividend increases (decreases) and stock prices associated with the firm's growing stages? In case of using the PBR as GROWTH, for example, it is found that the coefficient of a mature firm's dividend decreases (a_{11}, a_{15}) are estimated to be significantly negative, whereas the coefficient of a growing firm's dividend decreases (a_{12}, a_{16}) are estimated to be significantly positive. These results are consistent with the prediction by the dividend life-cycle theory. In this case, it is considered that the market depreciates a mature firm's dividend decreases, which may further worsen free cash flow issues, while also depreciating a growing firm's dividend decreases less than the usual decreases, considering them to be preparations for future investment.

On the other hand, dividend increases have a result completely opposite to that predicted by the life-cycle theory. The coefficient of a mature firm's dividend increases (a_9, a_{13}) are estimated to be significantly negative, whereas the coefficient of a growing firm's dividend increases (a_{10}, a_{14}) are estimated to be significantly positive.[36] This result suggests that the positive correlation between dividend increases and stock prices is stronger in growing firms and weaker in mature firms. How can these results be interpreted?

Kane et al. (1984) discovered the fact that announcements of changes in earnings and dividends are evaluated in conjunction with each other. For example, dividend increases at the time of an increase in earnings are more appreciated than at the time of a decrease in earnings.[37] This is called "corroboration effect." However, factors that additionally cause an increase in stock prices in corroboration of the announcement of dividend increases do not only include a direct performance factor such as an increase in earnings. Dividend increases represent a manager's confidence in good performance in future. Indices such as a high PBR and a high SGR can be considered as signals supporting it from different viewpoints. When both signals have the same vector, the dividend increase is considered highly reliable and more preferable. On the contrary, dividend increases with different vectors (that is low PBR and low SGR) is less effective in increasing stock prices.

We can also uniformly interpret the abovementioned result of dividend decreases using the concept of this corroboration effect. The reason why a dividend decrease by a mature firm is additionally depreciated is that a signal meaning "we are the mature (low-growing) company" has the same vector as a signal of a dividend decrease. On the contrary, the coefficient of dividend decreases by growing firms is estimated to be significantly positive because both vectors contradict each other. While the dividend decrease with the same vector causes stock prices to fall predominantly, the drop in stock prices due to dividend decreases with a different vector is limited.

5.3 Results of Control Variables

With regard to the relationship with the vector of changes in earnings, it is notable that both the coefficient of dividend increases by firms with increasing earnings (a_{17}, a_{21}) and that of dividend decreases by them (a_{23}) are almost estimated to be significantly positive. When a firm with increasing earnings is defined as a growing firm, the latter result can be explained with the dividend life-cycle theory, but the former one cannot. However, both results can be interpreted consistently using the concept of the corroboration effect. The dividend increase with the same vector as increasing earnings is further appreciated as a highly reliable signal. In contrast, changes in dividends with different

[36] In the case of using SGR and MARGIN, this point is baAsically much the same.
[37] Also see Chang and Chen (1991), Easton (1991), and Cheng and Leung (2006).

Table 4: Estimated Result of Equation (2) [a]

	variables	coef.	expected sign		GROWTH (9) ~ (16)					
			life-cycle	corrob-oration	PBR		SGR		MARGIN	
					est_coef.	t-value	est_coef.	t-value	est_coef.	t-value
	intercept	a_0	0		0.927	99.338 ***	0.946	62.454 ***	0.932	92.272 ***
(1)[b]	b_t	a_1	+		0.083	15.529 ***	0.035	4.761 ***	0.033	6.163 ***
(2)[b]	x_t	a_2	+		2.553	24.457 ***	3.089	20.493 ***	2.891	25.696 ***
(3)[b]	d_{t-1}	a_3	+		1.379	3.253 **	2.308	3.803 ***	1.897	4.160 ***
(4)[b]	Δd_t^+	a_4	+		10.514	7.608 ***	9.830	6.113 ***	10.257	7.518 ***
(5)[b]	Δd_t^-	a_5	-		-5.195	-5.277 ***	-5.531	-2.874 **	-7.839	-5.649 ***
(6)[b]	$E_t[\Delta\tilde{x}_{t+1}]$	a_6	+		2.386	20.958 ***	2.982	17.063 ***	2.666	21.193 ***
(7)[b]	D^+	a_7	+		0.032	2.971 **	0.034	2.229 *	0.034	2.837 **
(8)[b]	D^-	a_8	−		-0.060	-6.415 ***	-0.069	-5.162 ***	-0.071	-6.817 ***
(9)[c]	$D_{low\_GROWTH}\cdot\Delta d_t^+$	a_9	+	−	-16.165	-7.038 ***	-10.407	-4.495 ***	-3.937	-1.921
(10)[c]	$D_{high\_GROWTH}\cdot\Delta d_t^+$	a_{10}	−	+	31.326	7.007 ***	7.449	2.512 *	8.421	2.368 *
(11)[c]	$D_{low\_GROWTH}\cdot\Delta d_t^-$	a_{11}	−	−	-6.743	-4.002 ***	-2.856	-0.950	1.764	0.984
(12)[c]	$D_{high\_GROWTH}\cdot\Delta d_t^-$	a_{12}	+	+	10.061	2.632 *	-4.535	-0.938	4.200	0.676
(13)[c]	$D_{low\_GROWTH}\cdot D^+$	a_{13}	+	−	-0.145	-8.266 ***	-0.040	-1.844	-0.037	-1.655
(14)[c]	$D_{high\_GROWTH}\cdot D^+$	a_{14}	−	+	0.212	9.227 ***	0.020	0.770	0.097	3.855 ***
(15)[c]	$D_{low\_GROWTH}\cdot D^-$	a_{15}	−	−	-0.090	-5.042 ***	0.014	0.502	0.001	0.034
(16)[c]	$D_{high\_GROWTH}\cdot D^-$	a_{16}	+	+	0.219	6.175 ***	-0.029	-0.879	0.084	2.804 **
(17)[d]	$D_{inc\_earnings}\cdot\Delta d_t^+$	a_{17}	−	+	6.344	3.708 ***	8.078	4.208 ***	8.364	5.007 ***
(18)[d]	$D_{dec\_earnings}\cdot\Delta d_t^+$	a_{18}	?	−	-3.179	-0.788	0.933	0.164	-6.576	-1.530
(19)[d]	$D_{inc\_earnings}\cdot\Delta d_t^-$	a_{19}	+	+	3.053	2.011 *	3.550	1.385	2.689	1.374
(20)[d]	$D_{dec\_earnings}\cdot\Delta d_t^-$	a_{20}	?	−	3.202	0.995	0.741	0.111	-6.240	-1.657
(21)[d]	$D_{inc\_earnings}\cdot D^+$	a_{21}	−	+	0.040	3.274 **	0.068	4.329 ***	0.064	4.765 ***
(22)[d]	$D_{dec\_earnings}\cdot D^+$	a_{22}	?	−	-0.095	-3.615 ***	-0.094	-2.674 **	-0.059	-2.039 *
(23)[d]	$D_{inc\_earnings}\cdot D^-$	a_{23}	+	+	0.065	4.279 ***	0.092	4.843 ***	0.091	5.426 ***
(24)[d]	$D_{dec\_earnings}\cdot D^-$	a_{24}	?	−	-0.001	-0.052	0.007	0.216	-0.006	-0.336
(25)[d]	$D_{low\_cash}\cdot\Delta d_t^+$	a_{25}	−		0.078	0.033	-5.677	-2.098 *	-0.738	-0.340
(26)[d]	$D_{high\_cash}\cdot\Delta d_t^+$	a_{26}	+		2.447	0.710	6.994	1.437	3.232	0.844
(27)[d]	$D_{low\_cash}\cdot\Delta d_t^-$	a_{27}	+		2.481	1.348	7.856	2.101 *	5.407	2.127 *
(28)[d]	$D_{high\_cash}\cdot\Delta d_t^-$	a_{28}	−		-2.256	-0.838	-4.486	-0.806	-1.756	-0.518
(29)[d]	$D_{low\_cash}\cdot D^+$	a_{29}	−		-0.019	-1.069	-0.020	-0.859	-0.032	-1.632
(30)[d]	$D_{high\_cash}\cdot D^+$	a_{30}	+		-0.005	-0.219	0.039	1.472	0.003	0.134
(31)[d]	$D_{low\_cash}\cdot D^-$	a_{31}	+		-0.012	-0.577	-0.025	-0.858	-0.022	-0.877
(32)[d]	$D_{high\_cash}\cdot D^-$	a_{32}	−		-0.037	-1.686	-0.033	-1.102	-0.038	-1.644
(33)[d]	$D_{low\_equity}\cdot\Delta d_t^+$	a_{33}	−		-11.661	-5.545 ***	-6.461	-2.459 *	-7.765	-3.900 ***
(34)[d]	$D_{high\_equity}\cdot\Delta d_t^+$	a_{34}	+		2.550	0.910	-0.680	-0.191	-1.467	-0.423
(35)[d]	$D_{low\_equity}\cdot\Delta d_t^-$	a_{35}	+		-1.436	-0.955	0.053	0.019	0.408	0.195
(36)[d]	$D_{high\_equity}\cdot\Delta d_t^-$	a_{36}	−		3.291	1.253	-4.010	-0.850	5.889	1.628
(37)[d]	$D_{low\_equity}\cdot D^+$	a_{37}	−		-0.030	-1.722	0.001	0.048	0.010	0.539
(38)[d]	$D_{high\_equity}\cdot D^+$	a_{38}	+		-0.017	-0.802	-0.028	-1.059	-0.047	-1.966 *
(39)[d]	$D_{low\_equity}\cdot D^-$	a_{39}	+		-0.014	-0.495	-0.027	-0.620	0.027	0.850
(40)[d]	$D_{high\_equity}\cdot D^-$	a_{40}	−		0.043	1.848	0.059	1.800	0.029	1.024
	adj. R^2				0.525		0.506		0.498	

*, **, *** Significant at the 5%, 1%, and 0.1% levels (two-tailed test), respectively.

Note: [a] An expected sign represents a hypothesis regarding a sign of a coefficient. t-values are based on White (1980)'s heteroskedasticity- consistent standard errors. Samples include 18,489 firm-years respectively ending in March, from 1994 to 2007, which meet specific requirements.

[b] MVE_t is market value of equity at the end of June (stock price at the end of June, three months after the closing date × total number of shares issued at the end of term). b_t is the book-value of equity at the end of the current term, and x_t is the current earnings. The current dividend (d_t) is divided into dividend in the previous term (d_{t-1}) and the chage in current dividend. Furthermore, the change in current dividend is divided into current dividend increases (Δd_t^+) and current dividend decreases (Δd_t^-) (the current dividend decrease is converted to an absolute value). The change in earnings in the next term ($E_t(\tilde{x}_{t+1})$) is earnings forecast for the next term minus current net income. The management forecast of earnings for the next

(*Continued*)

(-*Continued*)

term, which is announced at the same time of the annual earnings announcement, is used as the earnings forecast for the next term. A dummy of dividend increase in the next term (D^+) is given 1 in case of forecasting a dividend increase in the next term, otherwise 0. A dummy of dividend decrease in the next term (D^-) is given 1 in case of forecasting a dividend decrease in the next term, otherwise 0. The dividend increases and decreases in the next term are judged with a sign of [management forecast of dividend for the next term – current dividend] (per share). The management forecast of dividend per share is also announced at the same time of the annual earnings announcement. I generally use consolidated data. If there is no consolidated data, non-consolidated data (parent-only data) is used as a substitute for it. Each variable is divided by market value of equity at the end of June in the previous year, and data after eliminating outliers in the upper and lower 0.5% (upper 0.5% for dividend) for each fiscal year is used. Control variables (β value estimated using a firm's rate of return minus market return (TOPIX) for 60 months ending by the end of June in the current year and year dummies) are inclued but omitted for simplicity.

[c] GROWTH of (9)-(16) represent three patterns of proxy variables with regard to growing stages (price to book-value ratio (PBR), sales growth ratio (SGR), ratio of ordinary income to sales (MARGIN)). For example, in case of using the PBR as growth, $D_{low\_BROWTH} \times \Delta d_t^+$ represents the interaction term obtained by multiplying Δd_t^+ by the low PBR dummy to be given 1 if falling into the lower 10% (per fiscal year) of [market value of equity at the end of June (stock price at the end of June, three months after the closing date × total number of shares issued at the end of term)/book value of equity at the end of term], otherwise 0. On the contrary, D_{high_GROWTH} is a dummy to be given 1 if falling into the upper 10% (per fiscal year) of the PBR, otherwise 0. In case of using SGR and MARGIN as GROWTH, samples are limited to those with values of these scales at 0 or more (n =11,530, 17,205), and the same dummy as the PBR stated above is set. The dummy of SGR to be multiplied Δd_t^+ and Δd_t^- is set based on [(current sales – sales in the previous year)/sales in the previous year], and the dummy of MARGIN based on [current ordinary income/current sales]. Meanwhile, the dummy of SGR to be multiplied D^+ and D^- is set based on [(sales forecast for the next term – current sales)/current sales], and the dummy of MARGIN is set based on [ordinary income forecast for the next term/sales forecast for the next term] (the forecasts by managers for the next term are also used, which is announced at the same time of earnings announcement).

[d] $D_{inc\_earnings}$ of (17)-(24) represents the dummy to which 1 is given if the current earnings increase and earning increases in the next term are forecasted, otherwise 0 (earning increase dummy). $D_{dec\_earnings}$ represents the dummy to which 1 is given if the current earnings decrease and earning decreases in the next term are forecasted, otherwise 0 (earning decrease dummy) (on net income basis). D_{low_cash} to be multiplied Δd_t^+ and Δd_t^- of (25)–(32) is the dummy to which 1 is given if falling into the lower 10% (each fiscal year) of [liquidity on hand (cash and securities) at the end of the previous term/total assets at the end of the previous term], otherwise 0 (dummy of low liquidity on hand ratio). D_{high_cash} is the dummy to which 1 is given if falling into the upper 10% (each fiscal year) of the liquidity on hand ratio, otherwise 0. The dummy of liquidity on hand ratio to be multiplied D^+ and D^- is set based on [liquidity on hand at the end of current term/total assets at the end of current term]. D_{low_equity} to be multiplied Δd_t^+ and Δd_t^- of (33)–(40) is the dummy to which 1 is given if falling into the lower 10% (each fiscal year) of [book-value of equity at the end of the previous term/total assets at the end of the previous term], otherwise 0 (dummy of low TE). D_{high_equity} is the dummy to which 1 is given if falling into the upper 10% (each fiscal year) of the TE, otherwise 0. The dummy of TE to be multiplied D^+ and D^- is set based on [book-value of equity at the end of current term/total assets at the end of current term].

vectors are discounted.[38]

Next, with regard to the relationship with excess funds, since the significance level varies depending on which variable is adopted as GROWTH, it cannot be considered robust evidence. Meanwhile, in the relationship with the capital structure, it is notable that the coefficient of dividend increases by firms with a low TE (a_{33}) is estimated to be significantly negative at the 5% level at least. When such firms are defined as growing firms, this result can be considered consistent with that predicted by the life-cycle theory. However, it can be also considered that the market will worry about further deterioration of financial conditions when a firm with excessively low TE (firms with poor

[38] The coefficient of dividend decreases by firms with decreasing earnings (a_{20}) is estimated to be negative (while the significance level is low) in case of using MARGIN, and the coefficient of dividend increases by firms with decreasing earnings (a_{22}) is estimated to be significantly negative in any case. These facts are consistent with the forecast of the hypothesis based on the corroboration effect.

financial conditions) increases dividends (the financial condition theory).[39]

6. Additional Analysis

In the fifth section, we find that dividend increases by growing firms are more appreciated, but those by mature firms are less appreciated. On the other hand, while dividend decreases by mature firms are additionally depreciated, but those by growing firms are less depreciated. The result of dividend decreases is consistent with the prediction by the dividend life-cycle theory. But the theory can not explain the result of dividend increases. In that regard, when using the concept of corroboration effect, we can consistently interpret the above mixed results. In this section, to clarify why we got the above relationship between change in dividends and stock prices, I verify the ability of dividends to predict future earnings.

Figure 1 compares the time-series of ROE (median[40])[41] of dividend-increasing and decreasing firms for total five fiscal terms before and after the term ($-2 \leq t \leq 2$) with those of control firms (stable dividend-paying firms). The relevant fiscal term of firms that changed dividends (dividend-increasing firm and dividend-decreasing firm) are defined as [t = 0]. Samples are common to the third section (898 dividend-increasing firms, 196 dividend-decreasing firms, and 1,917 stable dividend-paying firms).

According to this figure, firms with permanent and significantly high ROE increase dividends (at the 5% level, two-tailed test, and so forth).[42] Compared with the previous term, in general, ROE of dividend-increasing firms significantly increases every fiscal term. Time series of ROE of dividend-increasing firms in and after the next term supports the signaling theory strongly, at least, regarding dividend increases. This finding contrasts with the result of Grullon et al. (2002) analyzing the US market.[43] Meanwhile, ROE of dividend-decreasing firms is significantly lower than that of stable dividend-paying firms only in the current and next terms.[44] However, after significantly falling in the current term, ROE of dividend-decreasing firms show a significant upward tendency in the next term, and still sharply rise in the term after the next term.[45] Two years later, the significant difference from stable dividend-paying firms is disappeared.

Figure 1 shows that dividend increasing firms actually experience good performance in future.

[39] In this section, I conducted additional tests in the following conditions, and the empirical results regarding interaction terms of GROWTH are generally robust. (1) A case of limiting samples to firms with their fiscal year ending in March during the period from 2005 to 2007 when a number of firms increased dividends. (2) A case including a interaction terms obtained by multiplying dividends in the previous term and changes in earnings in the next term by a GROWTH dummy in dependent variables. (Since the correlation coefficient of interaction terms of equity and dividends in the previous term, and the correlation coefficient of interaction terms of the current earnings and changes in earnings in the next term are high, the former interaction term is respectively excluded.) (3) A case of limiting samples to firms with the PBR at 1 or over when adopting that ratio as GROWTH. (4) A case of eliminating interaction terms regarding vectors of changes in earnings, which contain data similar to GROWTH. (5) A case of using a mean value of SGR (over the past three years) or AGR (0 or over) as GROWTH. (6) A case of using net financial assets (= liquidity on hand –debt with interest) as a proxy variable of excess funds in place of liquidity on hand. (7) A case of using the retained earnings ratio (=retained earnings/book-value of equity) in place of liquidity on hand or the equity capital ratio.

[40] By using ROA or average, we can see similar results. See Ishikawa (2010).

[41] Figures 1-3 present the simple average of results of each fiscal year ending in March, from 2002 to 2005.

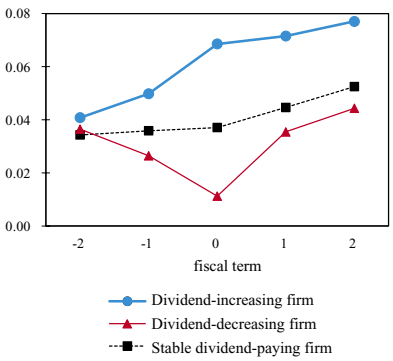
[42] I examine differences in the median of ROE between dividend-increasing (decreasing) firms and stable dividend-paying firms by fiscal term. The Mann-Whitney test with independent samples is used to examine differences in median. In addition, I examine differences in median of the time-series of ROE of dividend-increasing firms (dividend-decreasing firm, stable dividend payment) themselves. The Wilcoxon signed-rank test with related samples is used to examine differences in median.

[43] This finding is robust even if using ROA that Grullon et al. (2002) uses.

[44] But as for the next term, the level of significance is merely 10%.

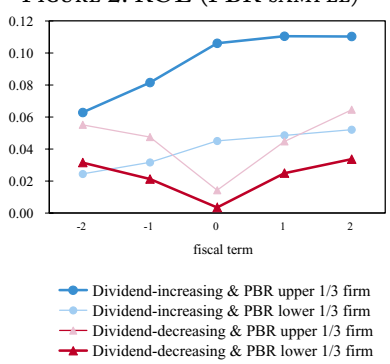
[45] This tendency on dividend-decreasing sample is consistent with Grullon et al. (2002).

Figure 1: ROE (full sample) [a]



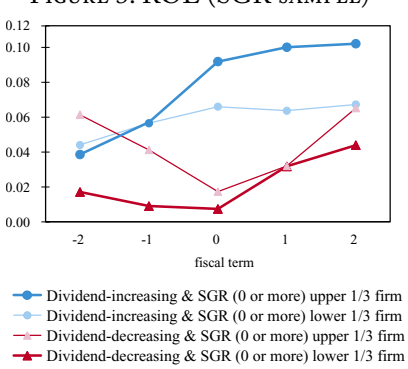
Note: [a] ROE = current net earnings/average book-value of equity. The relevant fiscal term that firms increase or decrease dividends isdefined as [t = 0]. Samples are common to Table 1.

Figure 2: ROE (PBR sample) [a]



Note: [a] a ROE = current net earnings/average book-value of equity. The relevant fiscal term that firms increase or decrease dividends is defined as [t = 0]. For example, dividend-increasing & PBR upper 1/3 firm is dividend-increasing firm falling into the upper 1/3 of PBR out of Figure 1.

Figure 3: ROE (SGR sample) [a]



Note: [a] ROE = current net earnings/average book-value of equity. The relevant fiscal term that firms increase or decrease dividends is defined as [t = 0]. For example, dividend-increasing & SGR (0 or more) upper 1/3 firm is dividend-increasing firm falling into the upper 1/3 of SGR (0 or more) out of Figure 1.

Dividend decreasing firms also suffer bad performance at least in the next term. Then, do those dividend increasing (decreasing) firms supported by growing (maturity) achieve *better* (*worse*) performance? Figure 2 shows the time-series of ROE (median) of dividend-increasing and decreasing firms falling into the upper and lower 1/3 of PBR (per fiscal year). Figure 3 is the result using SGR.

Regardless of using PBR or SGR as a growth variable, ROE of dividend increasing & growing firms is significantly higher than that of dividend increasing & mature firms in and after the current term. Also, as far as we look at Figure 2, ROE of dividend decreasing & mature firms is lower than that of dividend decreasing & growing firms in and after the current term. Dividend increasing (decreasing) firms corroborated by growing (maturity) actually experience better (worse) performance in future.[46] This is the reason why the market additionally appreciates dividend increases by growing firms and penalizes dividend decreases by mature firms. These results are consistent with the implication of corroboration effect.

7. Summary and Conclusion

Hanaeda and Serita (2008) sent questionnaires to firms in May 2006 and collected them by the end of June 2006. Then, they conducted the survey on ideas of Japanese firms to formulate the payout policy by analyzing 629 firms that responded to their questionnaires and met certain requirements. In response to the question "Is it acceptable for you to decrease dividends if you need funds to implement necessary investment projects?," 24.2% answered Yes, and 46.1% answered No.[47] In response to the question directly related to the dividend life-cycle theory, "Is there a possibility that dividend increases are regarded by investors as the evidence that your firm does not have so many investment opportunities?", 12.1% answered Yes and 45.5% answered No. These results suggest the possibility that the life-cycle theory has not been accepted by Japanese firms as dividends are not

[46] This finding is supported by the below estimated results using the same sample as the third section (t-values based on White (1980)'s heteroskedasticity-consistent standard errors are in parentheses).

(1) ΔROE_{t+1} = 0.019 − 0.743 · ΔROE_t − 0.591 · ROE_{t-1} + 0.884 · ΔDOE^+_t
(6.770)*** (−12.817)*** (−11.520)*** (2.277)*
− 1.662 · ΔDOE^-_t − 5.245 · D_{low_GROWTH} · ΔDOE^+_t + 4.871 · D_{high_GROWTH} · ΔDOE^+_t
(− 1.300) (−2.238)* (4.992)***
−4.721 · D_{low_GROWTH} · ΔDOE^-_t − 13.056 · D_{high_GROWTH} · ΔDOE^-_t.
(− 2.098)* (− 2.048)*
adj.R^2 = 0.280. (in case of using PBR as GROWTH)

(2) ΔROE_{t+1} = 0.019 − 0.747 · ΔROE_t − 0.586 · ROE_{t-1} + 1.409 · ΔDOE^+_t
(5.169)*** (−11.232)*** (−10.583)*** (1.998)*
− 6.748 · ΔDOE^-_t − 1.758 · D_{low_GROWTH} · ΔDOE^+_t + 3.462 · D_{high_GROWTH} · ΔDOE^+_t
(− 1.416) (−2.361)* (3.072)**
+ 5.102 · D_{low_GROWTH} · ΔDOE^-_t +0.098 · D_{high_GROWTH} · ΔDOE^-_t.
(1.083) (0.019)
adj.R^2 = 0.260. (in case of using SGR as GROWTH).

The coefficient of ΔDOE^+_t (ΔDOE^-_t) is estimated to be significantly positive (negative, but the level of significance is low) (ΔDOE^-_t is converted to a positive value by adding an absolute value to it). This means that change in dividend in the current term has an ability to predict change in earnings in the next term. Moreover, the coefficient of an interaction term, that is D_{high_GROWTH} · ΔDOE^+_t (D_{low_GROWTH} · ΔDOE^-_t) is estimated to be significantly positive (negative, in case of (1)). This result shows that the dividend increases (decreases) corroborated by growing (maturity) has an additional earnings increases (decreases) predictability, consistent with the implication of corroboration effect.

[47] This result is consistent with the fact that 84.3% of the firms answered that it is important to not lower the amount of dividend per share (4.5% answered No). It suggests the downward rigidity of dividends and the significance of dividends to Japanese firms. For information on surveys in US, see Brav et al. (2005).

influenced by the status of investment opportunities.

The empirical result of this study supports the result of the survey research shown above. In the fourth section, we did not obtain the result that mature firms select more dividend increases than growing firms. If assuming that ROA is a proxy variable representing the quality of investment opportunities or defining a firm with increasing earnings as a growing firm, I obtain the opposite result that growing firms select more dividend increases. The fifth section presents the evidence that while these dividend increases by growing firms are more highly appreciated than those by others, dividend increases by mature firms are less appreciated. These findings are not consistent with the prediction by the dividend life-cycle theory, but can be interpreted using the concept of corroboration effect.

Dividend increases represent a manager's confidence in good performance in future. Indices such as a high PBR and a high SGR can be considered as signals supporting it from different viewpoints. When both signals have the same vector, the dividend increase is considered highly reliable and more preferable. On the contrary, dividend increases with different vectors is less effective in increasing stock prices. In fact, the sixth section presents the evidence that profitability of dividend-increasing firms supported by high growing is actually more improving in and after the next term than that with different vectors. In Japan, dividend increases by highly growing firms become a highly reliable signal with regard to the improvement in future profitability. This is the reason why dividend increases by highly growing firms are additionally appreciated.

The dividend life-cycle theory has not been accepted by Japanese firms and markets, at least under the research design and samples in this study. But this result does not suggest that growing firms should increase dividends at a cost of investment. If investment is sacrificed, earnings will decrease in future. As a result, it is apparent that the firm value itself will deteriorate. In that case, scales of growth such as PBR and SGR, etc. are also likely to deteriorate. A firm that sacrifices investment for future growth cannot be called a growing firm any more. With the evidence shown here, we should consider that dividend increases after securing investment for growth are additionally appreciated.

REFERENCES

AHARONY, J., AND I. SWARY. 1980. Quarterly dividend and earnings announcements and stockholders' returns: An empirical analysis. *The Journal of Finance* 35 (March): 1-12.

ASQUITH, P., AND D. W. MULLINS, JR. 1983. The impact of initiating dividend payments on shareholders' wealth. *The Journal of Business* 56 (January): 77-96.

BAJAJ, M., AND A. M. VIJH. 1990. Dividend clienteles and the information content of dividend changes. *Journal of Financial Economics* 26 (August): 193-219.

BRAV, A., J. R. GRAHAM, C. R. HARVEY, AND R. MICHAELY. 2005. Payout policy in the 21st century. *Journal of Financial Economics* 77 (September): 483-527.

CHANG, S. J., AND S. N. CHEN. 1991. Information effects of earnings and dividend announcements on common stock returns: Are they interactive? *Journal of Economics and Business* 43 (May): 179-192.

CHAREST, G. 1978. Dividend information, stock returns and market efficiency – II. *Journal of Financial Economics* 6 (June/September): 297-330.

CHENG, L. T. W., AND T. Y. LEUNG. 2006. Revisiting the corroboration effects of earnings and dividend announcements. *Accounting and Finance* 46 (June): 221-241.

COLLINS, D. W., E. L. MAYDEW, AND I. S. WEISS. 1997. Changes in the value-relevance of earnings and book values over the past forty years. *Journal of Accounting and Economics* 24 (December): 39-67.

COLLINS, D. W., M. PINCUS, AND H. XIE. 1999. Equity valuation and negative earnings: The role of book value of equity. *The Accounting Review* 74 (January): 29-61.

DAMODARAN, A. 2006. *Applied Corporate Finance: A User's Manual*. Second Edition. New York, NY : John Wiley & Sons.

DeAngelo, H., and L. DeAngelo. 2006. The irrelevance of the MM dividend irrelevance theorem. *Journal of Financial Economics* 79 (February): 293-315.

DeAngelo, H., L. DeAngelo, and D. J. Skinner. 2000. Special dividends and the evolution of dividend signaling. *Journal of Financial Economics* 57 (September): 309-354.

DeAngelo, H., L. DeAngelo, and R. M. Stulz. 2006. Dividend policy and the earned/contributed capital mix: A test of the life-cycle theory. *Journal of Financial Economics* 81 (August): 227-254.

Easton, S. 1991. Earnings and dividends: Is there an interaction effect? *Journal of Business Finance and Accounting* 18 (January): 255-266.

Fama, E. F., and K. R. French. 2001. Disappearing dividends: Changing firm characteristics or lower propensity to pay? *Journal of Financial Economics* 60 (April): 3-43.

Grullon, G., and R. Michaely. 2002. Dividends, share repurchases, and the substitution hypothesis. *The Journal of Finance* 57 (August): 1649-1684.

Grullon, G., R. Michaely, and B. Swaminathan. 2002. Are dividend changes a sign of firm maturity? *The Journal of Business* 75 (July): 387-424.

Hanaeda, H., and T. Serita. 2008. Dividend policy and repurchase of Japanese firms: Verification using survey data. *Gendai Finance* (*Contemporary Finance*) 24 (September): 129-160 (in Japanese).

Ishikawa, H. 2005. Flexibility of commemorative dividends and dividends manipulation. *Working Paper,* Osaka City University.

Ishikawa, H. 2007. *Dividend Policy: An Empirical Analysis*. Tokyo, JAPAN : Chuokeizai-sha (in Japanese).

Ishikawa, H. 2010. *Dividend Policy: Empirical Analysis on Corroboration Effects*. Tokyo, JAPAN : Chuokeizai-sha (in Japanese).

Jensen, M. C. 1986. Agency costs of free cash flow, corporate finance, and takeovers. *The American Economic Review* 76 (May): 323-329.

Julio, B., and D. L. Ikenberry. 2004. Reappearing dividends. *Journal of Applied Corporate Finance* 16 (Fall): 89-100.

Kane, A., Y. K. Lee, and A. Marcus. 1984. Earnings and dividend announcements: Is there a corroboration effect? *The Journal of Finance* 39 (September): 1091-1099.

Lie, E. 2000. Excess funds and agency problems: An empirical study of incremental cash disbursements. *The Review of Financial Studies* 13 (January): 219-248.

Michaely, R., R. H. Thaler, and K. L. Womack. 1995. Price reactions to dividend initiations and omissions: Overreaction or drift? *The Journal of Finance* 50 (June): 573-608.

Ohlson, J. A. 1995. Earnings, book values, and dividends in equity valuation. *Contemporary Accounting Research* 11 (Spring): 661-687.

Ohlson, J. A. 2001. Earnings, book values, and dividends in equity valuation: An empirical perspective. *Contemporary Accounting Research* 18 (Spring): 107-120.

Pettit, R. R. 1972. Dividend announcements, security performance, and capital market efficiency. *The Journal of Finance* 27 (December): 993-1007.

White, H. 1980. A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica* 48 (May): 817-838.