Adjustment Behaviours of Dividend Payouts in G7 Countries: A Different Look

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ABSTRACT

The topic of the dividend adjustment behaviours of firms in G7 countries was analysed in this study. After dividing the entire sample of firms into countries and separating listed, delisted, and unlisted firms by their listing type, we investigated the question using quantile regressions. Our analyses provided the following results. First, payout ratios showed decreasing tendencies irrespective of both country origin and listing types. Second, the speeds of dividend adjustment in Japan and Italy were estimated to be the fastest by quantile, whereas that of Canadian firms was estimated to be the slowest. Third, when the same issue was examined for listing types, unlisted firms showed the fastest speed of adjustment. In general, the estimated curves for both the speed of adjustment and the required time for partial adjustment were found to be cross-sectionally unstable and nonlinear with respect to dividend levels.

Keywords: *Dividend Policy; G7 market; Speed of Adjustment; Quantile Regression*
JEL Classifications: *G1; G3; C3*

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I. INTRODUCTION

Since Lintner proposed the partial adjustment model for dividend policies of US corporations in 1956, the study of finance has seen numerous theories appear on corporate dividend behaviours. Those theories include dividend irrelevance theory, residual dividend policy, the agency and free cash flow hypothesis, asymmetric information and signalling theory, the behavioural explanation of dividends, firm life-cycle theory, and catering theory (Baker, 2009). Despite the existence of these dividend theories, Lintner's model has been continuously the subject of empirical investigations. Examples can be found in studies by Lee and Kau (1987), Behm and Zimmermann (1993), Brav, Graham, Harvey, and Michaely (2004), Benzinho (2004), Short, Zhang, and Keasey (2004), Khan (2006), Aivazian, Booth, and Cleary (2006), and Hanyunga and Stephens (2008).

Upon reviewing these research findings from the perspective of the speed of adjustment, methodology, and data type, we find several differences in the results and, at the same time, implications for future research. First, different studies report different speeds of adjustment. For example, Lintner reports 0.30, Fama and Babiak (1968) 0.32 to 0.37, Lee and Kau (1987) 0.24, and Behm and Zimmermann (1993) 0.26. Studies after 2000 also report varying speeds of dividend adjustment. Fama and French (2002) report 0.33, Short et al. (2004) 0.38, Brav et al. (2004) 0.33, Benzinho (2004) 0.35, Aivazian et al. (2006) 0.24, and Hanyunga and Stephens (2008) 0.04. Second, ordinary least squares and panel data regression analyses have been the major analytical tools in previous studies. Most studies including Brav et al. (2004) and Renneboog and Trojanowski (2005) depend on panel data regression analyses, whereas the studies by Fama and Babiak (1968) and Dorsman, van Montfort, and Vink (1999) depend on OLS for their analysis. In addition, it is often found that both types of methodologies have been simultaneously used in the same analysis, as in the study by Goergen, Renneboog, and Correia da Silva (2005). Third, listed firms have been the main data source in previous studies because of data availability and the trustworthiness of estimates. In this context, studies by Fama and French (2001) and von Eije and Megginson (2007) stand out in the sense that they examine the dividend policies of newly listed firms.

Considering the preceding discussions, this study aims to examine the corporate adjustment behaviours of dividend policies in G7 countries. To solve these problems, two major aspects will be emphasised in the investigation process: methodological difference and firms' list-type. First, quantile regression will be the major analytical tool in this paper. The reason for its use is that corporate adjustment behaviours of dividend payout can be different depending on dividend-payout propensity. This means that the adjustment pattern of dividend payout will not be stable cross-sectionally or across firms. This existence of cross-sectional instability in dividend adjustment patterns and the possible use of new methodologies such as quantile regression have been pointed out by earlier studies, including Dorsman et al. (1999), and Brav et al.(2004). For example, Dorsman et al. (1999) analysed Lintner's model for the Dutch data at 10%, 30%, 50%, 70%, and 90% quantiles, and Brav et al. (2004) presented their results according to percentiles. Second, not only listed firms but also delisted and unlisted firms will be used in the analysis. One of the aims of this study is to investigate possible differences in dividend payout behaviours by listing type. Common sense has it that unlike delisted and unlisted firms, firms listed on the stock exchanges enjoy easier access to financial markets, wider distributions in their stock ownership, and higher and favourable reputation effects. Thus, we expect listed firms to have more flexible adjustment patterns compared to delisted and unlisted firms. One reason for this lack of previous literature on delisted and unlisted firms is data unavailability, and this scarcity can be regarded as indicating a need for research by listing type.

This paper is organised as follows. The methodology of the paper will be introduced in Section 2, and empirical results will be explained in Section 3. Section 4 concludes the paper.

II. MODEL

2.1 Estimation of Speed of Adjustment (SOA)

The estimation of the speed of adjustment consists of two stages. In the first stage, the target dividend payout ratio at time *t+1* is defined by using the information at time *t*.

$$\begin{aligned} DVN^*_{i,t} &= c_i + \beta_1 Tangibility_{i,t-} + \beta_2 LT\_Debt_{i,t-1} + \beta_3 Current\_Ratio_{i,t-1} \\ &+ \beta_4 Corporate\_Tax_{i,t-1} + \beta_5 \Pr ofitability_{i,t-1} + \beta_6 Firm\_Size_{i,t-1} + \varepsilon_{i,t} \end{aligned} \quad (2.1)$$

where $DVN^*_{i,t}$ was set as target dividend payout. Independent variables include asset tangibility (*Tangibility*), long-term debt ratio (*LT_Debt*), current ratio ($Current\_Ratio$), corporate tax rate ($Corporate\_Tax$), profitability (*Profitability*), and firm size ($Firm\_Size$). These variables are expected to influence dividend payout ratios as follows. (1) Asset tangibility is defined as (fixed asset/total asset)*100 and can be regarded as a proxy for investment in physical assets. As investment in physical assets increases, firms' cash surpluses will decrease and result in decreases in dividends. (2) The long-term debt ratio is defined as (long-term debt/total asset)*100. Higher debt ratios imply lower dividend payouts because firms will pay higher interest expenses and have lower financial surpluses (Aivazian et al., 2003). (3) Current ratio is defined as (current asset/current liabilities). Higher current ratios imply that it is possible for firms to pay higher levels of dividend payout with a higher liquidity level. (Hanyunga and Stephens, 2008; Anil and Kapoor, 2008) (4) The corporate tax rate, computed as (corporate tax/earnings after tax)*100, will decrease dividend payouts because higher corporate taxes imply lower cash surpluses (Anil and Kapoor, 2008). (5) The effect of profitability on dividend payout is expected to be negative because a higher rate of return on assets will induce firms to have a higher propensity to retain earnings. This variable is defined as (earnings after tax/total asset)*100, following Fama and French (2002) and Anil and Kapoor (2008). (6) Finally, firm size is measured as a natural logarithm of total sales. This variable is expected to have positive influence on firms' propensity to pay dividends because firms greater in size will have easier access to financial markets and institutions (Silva et al., 2008; von Eije and Megginson, 2008; Bancel, Bhattacharyya, and Mittoo, 2009).

In the second stage, the speed of adjustment will be estimated by using the target ratio set in the first stage. Equation (2.2) measures how much actual adjustment in dividend payout has been made compared to the target.

$$DVN_{i,t} - DVN_{i,t-1} = \alpha_i + \delta_i (DVN^*_{i,t} - DVN_{i,t-1}) + \varepsilon_{i,t}, \quad (2.2)$$

where $DVN_{i,t}$ is the actual dividend payout ratio, defined as (earnings after tax/total asset)*100, following Leary and Michaely (2008) and Aivazian et al. (2003). And, α_i is expected to be positive because firms will not decrease their current dividend levels. However, firms in fact sometimes do cut dividends, also those firms what usually try to smooth dividends. If $\delta_i(DVN^*_{i,t} - DVN_{i,t-1})$ is sufficiently negative, then left-hand side of (2.2) may become negative even with α_i>0. Then, δ_i is defined as the speed of adjustment toward the target dividend payout ratio. This speed of adjustment from regression (2.2) may be understood in conjunction with the dividend smoothing process, as interpreted by Cahit (2008). The target dividend payout will change according to firms' characteristics, as stated in (2.1). In addition, increasing δ_i s imply that firms' actual dividend adjustment will be made very quickly. If the value δ_i equals one, firms will immediately adjust their actual dividend levels to the target levels. This means, in other words, that firms will not seek dividend-smoothing policies. As the value of δ_i approaches zero, firms will not respond to changes in the target dividend levels. Thus, when the value δ_i is normally located between zero and one, firms will restrain their immediate responses in dividend adjustment or will follow dividend smoothing policies (Hanyunga and Stephens, 2008; Leary and Michaely, 2008). To facilitate empirical tests, we transform Equation (2.2) into Equation (2.3) as follows:

$$DVN_{i,t} = \alpha_i + (1-\delta_i)DVN_{i,t-1} + \delta_{i,t}DVN^*_{i,t} + \varepsilon_{i,t}\,, \qquad (2.3)$$

where the null hypothesis $H_0 : 1-\delta_i = 0$ or $H_0 : \delta_i = 1$. If δ_i is estimated to be less than one and the null hypothesis is rejected, it indicates that firms are likely to follow dividend smoothing policies. Our study used quantile regressions for empirical analysis. We did this because we believed that different firms would display different payout propensity and adjustment behaviours, depending on their dividend levels. For example, firms with relatively low payout propensity may attempt to increase their dividend levels, whereas those with higher payout propensity may try to lower their dividend levels. We set target level $DVN^*_{i,t}$ as the forecast value at 50% quantile because we assumed that firms would follow market averages. The adjustment speeds may differ depending on the distribution of dividend payout propensities, which will result in varying speeds of adjustment. We believe that this can be explained more appropriately with the use of quantile regressions because quantile regressions can explain the cross-sectional differences in dividend adjustment behaviours.

III. DATA AND EMPIRICAL RESULTS

3.1 Data

We obtained data for this study from OSIRIS, a sub-database of WRDS (http://wrds.wharton.upenn.edu). The period of 16 years from 1991 to 2006 was covered in the data, and, in the initial database, all available firms in G7 countries were included: Canada, France, Germany, Italy, Japan, the UK, and the US. This initial dataset was then divided into seven groups by the firms' countries of origin and into three groups by their listing types: listed, delisted, or unlisted. In this study, the terminology 'listed firms' refers to firms that kept their listings from 1991 through 2007 or firms that were first listed on the stock exchange during this period and were still listed as of 2007. In contrast, we mean 'delisted firms' by firms that stopped listing on a stock exchange during the data period because of bankruptcies or other reasons. For instance, U.S. firms begin delisting procedures when they do not meet continued listing standards, such as share distribution requirements, market value requirements, or price requirements. Finally, the terminology 'unlisted firms' includes firms that are not registered as listed firms on an exchange, because of their not meeting listing requirements such as asset size. For example, in the UK, some of the required conditions for initial listing include having a market value of more than ￡700,000 and a minimum 25% distribution of stocks held by the public. Frequency distributions, descriptive statistics and time series behaviour of (dividend/total assets) ratio by quantiles are reported in <Table 3-1>, <Table 3-2>, <Table 3-3>, <Figure 3-1>, <Figure 3-2>, and <Figure 3-3>.

3.2 Empirical Results

1) Descriptive Statistics

[<Table 3-1> about here]

<Table 3-1> reports the frequency distributions for the sample companies in G7 countries by year and by listing type. For example, shaded label 'a' indicates that the numbers of listed, delisted and unlisted firms for the UK

are, respectively, 1,373, 736, and 14 in 2002. Similarly, label 'b' indicates that the total sample for Japan comprises 31,144 listed firms, 4,861 delisted firms, and 77 unlisted firms. The total numbers of sample data for Canada, France, Germany, Italy, Japan, the UK, and the US reached 15,375, 9,893, 9,391, 2,371, 36,082, 28,312, and 101,074, respectively. The same database by listing type included 148,758 listed firms, 48,692 delisted firms, and 5,045 unlisted firms.

[<Table 3-2> and <Table 3-3> about here]

In <Table 3-2>, we report the average and standard deviation of each independent variable, together with the number of firms according to payout ratios. For example, label 'e' indicates that the average value and the standard deviation of the current ratio are 2.18 and 8.71, with the number of dividend-paying firms at 20,490 when the payout ratio ranges from 25 to 50%. Major findings include the following. (1) The proportion of non-paying firms is significantly high. For example, the number of non-paying firm sample data for the variable debt ratio is 85,921, whereas that of dividend-paying firms is 51,243. The firm size variable can be taken as another example. In all the available data, the number of non-paying firms is 92,264, whereas that of dividend-paying firms is 53,585. (2) Non-paying firms turned out to have higher debt ratios and lower profitability, corporate tax rate, and firm size. It is expected that lower profitability will decrease dividend payments because of reduced cash flow. Firms with low profitability will have lower corporate tax rates, which will very often result in zero dividend payments. Firms with higher debt ratios bear the burden of outlays of more interest expenses, which will reduce their cash surpluses for dividend payout. In addition, firms with lower sales are more likely to offer less or no payout because those firms will not have a great amount of cash surplus. <Table 3-3> presents descriptive statistics for the independent and dependent variables for all dividend-paying firms. The shaded area ‘f’ indicates that the median, standard deviation, skewness and kurtosis of the variable corporate tax rate are 24.6329, 468.90, 61.06, and 4459.5, respectively, with the corresponding number of firms being 11,332.

[<Figure 3-1> and <Figure 3-2> about here]

The time series of median payout ratios for all firms are illustrated by country in <Figure 3-1>. The demonstrated overall tendency was that the median payout ratios decreased over time. In the early 1990s, the German and the UK firms maintained higher payout ratios, and all other countries maintained similar payout levels, with the exception of the US. In the mid-1990s, the country with the highest overall payout ratio was Germany, followed by the UK, and the remaining rankings for payout ratios were Japan, France, Italy, Canada, and the US. Japan has had the highest payout ratio since 2002, followed by France. In contrast, the median payout ratio of US firms during the entire data period was zero. This can be attributed to the fact that the number of US firms increased over the period and the number of non-dividend-paying US firms also increased. This finding corresponds to that of Fama and French (2001), who claim that newly-listed US companies required more funds for investments and therefore had less capacity to pay dividends. <Figure 3-2> also illustrates the time series of median payout ratios by listing type. Firms with no dividend history were excluded from the analysis. The levels of the payout ratios of the unlisted firms were the highest, followed by those of delisted firms and then those of listed firms. The payout ratios of all three types of firms decreased over time regardless of their list types.

[<Figure 3-3> about here]

<Figure 3-3> illustrates time series of dividend/total assets ratios over the entire data period by quantiles. The ratios at all quantiles showed decreasing tendencies after 1999 or 2000, and, in particular, the ratios at higher quantiles such as 80% or 90 % decreased considerably, compared with other quantiles. For example, the (dividend/total assets) ratio at 70% quantile in 1994 was 2.9374% whereas it was 1.7706% in 2003. In contrast, the ratios at 10%, 20%, and 30% quantiles were not so different between 1990s and 2000s. For example, the ratio at 20% quantile in 1991 was 0.6619% whereas it was 0.5579% in 2006.

2) Estimation of Speed of Adjustment and Time for Partial Adjustment

[<Table 3-4> and <Figure 3-4> about here]

<Table 3-4> presents the estimated speeds of dividend adjustment to the target levels for seven countries. We set the dividend target level as the forecast value at 50% quantile by assuming that firms would follow market average levels. The speed of adjustment for French firms was reported as 0.2573 at the 60 % dividend quantile. The speeds of adjustment showed non-linear patterns over all quantile ranges: At the low level of the 10% quantile, the speed of adjustment was 0.2730. The speed continued to drop as the quantile increased until it hit

the bottom at the 50% quantile. The speed was estimated to have the lowest value of 0.2236 at the 50% quantile and to gradually increase to 0.5047 and 0.8772 at the 80% and 90% quantiles, respectively. In general, the speeds of adjustment at lower quantiles of the dividend-to-total assets ratio distribution were slower than those at higher levels are. Detailed results by country are as follows: the speeds of dividend adjustment for Japan marked the fastest speeds up to the 60% quantile, and beyond the quantile, the adjustment speed was estimated to be the highest for Italy. Canadian firms, however, turned out to have the lowest adjustment speeds throughout all quantiles. The rankings for speeds of adjustment listed, in descending order, Japan, Italy, the UK, France, Germany, the US, and Canada at the 50% quantile.

This result can be re-interpreted from the perspectives of corporate governance and legal systems as well. The speeds of adjustment of bank-based countries such as Japan and Italy were higher than those of market-based countries such as the US and Canada. It is known that the US and Canada belong to common law countries whereas Italy and Japan belong to civil law countries. However, this does not say that the speeds of adjustment of bank-based countries are always higher than those of market-based countries. When we compared SOAs between the UK and French firms, the UK firms turned out to have faster speed of adjustment. In general, estimates were higher in higher quantiles of dividend per total assets than they were in lower quantiles. This can be confirmed in <Figure 3-4>. Using the speeds of adjustment in <Table 3-4>, we were able to compute the periods of time to the target dividend/total asset ratios. With the speed of adjustment (or SOA) estimated as $\delta_{i,t}$, the time for half-life adjustment was calculated as $\log 0.5/\log(1-\delta_{i,t})$, suggested by Elsas and Florysiak (2010). For instance, if the adjustment speed is 0.2573, the time for partial half-life adjustment could be computed as 2.3302, or $\log 0.5/\log(1-0.2573)$. This means that it took French firms at the 60% quantile 2.33 years to reach the half-life of the target dividend level at the adjustment speed of 25.73% per year. Other numbers can be interpreted in a similar way. One point to note is that the speeds of adjustment at 90% quantile for Japan and Italy were 1.0468 and 1.5343, respectively—both estimates beyond one. The economic significance of these estimates is that the actual dividend adjustment exceeded the expected amount of adjustment to the target level. We were able to compute the periods of time required for a half-life adjustment by using the estimated speeds of adjustment from <Table 3-4>.

[<Table 3-5> about here]

The test results for time for half-life adjustment are presented in <Table 3-5>. The case of Japan can be used for further explanation. The speed of adjustment and the time to partial half-life adjustment were computed to be 0.5023 and 0.9934 at the 50% quantile. This indicates that the actual annual adjustment against each year's target dividend level is 50.23% on average and that it takes 0.9934 years to reach that target level. The speeds of adjustment and the consequent periods of time for partial half-life adjustment were computed in a similar way. For example, adjustment periods for Canadian firms were estimated to be the longest across all quantiles except for the 10% quantile. However, the periods of time required for partial adjustment in France and Japan did not differ greatly from quantile to quantile.

[<Table 3-6> and <Figure 3-5> about here.]

[<Table 3-7> about here.]

The results for our second major topic are presented in <Table 3-6>. <Table 3-6> reports the speeds of adjustment for all dividend-paying firms by their list types, and their estimated speeds are illustrated in <Figure 3-5>. The findings from these results are indicated as follows: (1) the adjustment speeds of unlisted firms were estimated to be the fastest at all quantiles and (2) the adjustment speeds of listed firms were higher that those of delisted firms beyond the 50% quantile level. The second finding is partly consistent with the expectation that firms listed on the stock exchange can have easier access to financial markets and institutions, thereby enjoying a greater advantage with regard to financing activities than the delisted firms. The overall pattern for the speed of adjustment was at low quantiles relatively low, irrespective of listing status. The speeds of adjustment were estimated to be the lowest around the 50% quantile, and the speed began to increase beyond that level in a non-linear fashion. <Table 3-7> reports the periods of time required for partial half-life adjustment. The partial adjustment period for delisted firms at the 60% quantile was computed as 2.5737 years or $\log 0.5/\log(1-0.2361)$.

[<Table 3-8> and <Table 3-9> about here.]

<Table 3-8> reports test results for the stability of the speeds of adjustment. Shaded areas indicate whether the estimated coefficients at two different quantiles are significantly different at 5% significance level. When looking at the results, we find that significant differences were found between coefficients at quantiles higher than 60% and other quantiles. This can be interpreted as evidence against cross-sectional stability in the speeds of adjustment or adjustment behaviours of cross-sectional dividend policy. <Table 3-9> shows test results for the symmetry hypothesis $H_0 : \delta(\tau) + \delta(1-\tau) - 2\delta(0.5) = 0$. Reported results can be interpreted as evidence against stability in the cross-sectional speeds of dividend adjustment, except for the coefficients at 40% and 60% quantiles.

IV. CONCLUDING REMARKS

The following results were obtained from the preceding analysis. First, median payout ratios showed decreasing tendencies irrespective of country origins and listing types. Second, speeds of dividend adjustment were estimated to be much higher for high dividend quantiles than for low and middle quantiles. The speeds of adjustment of firms in Japan and Italy turned out to be relatively higher whereas that of Canadian firms entailed low estimates for all quantiles. The cross-sectional patterns for the estimated speeds of adjustment were non-linear and unstable with respect to dividend quantiles. Third, the speed of adjustment was estimated to be the fastest for unlisted firms in all quantiles. The speeds of adjustment by listing types were also shown to be nonlinear and unstable for all dividend quantiles. This study has contributed to the dividend literature in two respects: (1) it has been indicated that varying speeds of dividend adjustment in previous studies could be explained using quantile regressions, and (2) the effects of listing types and country origins on both speeds of adjustment and periods of time required for partial adjustment have been examined.

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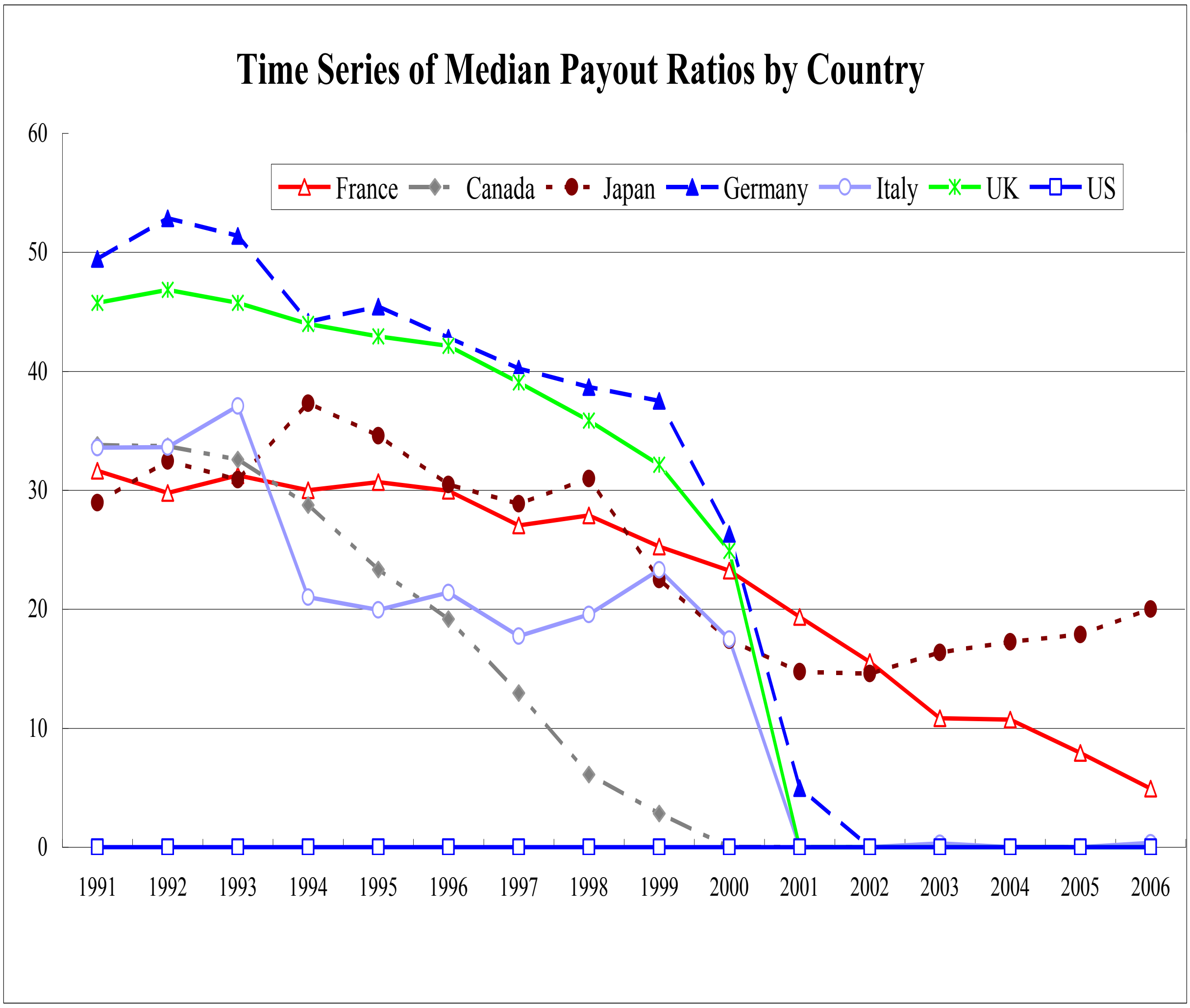
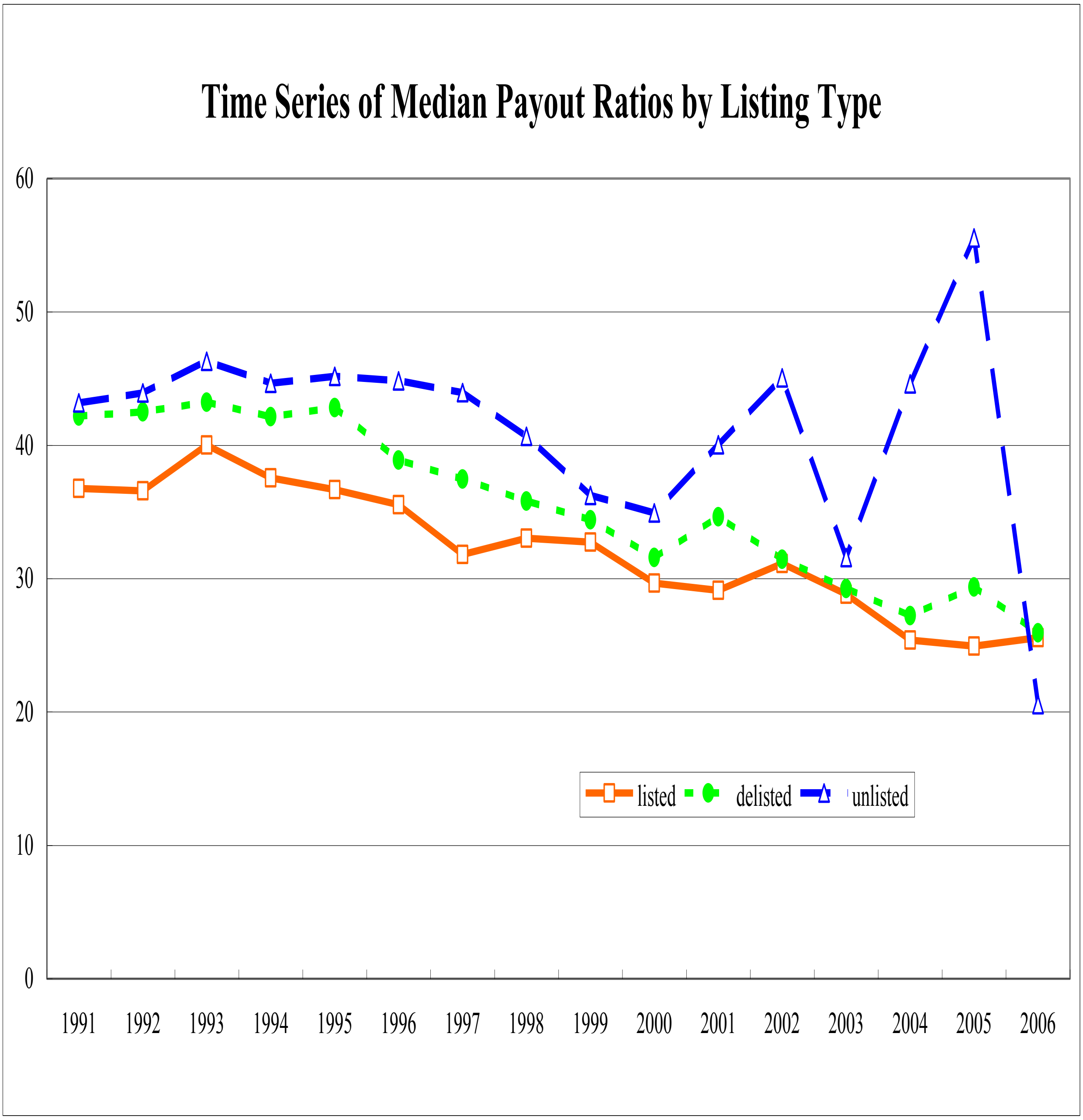
Tables and Figures

<Figure 3-1> Time Series of Median Payout Ratios by Country



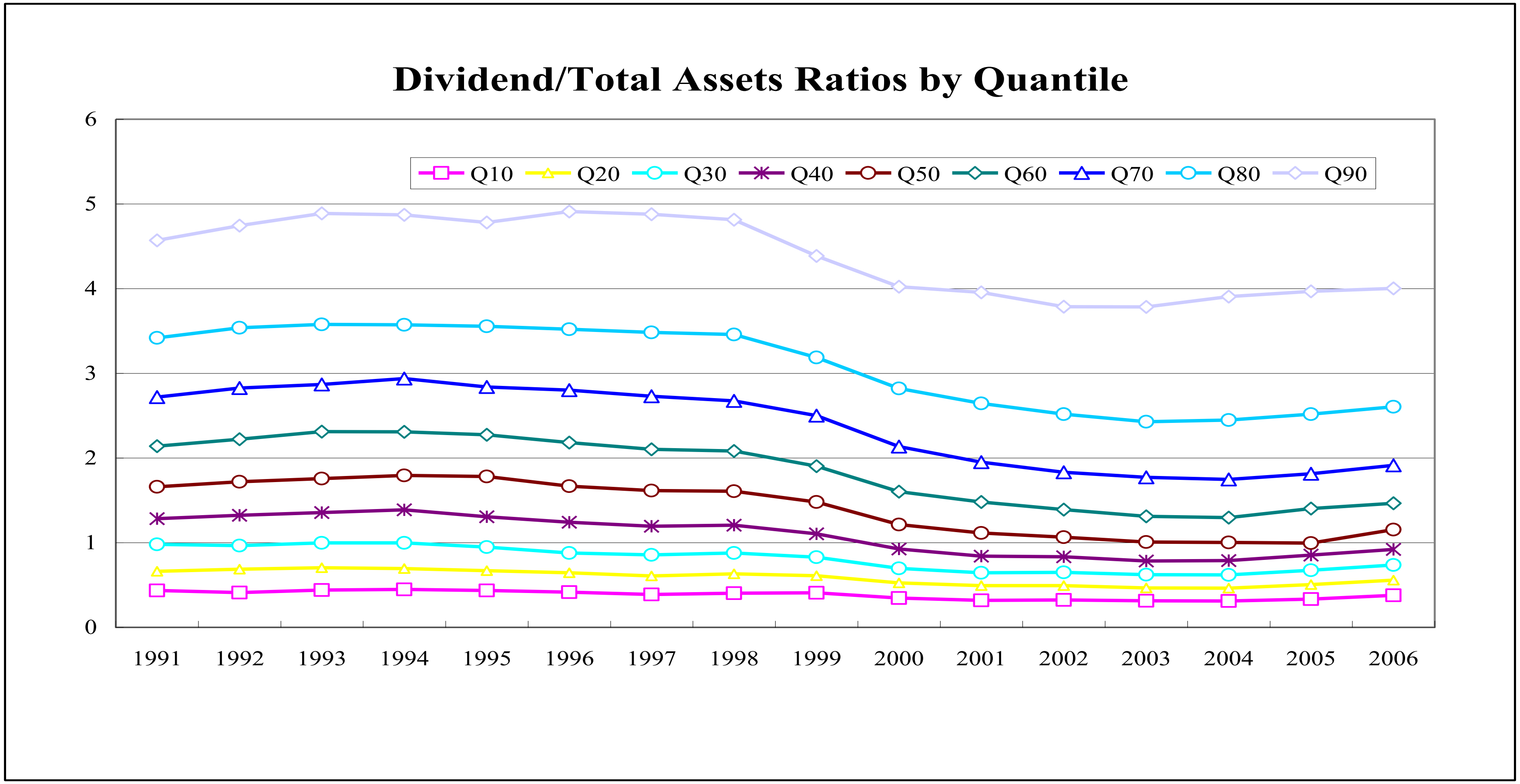
This figure illustrates time series of payout ratios from 1991 to 2006 for entire sample firms in G7 countries. Payout ratios are calculated as (dividend/earnings after tax)*100, and median payout ratios are illustrated in the figure. For example, in 1996, the median payout ratios for Germany, UK, Japan, France, Italy, Canada and US were, respectively, 42.82%, 42.93%, 30.48%, 29.95%, 21.39%, 19.17%, and 0%. The median payout ratio for US firms is zero. This indicates that more than 50% of the entire sample firms did not pay cash dividends. We see in this graph that the median payout ratios for six countries decreased over the data period. In particular, the payout ratio of Japan showed relatively stable patterns over the period.

<Figure 3-2> Time Series of Median Payout Ratios by Listing Type



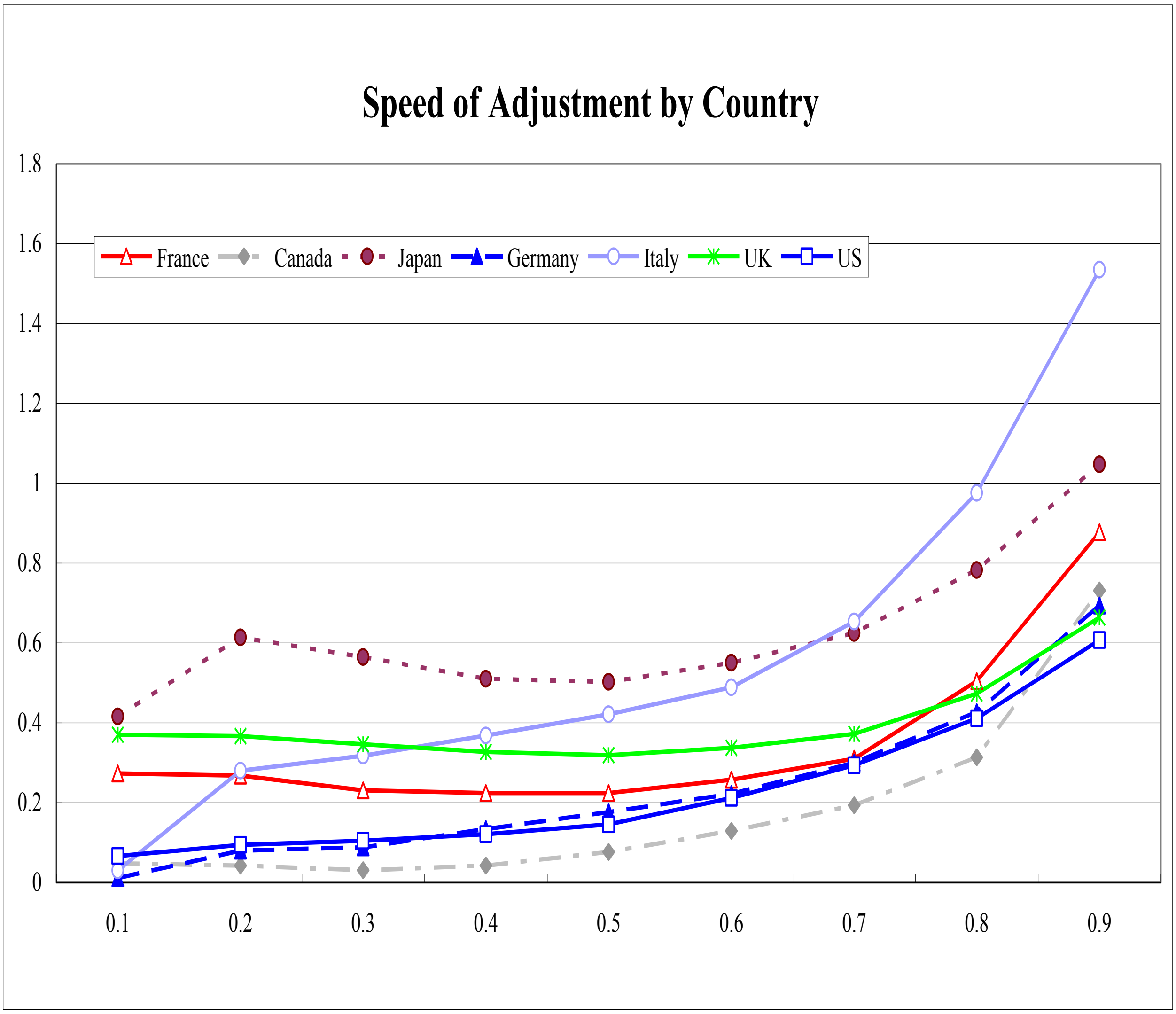
This graph illustrates time series of payout ratios for listed, delisted, and unlisted firms. The median payout ratios were calculated from the selected sample firms that paid dividends. Firms with zero dividend payout ratios were excluded from the analysis. The figure shows that the median payout ratios tend to decrease irrespective of listing status. For example, the median payout ratio for listed firms in 1991 was 36.76%. In 2006, however, it was 25.58%. We see in this figure that the median payout ratio of unlisted firms was the highest, followed by that of delisted firms; listed firms maintained the lowest payout ratios over the period. For example, in 2000, the median values for unlisted, delisted, and listed firms were 34.92%, 31.59%, and 29.66%, respectively.

<Figure 3-3> Time Series of (Dividend /Total Assets) Ratios by Quantile



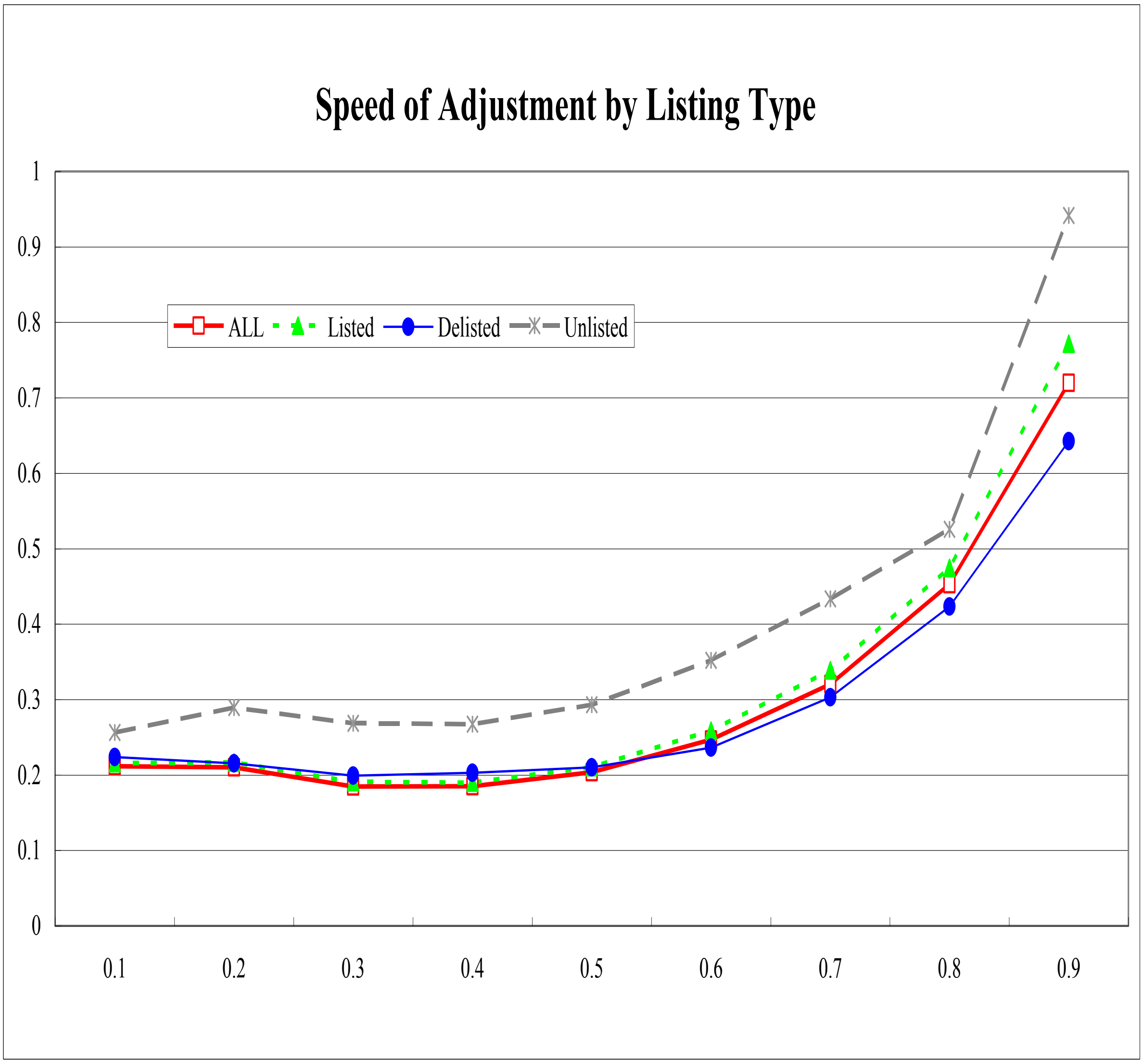
The ratios of (dividend/total asset)*100 are illustrated by year and quantile. For example, the ratio at 30% quantile in 2000 was 0.9253% whereas, in 2005, it was 2.5170% at 80% quantile.

<Figure 3-4> Estimated Speeds of Adjustment by Country



This figure illustrates speeds of dividend adjustment for firms in G7 countries from 1991 to 2006. The speeds of adjustment were computed as (2.2). Upon looking at the figure, we find the non-linear and unstable patterns of adjustment speeds with respect to dividend level quantiles. We set target level $DVN^*_{i,t}$ as the forecast value at 50% quantile because we assumed that firms would follow market averages. Generally speaking, the speeds of adjustment for G7 countries increased as the dividend quantiles increased. For example, the speeds of adjustment for Italian firms increased from 0.0298 at the 10% quantile, to 0.2800, 0.3172, 0.3678, 0.4209, 0.4888, 0.6532, 0.9752, and 1.5343 at the 20%, 30%, 40%, 50%, 60%, 70%, 80%, and 90% quantiles. Up to the 60% quantile, the speed of adjustment for Japanese firms recorded the highest levels, whereas at higher quantiles, that of Italian firms recorded the highest speed. Throughout all dividend quantiles except for 10% and 90% quantiles, the speed of adjustment for Canadian firms was the lowest.

<Figure 3-5> Estimated Speeds of Adjustment by Listing Type



This figure illustrates speeds of adjustment for firms in G7 countries according to their list types. We set target level as the forecast value at 50% quantile because we assumed that firms would follow market average levels. It shows that the speed of adjustment of unlisted firms is the fastest, whereas up to the 40% quantile, the speed of adjustment of delisted firms was the slowest. For example, the speeds of adjustment were 0.2686, 0.199, and 0.1906 for unlisted, delisted, and listed firms, respectively, at the 30% quantile. In general, the curves for speeds of adjustment are unstable and nonlinear with respect to dividend/total asset quantiles. The speeds of adjustment are slower at lower quantiles than at higher quantiles, irrespective of listing types. At middle quantiles such as 30%, 40% or 50% quantile, the speeds of adjustment were the lowest. For example, the speeds of adjustment were 0.2157, 0.2165, 0.1906, 0.1900, 0.2105, 0.2587, 0.3385, 0.4745, and 0.7716 at 10%, 20%, 30%, 40%, 50%, 60%, 70%, 80%, and 90% quantiles.

<Table 3-1> Data Frequencies by Listing Type and by Year, LISTED, [DELISTED], (UNLISTED)

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	Total
Canada	89 [95] (45)	114 [129] (54)	128 [154] (58)	184 [210] (79)	247 [263] (87)	295 [295] (83)	314 [305] (58)	462 [460] (51)	546 [482] (50)	649 [451] (35)	818 [443] (31)	1019 [455] (27)	1114 [401] (26)	1223 [338] (25)	1380 [236] (21)	1451 [113] (11)	9802 [4830] (740)
France	158 [157] (167)	168 [159] (131)	173 [162] (119)	197 [186] (93)	219 [198] (67)	252 [207] (50)	296 [223] (37)	395 [237] (18)	514 [271] (13)	532 [258] (10)	535 [206] (8)	593 [148] (8)	641 [117] (9)	670 [82] (10)	666 [49] (7)	660 [18] (4)	6650 [2492] (751)
Germany	147 [94] (69)	156 [104] (62)	173 [108] (63)	182 [117] (63)	192 [115] (59)	240 [135] (55)	321 [146] (45)	467 [176] (53)	574 [206] (56)	603 [184] (54)	586 [142] (46)	598 [108] (36)	612 [76] (33)	658 [49] (29)	678 [28] (31)	651 [13] (28)	6809 [1801] (781)
Italy	27 [23] (27)	25 [19] (23)	27 [22] (22)	28 [20] (12)	43 [28] (15)	53 [39] (13)	65 [42] (11)	64 [44] (6)	96 [45] (4)	129 [50] (1)	148 [46] (0)	153 [40] (0)	177 [28] (1)	224 [26] (1)	243 [19] (1)	238 [9] (1)	1733 [500] (138)
Japan	138 [118] (15)	128 [111] (14)	195 [139] (9)	273 [153] (6)	479 [188] (5)	602 [217] (5)	679 [233] (4)	752 [251] (3)	1172 [301] (1)	1583 [326] (0)	1962 [385] (0)	2875 [467] (4)	6112 [592] (4)	6467 [545] (4)	6671 [469] (3)	6814 [366] (3)	31144 [4861] (77)

																	b
UK	327 [474] (307)	377 [502] (291)	438 [579] (310)	533 [704] (313)	624 [824] (268)	674 [869] (205)	804 [956] (132)	889 [984] (57)	968 [908] (33)	1081 [850] (20)	1258 [834] (14)	1373 [736] (14) a	1467 [595] (12)	1661 [475] (13)	1924 [353] (12)	2113 [183] (9)	1547 8 1082 6 (200 8)
US	2824 [1077] (6)	3070 [1220] (6)	3413 [1379] (9)	3917 [1577] (9)	4329 [177 8] (28)	463 1 [189 6] (36)	4971 [200 8] (59)	5286 [208 2] (72)	5529 [212 9] (95)	5711 [214 4] (84)	5603 [176 5] (56)	5806 [142 2] (28)	5825 [110 1] (28)	5901 [867] (17)	6054 [627] (10)	5951 [310] (8)	7714 2 2338 2 (550)

<Table 3-2> Descriptive Statistics (Categorised by Payout Ratio for All Sample Firms)

	0	0-5%	5-10%	10-25%	25-50%	50-75%	75-90%	90-95%	95-100%
Tangibility	45.78 (28.10) [94801]	61.36 (27.64) [2016]	54.23 (26.52) [3588]	48.77 (23.64) [16388]	49.33 (23.64) [20502]	55.09 (25.72) [9014]	61.98 (27.76) [3272]	66.72 (28.82) [937]	70.28 (29.05) [1240]
Debt Ratio	50.14 (1972) [85921]	15.13 (16.05) [1739]	14.06 (14.37) [3247]	12.94 (13.55) [15252]	13.88 (13.87) [18631]	17.14 (15.64) [7950]	19.38 (17.66) [2734]	19.85 (16.89) [744]	19.73 (18.63) [946]
Current Ratio	4.19 (17.49) [94852]	4.22 (27.64) [2016]	2.76 (13.09) [3565]	2.35 (11.61) [16355]	. 218 e (8.71) [20490]	2.47 (14.77) [9000]	2.92 (13.82) [3268]	3.19 (13.55) [931]	4.66 (30.88) [1233]
Tax Rate	8.52 (637) [73250]	21.86 (33.95) [1641]	36.38 (699.4) [3115]	33.19 (166.92) [15063]	24.58 (1000) 19090	29.58 (149.5) [8264]	87.22 (2934) [2919]	41.47 (507) [768]	11.86 (305) [963]
Profitability	-212.63 (6151) [94801]	12.46 (20.34) [2038]	8.64 (7.16) [3588]	6.59 (5.05) [16388]	6.10 (5.11) [20502]	5.08 (5.71) [9014]	4.73 (3.25) [3272]	6.19 (29.49) [937]	14.79 (75.48) [1240]
Firm Size	10.48 (2.91) [92264]	14.33 (2.95) [1549]	15.04 (3.03) [3181]	15.16 (3.19) [15655]	14.16 (3.20) [20003]	13.66 (3.15) [8609]	13.40 (3.25) [2870]	13.25 (3.25) [737]	12.86 (3.05) [981]

Numbers in each cell are average, (standard deviation), and [the number of firms] in the range. For example, numbers in the shaded area indicate that the average current ratio, its standard deviation, and the number of firms are, respectively, 2.18, 8.71, and 20490, when the dividend payout ratio (dividend/after tax earnings)*100 is between 25-50%.

<Table 3-3> Descriptive Statistics (for dividend-paying firms)

Variables	Median	S.D.	Skewness	Kurtosis	No. of Firms
DVD/TA					
List	1.1339	2.9773	11.0187	228.19	42404
Delist	1.7025	2.4483	4.0043	36.795	12462
Unlist	1.9717	3.0693	13.2989	361.53	2062
Tangibility					
List	49.9006	24.7914	0.1934	2.2004	42404
Delist	49.4858	26.9034	0.0992	1.9351	12462
Unlist	50.8236	27.8684	0.0288	1.8243	2062
Debt Ratio					
List	10.5086	14.5972	1.5482	7.5049	38940
Delist	12.9951	15.0384	1.5926	10.1409	10588
Unlist	10.3336	14.2060	1.8381	7.7524	1677
Current R.					
List	1.52	14.4718	38.1019	1822.17	42298
Delist	1.45	6.2018	39.2009	1946.39	12454
Unlist	1.42	26.5904	26.2362	788.88	2058
Tax Rate					
List	30.9839	714.75	-180.03	34574	38576
Delist	24.6329	468.90	61.06	4459.5	11332
Unlist	22.5026	3610.6	43.2309	1874.4	1885
Profitability					
List	4.5876 f	6.1724	4.5425	57.7778	42404
Delist	5.1341	8.9416	-23.05	2243.5	12462
Unlist	5.0326	5.4026	5.5097	85.3827	2062
Firm size					
List	14.9857	3.2268	3.2268	2.3585	39989
Delist	12.4653	2.8633	0.6467	3.0732	11742
Unlist	12.2258	2.3402	0.3979	4.2286	1777

Numbers in the shaded area indicates that the average value, standard deviation(S.D.), skewness and kurtosis, and the number of sample firms are, respectively, 4.5876, 6.1724, 4.5425, 57.7778, and 42404 for the profitability variable of the listed firms. DVD/TA is the ratio of (dividend/total asset)*100.

<Table 3-4> Estimated Speeds of Adjustment by Country

Quantile	France	Canada	Japan	Germany	Italy	UK	US
Q10	0.2730	0.0475	0.4159	0.0109	0.0299	0.3701	0.0658
	(11.785)	(2.287)	(29.30)	(1.370)	(3.114)	(28.12)	(3.279)
Q20	0.2676	0.0426	0.6139	0.0080	0.2800	0.3663	0.0942
	(13.498)	(2.228)	(36.42)	(3.949)	(1.8381)	(23.56)	(2.769)
Q30	0.2309	0.0309	0.5647	0.0883	0.3172	0.3459	0.1042
	(7.747)	(1.854)	(2.159)	(3.992)	(1.823)	(16.29)	(3.483)
Q40	0.2237	0.0424	0.5098	0.1337	0.3678	0.3269	0.1211
	(11.071)	(2.113)	(2.449)	(4.284)	(2.011)	(13.34)	(4.122)
Q50	0.2236	0.0767	0.5023	0.1758	0.4209	0.3185	0.1454
	(10.411)	(2.943)	(2.722)	(7.667)	(1.996)	(15.74)	(5.628)
Q60	0.2573	0.1292	0.5504	0.2218	0.4888	0.3375	0.2114
	(10.335)	(4.751)	(3.914)	(7.379)	(2.023)	(13.52)	(6.86)
Q70	0.3098	0.1933	0.6244	0.2999	0.6532	0.3718	0.2938
	(10.112)	(3.901)	(4.253)	(6.636)	(2.998)	(15.42)	(5.386)
Q80	0.5047	0.3135	0.7820	0.4268	0.9752	0.4732	0.4111
	(13.166)	(6.003)	(4.832)	(10.62)	(4.014)	(15.56)	(19.24)
Q90	0.8772	0.7313	1.0468	0.6937	1.5343	0.6638	0.6066
	(11.968)	(8.630)	(5.924)	(8.159)	(3.422)	(19.74)	(69.17)

The estimates reported in this table are the speeds of dividend adjustment with their t-statistics from Equation (2.2). The shaded numbers indicate that the speed of adjustment and the standard deviation are, respectively, 0.2999 and 6.636 at the 70% quantile for German firms. The speeds of adjustment for Italian and Japanese firms at the 90% quantile were computed as 1.0468 and 1.5343, respectively. This means that the dividend adjustment has been made more than the required amount to the target dividend ratio. Figures in the parentheses are t-statistics.

<Table 3-5> Time Required for Half-life Adjustment by Country

Quantile	France	Canada	Japan	Germany	Italy	UK	US
Q10	2.1740	14.2432	1.2891	63.2442	22.8339	1.4997	10.1836
Q20	2.2257	15.9220	0.7283	86.2964	2.1160	1.5195	7.0059
Q30	2.6402	22.0836	0.8334	7.4980	1.8166	1.6329	6.2991
Q40	2.7374	15.9987	0.9722	4.8295	1.5116	1.7509	5.3697
Q50	2.7388	8.6859	0.9934	3.5851	1.2688	1.8076	4.4412
Q60	2.3302	5.0104	0.8671	2.7641	1.0330	1.6835	2.9186
Q70	1.8695	3.2269	0.7078	1.9441	0.6545	1.4909	1.9926
Q80	0.9866	1.8427	0.4550	1.2455	0.1875	1.0815	1.3091
Q90	0.3305	0.5274	N/A	0.5858	N/A	0.6359	0.7429

The numbers in this table indicates the required time to partial half-life adjustment by country. The shaded number 1.9441 indicates that it will take German firms 1.9441 years at the 70% quantile to reach the half of the target (dividend/total asset) ratio as set by (2.2). The speed of adjustment was computed 0.2999 in <Table 3-4>, and the time to partial adjustment was computed as $\log 0.5 / \log(1-0.2999)$.

<Table 3-6> Estimated Speeds of Adjustment by Listing Type

Quantile	All	Listed	Delisted	Unlisted
Q10	0.2118	0.2157	0.2238	0.2565
	(27.56)	(24.84)	(17.10)	(2.798)
Q20	0.2100	0.2165	0.2155	0.2894
	(11.17)	(8.83)	(12.56)	(4.479)
Q30	0.1849	0.1906	0.1990	0.2686
	(10.28)	(7.02)	(10.25)	(4.748)
Q40	0.1850	0.1900	0.2031	0.2674
	(10.81)	(8.19)	(11.36)	(3.926)
Q50	0.2038	0.2105	0.2101	0.2932
	(11.79)	(9.42)	(13.29)	(4.469)
Q60	0.2471	0.2587	0.2361	0.3518
	(13.71)	(10.54)	(11.09)	(4.526)

Q70	0.3205	0.3385	0.3029	0.4335
	(16.38)	(11.89)	(11.99)	(6.414)
Q80	0.4529	0.4745	0.4233	0.5256
	(21.02)	(14.06)	(16.55)	(7.781)
Q90	0.7196	0.7716	0.6425	0.9415
	(21.32)	(17.08)	(20.49)	(7.111)

The estimated speeds of adjustment by listing type are presented in this table. The numbers in the shaded are the speed of adjustment for listed firms at the 30% quantile and its t-statistic.

<Table 3-7> Time Required for Partial Half-life Adjustment by Listing Type

Quantile	All	Listed	Delisted	Unlisted
Q10	2.9123	2.8529	2.7359	2.3387
Q20	2.9405	2.8409	2.8559	2.0288
Q30	3.3904	3.2779	3.1238	2.2159
Q40	3.3884	3.2804	3.0532	2.2276
Q50	3.0414	2.9326	2.9389	1.9975
Q60	2.4422	2.3155	2.5737	1.5987
Q70	1.7938	1.6777	1.9209	1.2197
Q80	1.1493	1.0773	1.2593	0.9295
Q90	0.5451	0.4694	0.6739	0.2442

The number 3.2779 indicates that it will take listed firms at the 30% quantile 3.2779 years to reach the half-life of the target (dividend/total asset) ratio. The speed of adjustment was calculated as 0.1906 in <Table 3-6>, and the time required to partial half-life adjustment was computed as $\log 0.5/\log(1-0.1906)$.

<Table 3-8> Equality Tests of the Speeds of Adjustment for All Firms: $H_0 : \delta(\tau_i) - \delta(\tau_j) = 0$

j \ i	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8
0.2	0.0017 (0.9121)							
0.3	0.0269 (0.0957)	0.0252 (0.0471)						
0.4	0.0267 (0.0961)	0.0250 (0.1154)	-0.0002 (0.9894)					
0.5	0.0079 (0.0635)	0.0062 (0.7318)	-0.0189 (0.1973)	-00188 (0.072)				
0.6	-0.0353 (0.0469)	-0.0370 (0.0650)	-0.0622 (0.0004)	-0.0621 (0.0000)	-0.0432 (0.0001)			
0.7	-0.1088 (0.0000)	-0.0111 (0.0000)	-0.1357 (0.0000)	-0.1355 (0.0000)	-0.1167 (0.0000)	-0.0735 (0.0000)		
0.8	-0.2412 (0.0000)	-0.2429 (0.0000)	-0.2681 (0.0000)	-0.2679 (0.0000)	-0.2491 (0.0000)	-0.2059 (0.0000)	-0.1324 (0.0000)	
0.9	-0.5088 (0.0000)	-0.5096 (0.0000)	-0.5347 (0.0000)	-0.5346 (0.0000)	-0.5158 (0.0000)	-0.4725 (0.0000)	-0.3991 (0.0000)	-0.2666 (0.0000)

Figures in the parentheses are p-values. The differences between estimated coefficients at different quantiles are compared and presented. The shaded numbers indicate significant differences between estimated coefficients at two quantiles at the 5% significance level. For example, the difference between estimated coefficients at 40% and 60% quantile is -0.0621, computed as $\delta(0.4) - \delta(0.6)$=-0.0621. The target dividend level was forecasted at 50% quantile.

<Table 3-9> Symmetry Tests for Coefficients for All Dividend-Paying Firms

$(\tau,\ 1-\tau)$	Restricted Value	p-value
(0.1, 0.9)	0.5237	(0.0000)
(0.2, 0.8)	0.2553	(0.0000)
(0.25, 0.75)	0.1620	(0.0000)
(0.3, 0.7)	0.0978	(0.0000)
(0.4, 0.6)	0.0244	(0.1155)

The results for symmetry tests at various quantiles are reported in the table. The hypothesis here is whether the absolute values of the distances of two coefficients from the coefficient at median quantile are different. The restricted values for the hypothesis $H_0 : \delta(\tau)+\delta(1-\tau)-2\delta(0.5)=0$ were reported with the marginal significance levels. The shaded number 0.2553 is computed as $\delta(0.2)+\delta(0.8)-2\delta(0.5)$ =0.2100+0.4529-2(0.2038)=0.2553, and presented with its marginal significance level. The target dividend level was set as the forecast value at 50% quantile.