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Reputation building and the lifecycle model of dividends

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Abstract

We analyse the relationship between corporate dividend policy and firm lifecycle in a low-disclosure regime, where domestic firms have an incentive to use dividends to build capital market reputation among external investors. We use a range of lifecycle indicators from the extant literature and find that, as predicted by the lifecycle model, dividend payouts increase along the lifecycle until peaking in the mature stage. Furthermore, dividends are positively related to growth opportunities. In all lifecycle stages, firms with relatively larger growth opportunities pay relatively larger dividends. We find that firms in low-disclosure regimes, engage in reputation-building behaviour, not just in the early stages of their lifecycle but also in the mature stage.

Keywords: Dividend payout; lifecycle; retained equity; contributed equity; firm age.

Introduction

The lifecycle model of dividends postulates that a firm's dividend payout policy is a function of their lifecycle stage. Early empirical studies of dividend policy, though not explicitly focusing on the lifecycle model, identified key characteristics of dividend-paying firms that are consistent with the prediction of the lifecycle model. For example, studies by Fama and French (2001) and Grullon et al. (2005) offer indirect support for this model as they find dividend initiators exhibit mature tendencies; they are large, profitable, and have positive free cash flow for distribution to shareholders. Furthermore, Brockman and Unlu (2009) show that dividend-paying growth firms pay smaller dividends compared to dividend-paying mature firms.

DeAngelo et al. (2006) explicitly test the dividend-lifecycle relationship by employing a single lifecycle measure, namely the ratio of retained to total equity, RE/TE. They argue that as firms mature this ratio increases for two reasons. First, as firms grow and become profitable RE increases. Second, their reliance on contributed equity falls as their investment opportunity set diminishes, and this coupled with growing profitability means that firms can substitute retained for external equity. Based on a sample of U.S. firms, DeAngelo et al. (2006) present empirical evidence that corporate dividend payouts follow a distinct lifecycle pattern, with a positive monotonic relationship between RE/TE and the likelihood of paying a dividend. Mature firms with large RE/TE are most likely to pay a dividend. Subsequent studies show that this also applies to other developed markets (Denis and Osobov, 2008); and to the dividend amount and not just to the likelihood of paying a dividend (Brockman and Unlu, 2009).

A connected strand of literature relates corporate dividend policy to country-level institutions and disclosure standards. Beck et al. (2006) show that country-level institutional development is inversely related to financing obstacles, prompting firms to implement their own strategies to overcome these obstacles. Brockman and Unlu (2011) test the lifecycle-inclusive disclosure standards versions of the agency outcome and substitution models of dividends (La Porta et al., 2000) and find that the 'dividend-payout-disclosure standards' relationship is u-shaped. The probability of paying a dividend is highest when disclosure standards are either weak or strong. Where disclosure standards are weak, the costs of debt and equity capital are often prohibitively high (see Botosan, 1997; and Sengupta, 1998 for the link between disclosure quality and the cost of capital). In such countries, growth firms respond by

establishing a history of paying large dividends to foster trust with outside investors and build capital market reputation.¹ This reduces financing constraints and allows them to grow (Gan et al., 2013).² Where disclosure standards are strong, the cost of capital is lower implying that firms have less need to engage in reputation-building strategies. Therefore, we should not be surprised that the lifecycle model of dividends receives empirical support in countries with high disclosure standards, e.g. DeAngelo et al. (2006) and Denis and Osobov (2008) among others. Interestingly, Brockman and Unlu (2011) report similar findings for low-disclosure regimes. They find that the likelihood of paying a dividend increases with RE/TE but do not address the issue of whether or not the dividend amount varies over the firm lifecycle. Shao et al. (2013) show that RE/TE is positively and statistically significantly related to being a dividend payer but statistically indistinguishable from zero using dividends-to-sales (the dividend amount), in countries where creditor rights are weak. However, it remains an unanswered question if the magnitude of dividends differs between mature and growth firms in countries with low-disclosure requirements, where dividends may be used to establish capital market reputation. Arguably it is the size of the dividend that provides the strongest signal of a firm's intent to protect prospective shareholders, thus incentivising firms with greater growth potential to pay larger dividends.³

In this paper, we build on these two strands of the literature to address two issues. Firstly, we test the lifecycle model of dividends using data from Korea, a country with low-disclosure standards relative to developed markets, focusing on both the likelihood of paying a dividend and the dividend amount. Secondly, we try to reconcile the dividend-lifecycle relationship with the reputation-building strategies pursued by firms in countries with weak institutions. Ignoring reputation-building motives, the extant literature suggests that mature companies pay larger dividends than growth companies. However, where these motives are strong, early-stage firms may potentially pay comparable or larger dividends than their

¹ Using dividend payouts to build external financing capacity is also highlighted by Masters et al. (2016). Using a sample of publicly-traded U.S. firms, they show that contrary to conventional wisdom, financially constrained firms pay dividends, and increase their dividend immediately prior to a SEO announcement.

² The notion that firms can build capital market reputation using dividend payout is not new. Campbell and Turner (2011) find evidence in support of the agency substitution model of dividends in Victorian Britain.

³ Using large dividends to build reputation involves a trade-off for corporate insiders. Since expropriation risk is higher in countries with weak legal protection/disclosure standards, insiders forgo large private gains by paying large dividends rather than retaining the funds. However, if this form of reputation building is effective in reducing firm-level financing constraints, corporate insiders gain as the value of their (legal) cash flow rights increases as firms fund growth opportunities. Outside investors are prepared to fund these growth opportunities as the dividend signal is deemed both costly (for insiders) and credible. The larger the dividend the more costly it is for corporate insiders, hence the larger the signal sent to outside investors. Doidge et al. (2004) model this trade-off for firms who cross-list in the U.S. and use Level 2/3 ADRs (or an ordinary listing) as a bonding device.

more-established counterparts. In addition to the RE/TE ratio, we employ a range of lifecycle measures such as firm age, size- and industry-adjusted age, multiclass linear discriminant analysis, and the composite proxy developed by Dickinson (2011). To the best of our knowledge, no study of the lifecycle model of dividends to date has used this wide range of lifecycle indicators. Using more than one lifecycle proxy insures that our findings are not driven by one specific lifecycle measure and allows us to assess the interpretation of some of these measures in a low-disclosure regime.

Our results produce a number of interesting findings. Firstly, firms engage in reputation-building behaviour. Firms with relatively larger growth opportunities tend to pay larger dividends, in contrast to the findings for firms in more developed, high-disclosure regimes. Secondly, reputation building through dividend payout policy is not the sole preserve of early-stage firms. We find that such behaviour is also a characteristic of mature firms, i.e. mature firms with relatively higher growth opportunities continue to pay higher dividends to signal to potential investors that they are committed to protecting external providers of capital. Thirdly, the evidence supports the lifecycle model of dividends. Dividends increase over the lifecycle and peak during the mature stage. However, this story emerges because both growth- and mature-stage firms pursue reputation-building strategies.

Our paper proceeds as follows. Section 2 describes our four lifecycle proxies and contains a description of the data. Section 3 presents our empirical methodology and discusses our results. Finally, section 4 concludes.

1. Lifecycle proxies and other data

2.1 Lifecycle proxies

There are many lifecycle proxies proposed in the extant literature. Recent work suggests lifecycle proxies can conflict with one another (Von Eije and Megginson, 2008; and Banyl and Kahle, 2014), which suggests that reliance on a single lifecycle proxy is potentially problematic and/or existing proxies may be open to alternative interpretations. We use four lifecycle proxy measures. First, following DeAngelo et al. (2006), we use the ratio of retained earnings to total equity (RE/TE) (or assets, RE/TA), where total equity (TE) is the sum of retained (RE) and contributed equity. The underlying premise is that young firms have little or no retained equity and rely on contributed (external) equity, resulting in low RE/TE

ratios. In contrast, mature firms with positive net cash inflows from operations coupled with a diminishing investment opportunity set have greater access to internal funds (retained equity) and less need for contributed equity. Hence, mature firms are expected to have large RE/TE ratios.

Second, we employ the lifecycle proxy of Dickinson (2011). It classifies firms into one of five lifecycle stages, namely introduction (birth), growth, maturity, shake-out and decline based on the combined signs of net cash flows from operating, financing, and investing activities. Net cash flows can be positive or negative, resulting in eight possible cash flow combinations.⁴ Firm classification is grounded in economic theory. For example, firms in the introductory stage invest more than they divest, spend more cash than they can generate internally, and issue more capital than they retire/repurchase, resulting in negative net cash flows from investments and operations, and a positive net cash flow from financing. In our empirical application, we follow Faff et al. (2016) in combining the shake-out and decline stages.

Third, we use the multiclass linear discriminant analysis (MLDA) of Faff et al. (2016), to classify firms into one of four lifecycle stages. This approach initially follows Dickinson (2011) to allocate firms to a lifecycle stage but then refines the classification by performing linear discriminant analysis, such as:

$$\text{Group}_i = \alpha_0 + \alpha_1 \text{AGE}_i + \alpha_2 \text{RE} / \text{TE}_i + \alpha_3 \text{PROFIT}_i + \alpha_4 \text{SGrowth}_i + \varepsilon_i,$$

where age is firm age, RE/TE is the ratio of retained to total equity, PROFIT is return on assets (EBIT/Assets), and SGrowth is one-year sales growth. Using these variables, MLDA provides maximum separation between the groups. A benefit that MLDA and Dickinson (2011) has over RE/TE is that it explicitly classifies firms into a lifecycle stage. In contrast, RE/TE provides no objective cut-off point to delineate between lifecycle stages. The MLDA overcomes some of the problems inherent in the Dickinson (2011) approach and hence is expected to yield a more accurate method of allocating firms to a lifecycle stage.⁵ Thus, MLDA is our preferred lifecycle indicator and is our main reference point.

Finally, we use firm age. Many papers have suggested that firm age is an imperfect lifecycle proxy. Rather than increase monotonically with maturity, the ‘firm age-maturity’ relationship is inverted u-shaped; by definition, new firms are young in age but are also more likely to fail meaning that young firms

⁴ See Appendix 1 for these eight cash flow combinations.

⁵ Faff et al. (2016, pp. 98) provide a number of arguments as to why MLDA is a superior lifecycle classification system.

can occupy the introduction and decline lifecycle stages. The time required for firms to reach maturity varies across industries. An old firm is not necessarily a mature firm and similarly, a young firm may not be a growth firm. We use age plus industry- and size-adjusted age. Age is sourced from Black et al. (2014) and we follow Faff et al. (2016) in adjusting firm age by industry and size to account for cross-sectional age differences across industries and firm size. The adjustments are implemented by, first, assigning firms to an industry based on 2-digit SIC codes. Second, for each industry firms are sorted into size-based quintiles. Then, age is regressed on industry and size dummies. Industry- and size-adjusted firm age is calculated as the percentile rank of the residual from this age regression. Von Eije and Megginson (2008) suggest that firm age measures calendar age while RE/TE captures ‘financial age’.

2.2 Other variables

Korea is chosen as it is a large market, where firms have a strong incentive to engage in reputation-building strategies to overcome country-level barriers to investment and hence provides an interesting study of the dividend-lifecycle model in an emerging market.⁶ As a country, it has relatively low-disclosure standards. Its CIFAR score of 68 places it in the bottom tercile of the CIFAR score distribution.⁷ Furthermore, Korea of civil law origin provides relatively weak protection of minority shareholders with La Porta et al. (1998) showing that its Rule of Law and Efficiency of Judicial System scores (5.35 and 6 respectively) are well below the average for common-law countries (6.46 and 8.15 respectively) and far removed from the U.S. market (who scores 10 on each measure).

From Worldscope, we source a full list of Korean firms, both dead and alive, over the period from 1996 to 2004. Our sample stops in 2004 because we use the Black et al. (2014) corporate governance scores which are only available over this period. We exclude firms in the financial and utility industries and firms with negative total equity, missing retained equity, and missing control variables. Once we exclude firms with missing TE and RE, all firms have non-negative RE. Our final sample of firms is described in Table 1. There are 435 individual firms, providing 1,810 firm-year observations. The vast majority (86 percent) of firms are in manufacturing, 79 belong to a Chaebol (business group) and 79

⁶ Korea has been the focus of a number of influential single-country studies, e.g. Baek et al. (2004), Choe et al. (2005), Black et al. (2006) and Bae and Goyal (2010) among others.

⁷ The CIFAR disclosure index captures the accounting disclosure standards in a given country by examining annual reports for the inclusion or exclusion of 85 key items.

are cross-listed in the United States. Of the 435 firms, 48 remain in the sample throughout, while 32 are in the sample for just a single-year. The number of firm-year observations peaks at 335 in 2001.

We measure dividend payout using dividends-to-sales, dividends-to-assets, and ‘payer’. Dividends-to-sales (assets) are measured as total common dividends scaled by total sales (assets). ‘Payer’ is a binary dummy variable which equals one if the firm pays a dividend in year t and zero otherwise. It is common in empirical studies of dividend payout to control for firm-specific determinants of this policy, and we control for firms’ growth opportunities, corporate governance, total equity (as opposed to retained equity), firm size, cash holdings, profitability, asset tangibility, leverage, and cash flow uncertainty.

We use market-to-book of assets (MBA) to control for growth opportunities. Adam and Goyal (2008) show that a firm’s investment opportunity set is best proxied by MBA. We calculate the rank decile MBA on an annual basis based on a 3-year average (including the current year).⁸ La Porta et al. (2000) show that dividends can be an outcome of, or substitute for, governance and hence we include the corporate governance scores of Black et al. (2014) in our analysis. Following DeAngelo et al. (2006), we include both RE/TE and the ratio of total equity to total assets (TE/TA) in our regressions to distinguish the impact of total equity financing (TE) from the composition of equity financing (RE/TE). They find that dividend payout is positively related to both retained and total equity and hence both the composition (RE/TE) and size (TE/TA) of total equity influences dividend payout. Firm size is the rank decile of assets (in dividends-to-sales regressions) and rank decile of sales (in dividends-to-assets regressions). Cash holdings is cash to assets, profitability is measured as operating income (EBIT) to book assets, asset tangibility is gross property plant and equipment (PPE) to assets, leverage is captured by total debt to book assets, and following Chay and Suh (2009), cash flow uncertainty is measured as the standard deviation of operating income to total assets over the most recent four years. Furthermore, we include a ‘Chaebol’ dummy which is one if the firm belongs to a business group and zero otherwise. There is little consensus on the payout policies of Chaebol and non-Chaebol (independent) firms. Gul and Kealey (1999) find no difference in dividend payout between the two groups, while Hwang et al. (2013) conclude that dividends paid by Chaebol firms are lower than independent firms. In all

⁸ Gan et al. (2013) capture the “reputation-building” effect using the rank decile of sales growth (using a 5-year median). We use three as opposed to five years to reduce the attrition rate in our sample.

regressions, we include a full set of industry and time dummies. Appendix 2 describes all variables and presents summary statistics for our sample of Korean firms.

Panel B of Table 1 reports the number of firm-year observations in each lifecycle stage according to MLDA and Dickinson (2011) and the mobility of firms across the lifecycle stages. Using MLDA, there are more firm-year observations in the introduction (506) and mature (681) stages than in growth and shake-out/decline lifecycle stages (193 in growth-stages and 430 in shake-out/decline-stages). 15 firms occupy all four lifecycle stages; 76 (165) occupy 3 (2) stages, while 179 firms remain in a single lifecycle stage. Based on Dickinson's classification, the number of firm-years is 152, 412, 760, and 486 in the introduction, growth, mature, and shake-out/decline stages, respectively. Similar to MLDA, we observe a strong propensity to transit across states with 50 firms appearing in all four stages over the sample period. Only 83 firms remain in one lifecycle stage throughout, with all the others displaying some mobility across the lifecycle spectrum. Some firms exhibit a simple lifecycle progression from birth to decline, but many do not. It is not uncommon to see firms move back along the lifecycle (e.g. mature stage followed by growth stage), or skip a stage altogether. Miller and Friesen (1984) observe similar lifecycle dynamics in their five-stage lifecycle model.

Using MLDA as a benchmark, Panel C compares the lifecycle classifications. As expected, the median RE/TE and RE/TA increase as firms progress along their lifecycles, peaking during the mature stage before declining again during the shake-out/decline phase. For the Dickinson measure, we present the percentage of overlapping firm-years with the MLDA classification and we find that the degree of overlap is relatively low. For example, only 13.44% of firm-years belong to both the introduction stage according to MLDA and Dickinson. The corresponding figures for growth, mature and shake-out/decline stages are 24.35, 50.66 and 24.88%, respectively. Interestingly, it is mature, and not growth firms which score highest in terms of growth opportunities. Firm age increases monotonically as firms mature. However, if we separate shake-out from decline firms, we observe the inverted u-shaped relation between firm age and lifecycle as anticipated.

Table 2 investigates if there is any preliminary evidence consistent with reputation building. Panels A and B classify firms by growth opportunity quartiles and presents median dividend payouts for each. Panel A shows a strong positive relationship between growth opportunities and dividend payout,

consistent with reputation building. Firms in the highest MBA quartile pay the largest dividends. Panel B shows that as firms' transition across MBA quartiles, dividend payouts increase. The largest increases are observed for firms transitioning from quartile 3 to 4.

2. Discussion of results

3.1 Preliminary analysis

Table 3 groups firms into lifecycle stages using each of our four-lifecycle proxies. MLDA and Dickinson use four stages, namely introduction, growth, mature, and shake-out/decline. Using firm age, we create age quartiles. We follow Owen and Yawson (2010) and partition firms into one of three lifecycle stages, namely young, mature, and old, using RE/TE (what we term RE/TE LC). Young (old) firms belong to the group of firms in the lowest (highest) 25%. All other firms are classified as mature. Dividend payout is proxied using dividends-to-sales (%), and dividends-to-assets (%). MLDA, Dickinson, and RE/TE present a consistent story for the relationship between lifecycle stage and dividend payout policy. Dividend payout increases as firms mature, and mature/old firms pay the largest dividends of all firms. MLDA and Dickinson agree on the nature of the dividend-lifecycle relationship, although the differences in dividend payouts between lifecycle stages is more pronounced using the former. For example, using dividends-to-sales, the median growth firm pays almost the same dividend amount in both classification schemes. However, the median mature firm's dividend payout is 0.89 under MLDA, yet just 0.62 under Dickinson. The bottom rows of Table 3 say that dividend payouts fall as firms age.

In Table 4 we show how dividends change for firms who transition between lifecycle stages. We focus on transitions from introduction to growth and growth to mature (old using RE/TE) lifecycle stages, and present transitions from quartiles 1 to 2, 2 to 3, and 3 to 4, using firm age. The number of transition firms is reported in parentheses. In general, dividend payouts increase as firms transition along their lifecycle. The size of the dividend changes differs by transition type. Under MLDA, the largest increase in dividend payouts occurs when firms transition from the introduction to the growth stage. Interestingly, growth firms continue to increase dividends once they mature. Dickinson and RE/TE say that the largest change in dividend payouts is observed when young/growth firms reach the mature stage. However, since growth firms always pay larger dividends once they mature, the analysis presented in

Tables 3 and 4 present a version of the lifecycle model of dividends whereby mature firms pay larger dividends than growth firms, irrespective of the lifecycle measure employed.

3.2 *Regression based tests of the lifecycle model of dividends*

We estimate dividend payout regressions for the dividend amount (equation 1) and the likelihood of a firm paying a dividend (equation 2). The equations are specified as follows:

$$\text{Div}_{it} = \alpha_1 + \alpha_2 \text{LIFE} - \text{CYCLE}_{it} + \beta \text{Controls}_{it} + \text{Year}_t + \text{Industry}_i + e_{it} \quad (1)$$

$$\text{Pr ob}(\text{Payer}_{it} = 1) = F(\alpha_1 + \alpha_2 \text{LIFE} - \text{CYCLE}_{it} + \beta \text{Controls}_{it} + \text{Year}_t + \text{Industry}_i) \quad (2)$$

The dividend amount equations are estimated using ordinary least squares with standard errors clustered by firms (Petersen, 2009), while the payer specification is estimated using logistic regression. Each regression contains a full set of firm, industry and time controls. We include the MBA-decile in our regressions to capture reputation-building and not lifecycle effects per se, even though finance theory implies that MBA falls as firms mature.⁹

Table 5 presents our coefficient estimates from estimating equation 1 using dividends-to-sales (%) and dividends-to-assets (%). We estimate equation 1 separately for each of our lifecycle proxies. The estimated coefficient for RE/TE (and RE/TA, unreported) is positive and significant which is consistent with the lifecycle hypothesis proposed by DeAngelo et al. (2006). The same pattern emerges when we use RE/TE LC, since we observe that firms in later lifecycle stages pay larger dividends. Simultaneously, the coefficient on TE/TA is positive and highly significant, which suggests that both total equity (TE/TA) and the retained proportion of total equity (RE/TE) matter for the dividend amount. These same dividend-lifecycle patterns emerge when we use MLDA, and to a lesser extent Dickinson, to proxy for lifecycle. RE/TE is excluded where lifecycle is proxied using MLDA because MLDA uses RE/TE to classify firms to lifecycle stages. Table 5 also reports results for pairwise tests for differences in dividend payout policy across lifecycle stages. Using MLDA, dividend payouts are always larger for mature firms when compared to all other lifecycle stages.

⁹ A concern is RE/TE may be correlated with MBA and other variables capturing lifecycle effects. However, in our sample, the correlations between these variables are small (e.g. the correlation between RE/TE and MBA is just 0.13) which may explain why MBA and RE/TE are both statistically significant in our tests. One-year sales growth is not included in our regressions as sales growth and MBA are highly correlated.

Using Dickinson, mature firms pay larger dividends (as a percentage of assets) than introduction and growth firms, although the differences in dividend payouts between the lifecycle stages are much lower than those recorded for the MLDA classification. Finally, we find that dividend payouts fall as firms age – the estimated coefficient for firm age is negative and statistically significant. When we classify firms using either Dickinson or firm age and include RE/TE as a regressor, it retains its statistical significance. This finding suggests that the RE/TE variable may not be capturing all of the lifecycle effect or possibly it may be capturing a different effect.

Going beyond the lifecycle measure, we find that the estimated coefficient on the MBA decile variable is positive and statistically significant using dividends-to-sales and dividends-to-assets. This is consistent with results in Aivazian et al. (2003) for their sample of emerging market firms and that firms with abundant growth opportunities pay large dividends to build reputation and foster trust and strong bonds with external stakeholders. Few of the control variables are statistically significant. The relationship between corporate governance and dividends is positive lending support to the agency outcome model of dividends. Cash flow uncertainty is negatively related to payout. As in Hwang et al. (2013), we find that Chaebol firms pay smaller dividends than non-business group firms. Leverage and cash holdings are statistically significant determinants of dividend payout in the MLDA specification alone, where MBA decile, firm size, RE/TE, and TE/TA are excluded. None of the other control variables appear to influence dividend payout policy.

Table 6 presents the marginal effects from the logit regression (equation 2).¹⁰ RE/TE (and RE/TA, unreported) is always positive and a statistically significant determinant of the decision to pay a dividend. RE/TE LC confirms these findings by showing that mature firms are more likely to pay a dividend when compared to young firms (but not old firms). Different patterns emerge using MLDA and Dickinson. The former suggests that from growth through shake-out/decline, there is no statistical difference in the propensity to pay a dividend; while the latter has a similar finding for growth and mature firms, it finds that firms in the shake-out/decline stage pay significantly lower dividends than earlier-stage firms.

¹⁰ As a robustness test, we follow DeAngelo et al. (2006) and include an indicator variable which is 1 if the firm paid a dividend in the previous year. Estimated coefficients for RE/TE and RE/TA are reduced, sometimes by more than half, but they always remain statistically significant. Other variables are unaffected by its inclusion. Coefficients on the lagged dividend variable are always positive, consistent with the stylized fact that dividends tend to be sticky.

The estimated coefficient on the MBA decile variable which was positive and statistically significant using dividends-to-sales and dividends-to-assets, loses statistical significance in the dividend payer regressions. This implies that firms with relatively large growth opportunities are no more likely to pay dividends but when they do, they tend to be larger. In the payer regressions, it is only size, profitability, and cash flow uncertainty, and to a lesser extent TE/TA, which are consistent and reliable determinants of dividend payout. Larger firms with stable cash flows (profits) pay dividends.¹¹

In Tables 7 and 8 we explore in detail the influence of growth opportunities (MBA) on dividend payouts, and in particular on the dividend-lifecycle relationship. In Table 7 we estimate equation 1 separately for each MLDA lifecycle stage and assess the influence of the MBA decile variable on dividend payouts in each lifecycle stage. In the bottom rows of Table 7, we report the proportion of the total explained variation in dividend payouts attributable to each variable. Interestingly while we find that the growth opportunities measure is a statistically significant determinant of dividend payout in all four lifecycle stages, they exert their largest influence in the mature lifecycle stage. The estimated coefficient on the MBA decile variable is largest for mature firms, and growth opportunities explain almost a third of the total variation in dividend payouts. For firms in the growth stage, the corresponding figure is 20%. Only TE/TA is more important than growth opportunities in explaining the variation in dividend payout, in the growth and mature lifecycle stage. These findings suggest that firms with relatively large growth opportunities use dividends to build reputation capital regardless of lifecycle stage, and reputation building is not restricted to firms in the “growth” lifecycle stage.

In Table 8, we explore this issue further by estimating dividend-lifecycle regressions by strength of growth opportunities (above- and below-median MBA). If reputation building is predominantly practiced by early-stage firms, then we may expect that for firms with relatively large growth opportunities, the differential in dividend payouts between growth and mature firms should narrow relative to that observed for firms with low growth opportunities and relative to the whole sample. This is not what we observe. Irrespective of the level of growth opportunities, mature firms always pay larger dividends than firms in the introduction stage and, using dividends-to-assets, they also pay larger dividends than growth firms. Even given large growth opportunities, the collective analysis presented in

¹¹ Appendix 3 presents results of robustness checks, which show that our dividend-lifecycle tests are robust to different MLDA specifications.

Tables 7 and 8 suggest that if anything, reputation building serves to maintain, and not reduce, the difference in dividend payouts that exists between firms in growth and mature lifecycle stages.

3. Conclusion

We analyze the influence of reputation building on the dividend-lifecycle relationship in a low-disclosure regime where the incentives for firms to undertake confidence building strategies with investors are strong. Since DeAngelo et al. (2006), scaled measures of retained equity, RE/TE and RE/TA, have been widely used as firm lifecycle indicators in the literature. However, this result is based on a sample of U.S. firms. Supporting international evidence from Denis and Osobov (2008) also comes from developed financial markets with high-disclosure requirements and strong investor protection. Here, we focus on the dividend payout-lifecycle relationship for Korea. To better understand the evolution of dividends in a relatively low-disclosure environment, we utilise, not only the aforementioned RE/TE lifecycle indicator, but a range of such indicators drawn from the extant literature, such as firm age, Dickinson (2011) and the MLDA methodology of Faff et al (2016).

Focusing on the lifecycle model of dividends, the different classification methods tell a broadly similar story and are supportive of the model. Dividends increase across the lifecycle spectrum, peaking in the mature stage before falling in the final shakeout / decline stage. However, reputation building also plays a significant role in determining the size of dividend payouts. Contrary to the premise underlying the adoption of RE/TE as a lifecycle indicator, we find that dividends are positively related to growth opportunities, implying that firms use dividend policy to reassure investors and thereby build reputation to overcome country-level institutional barriers to investment. Furthermore, the largest growth of dividends is observed for firms transitioning from the third to the fourth quartile of growth opportunities. Partitioning the sample into above- and below-median growth firms, confirms this finding with the relatively higher growth group paying higher dividends and the differential between dividends paid by mature and growth firms persisting. Therefore, it appears that reputation building is a motive for paying larger dividends for firms across all lifecycle stages and not solely associated with early-stage firms.

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Table 1
Sample and lifecycle descriptions

This table summarizes our sample of firms. We report the number of firms by industry, the number of firm-year observations in total and for each year, and the number of firm-year observations by the number of firms. Industry is based on local Korea Republic industry codes mapped to U.S. 2-digit SIC. Financial and utility firms are excluded. Crosslist (Chaebol) refers to the number of firm-years in which firms are cross-listed in the United States of any cross-listing type (belong to a business group). The sample period is 1998-2004. Panel B reports the number of firm-year observations in each lifecycle stage and reports whether firms belong in one or multiple lifecycle stages over the sample period using Multiclass Linear Discriminant Analysis (MLDA) and Dickinson (2011). The Dickinson (2011) lifecycle approach groups firm-years into one of four lifecycle stages, namely introduction, growth, maturity, and shake-out/decline. Panel C reports median RE/TE, RE/TA, firm age, MBA decile for each MLDA lifecycle stage. Panel C also reports the percentage of firms that are in the same lifecycle stage according to MLDA and Dickinson (2011).

Panel A: Number of observations by industry, year, firm, and firm-type

Number of firms by industry		Number of observations by year		Observations by firms		Firms by firm type	
Industry	# Firms	Year	# Obs	# Obs	# Firms	Firm type	# Obs
Agriculture, Forestry and Fishing	2	1998	151	1	32	Chaebol	79
Mining	2	1999	182	2	52	Crosslist	79
Construction	27	2000	320	3	82		
Manufacturing	373	2001	335	4	76		
Wholesale Trade	20	2002	261	5	82		
Retail Trade	7	2003	282	6	63		
Services	4	2004	279	7	48		
	435		1,810		435		

Panel B: Number of firm-years in each lifecycle stage and the number of lifecycle stages by firm

Multiclass Linear Discriminant Analysis (MLDA)				Dickinson (2011)			
Introduction	506	1 Stage	179	Introduction	152	1 Stage	83
Growth	193	2 Stages	165	Growth	412	2 Stages	168
Mature	681	3 Stages	76	Mature	760	3 Stages	134
Shake-out/decline	430	4 Stages	15	Shake-out/decline	486	4 Stages	50
	1,810		435		1,810		435

Panel C: Relationship between lifecycle proxies and MBA by MLDA lifecycle stage

	Introduction	Growth	Mature	Shake-out/decline
RE/TE	0.17	0.32	0.58	0.25
RE/TA	0.06	0.15	0.34	0.11
Dickinson (2011)	13.44%	24.35%	50.66%	24.88%
Age	28	32	35	45
MBA decile	5	6	7	4

Table 2

Dividend payout and growth opportunities

This table reports dividend payouts by level of growth opportunities for a sample of 435 Korea Republic firms over the period from 1998-2004. Growth opportunities are measured using market-to-book of assets (MBA). Dividend payout is measured using dividends-to-sales (%) and dividends-to-assets (%), as indicated. Panel A reports median dividend payout by MBA quartile. Panel B reports the level and percentage change in median dividend payout when firms transition across MBA quartiles. The number of transitions are reported in parentheses. Date 't' is the transition year. % Δ is the percentage change in median dividend payout between dates t-1 and t.

Panel A: Dividend payout by MBA quartile

	MBA quartile 1	MBA quartile 2	MBA quartile 3	MBA quartile 4
Div-Sales (%)	0.29	0.50	0.51	0.79
Div-Assets (%)	0.21	0.51	0.52	0.79

Panel B: Change in dividend payout by transitions in MBA quartiles

	MBA quartile 1 to 2 (68)			MBA quartile 2 to 3 (63)			MBA quartile 3 to 4 (59)		
	t-1	t	% Δ	t-1	t	% Δ	t-1	t	% Δ
Div-Sales (%)	0.42	0.46	9.52	0.33	0.42	27.27	0.45	0.78	73.33
Div-Assets (%)	0.34	0.45	32.35	0.39	0.50	28.21	0.48	0.71	47.92

Table 3

Dividend payout in each lifecycle stage

This table reports median dividend payout by lifecycle stage. Lifecycle is proxied using Multiclass Linear Discriminant Analysis (MLDA), Dickinson (2011), RE/TE, and firm age. Dividend payout is either dividends-to-asset (%) or dividends-to-sales (%), as indicated. MLDA classifies firms into one of four lifecycle stages (introduction, growth, mature, and shakeout/decline) using multiclass linear discriminant analysis. The Dickinson (2011) lifecycle approach groups firm-years into one of four lifecycle stages, namely introduction, growth, maturity, and shake-out/decline. In Panel C, firms are classified into three lifecycle stages, namely young, mature, and old using RE/TE. RE/TE is the ratio of retained to total equity. In Panel D, firms are classified by firm age quartile.

Panel A: Dividend payout and lifecycle using MLDA lifecycle stages

	Introduction	Growth	Mature	Shake-out/decline
Div-Sales (%)	0.12	0.45	0.89	0.35
Div-Assets (%)	0.09	0.48	0.92	0.27

Panel B: Dividend payout and lifecycle using Dickinson (2011) lifecycle stages

	Introduction	Growth	Mature	Shake-out/decline
Div-Sales (%)	0.39	0.46	0.62	0.28
Div-Assets (%)	0.37	0.44	0.54	0.26

Panel C: Dividend payout and lifecycle using RE/TE lifecycle stages

	Young	Mature	Old
Div-Sales (%)	0.00	0.56	0.82
Div-Assets (%)	0.00	0.53	0.82

Panel D: Dividend payout and lifecycle using age quartiles

	Age quartile 1	Age quartile 2	Age quartile 3	Age quartile 4
Div-Sales (%)	0.58	0.55	0.40	0.40
Div-Assets (%)	0.63	0.52	0.38	0.33

Table 4

Lifecycle transitions and change in dividend payout

This table reports median dividend payout as firms' transition across lifecycle stages. Date 't' is the transition year. Lifecycle is proxied using Multiclass Linear Discriminant Analysis (MLDA), Dickinson (2011), RE/TE, and firm age. Dividend payout is either dividends-to-sales (%) or dividends-to-assets (%), as indicated. In Panel C, firms are classified into three lifecycle stages, namely young, mature, and old using RE/TE. RE/TE is the ratio of retained to total equity. In Panel D, firms are classified by firm age quartile. The number of transitions is reported in parentheses. % Δ is the percentage change in median dividend payout between dates t-1 and t.

Panel A: MLDA lifecycle transitions and change in dividend payout

	Introduction to growth (39)			Growth to mature (44)		
	t-1	t	% Δ	t-1	t	% Δ
Div-Sales (%)	0.18	0.36	100.0	0.55	0.66	20.0
Div-Assets (%)	0.22	0.43	95.5	0.47	0.80	70.2

Panel B: Dickinson (2011) lifecycle transitions and change in dividend payout

	Introduction to growth (14)			Growth to mature (74)		
	t-1	t	% Δ	t-1	t	% Δ
Div-Sales (%)	0.32	0.29	(9.4)	0.43	0.45	4.7
Div-Assets (%)	0.37	0.43	16.2	0.38	0.49	28.9

Panel C: RE/TE quartile transitions and change in dividend payout

	Young to mature (41)			Mature to old (26)		
	t-1	t	% Δ	t-1	t	% Δ
Div-Sales (%)	0.20	0.49	145.0	0.60	0.79	31.7
Div-Assets (%)	0.13	0.38	192.3	0.63	0.77	22.2

Panel D: Age quartile transitions and change in dividend payout

	Age quartile 1 to 2 (48)			Age quartile 2 to 3 (41)			Age quartile 3 to 4 (38)		
	t-1	t	% Δ	t-1	t	% Δ	t-1	t	% Δ
Div-Sales (%)	0.28	0.60	114.3	0.40	0.48	20.0	0.36	0.43	19.4
Div-Assets (%)	0.23	0.70	204.3	0.35	0.47	34.3	0.25	0.37	48.0

Table 5

Regression estimates of the dividend-lifecycle relationship

This table reports pooled ordinary least squares estimates for the full sample of firms. The sample period is 1998 to 2004. The dependent variable is dividend payout. Dividend payout is either dividends-to-sales (%) or dividends-to-assets (%), as indicated. The standard errors are clustered by firm. RE/TE is the ratio of retained to total equity. RE/TE LC classifies firms as young (bottom quartile), mature (second and third quartile), or old (top quartile), using RE/TE. MLDA classifies firms into one of four lifecycle stages (introduction, growth, mature, and shake-out/decline) using multiclass linear discriminant analysis. The Dickinson (2011) lifecycle approach groups firm-years into one of four lifecycle stages, namely introduction, growth, maturity, and shake-out/decline. Firm age is size and industry adjusted. Corporate governance is from Black et al. (2014). All other variables are defined in the text. Firm-growth is proxied using the market-to-book of assets (MBA). MBA decile is the rank decile of the average market-to-book of assets based on the previous three years. All regressions include an intercept term, industry and time dummies but are not reported.

	Dependent variable is Div-Sales (%)				
	Lifecycle measure				
	RE/TE	RE/TE LC	MLDA	Dickinson (2011)	Firm age
RE/TE	0.401*** (4.49)			0.410*** (4.61)	0.405*** (4.59)
Growth			0.081*** (1.22)	-0.000 (0.00)	
Mature		0.246*** (4.83)	0.261*** (3.48)	0.024 (0.45)	
Shake-out/decline			0.037 (0.66)	0.061 (1.12)	
Old		0.351*** (4.37)			
Firm age					-0.0001*** (2.54)
MBA decile	0.069*** (6.80)	0.070*** (6.83)		0.070*** (6.83)	0.064*** (6.43)
Corporate governance	0.007** (2.05)	0.007* (1.90)	0.013*** (3.33)	0.007** (2.02)	0.008** (2.16)
Chaebol dummy	-0.098 (1.33)	-0.103 (1.38)	-0.117 (1.50)	-0.095 (1.29)	-0.112 (1.54)
Size decile	0.020 (1.38)	0.021 (1.49)	-0.013 (0.94)	0.019 (1.35)	0.021 (1.46)
Cash/Assets	0.432 (1.07)	0.497 (1.24)	1.182** (2.57)	0.447 (1.11)	0.332 (0.80)
Profitability	0.171 (0.40)	0.091 (0.21)		0.191 (0.45)	0.090 (0.21)
TE/TA	2.123*** (8.37)	1.970*** (7.57)		2.108*** (8.42)	2.187*** (8.67)
Leverage	0.182 (0.82)	0.108 (0.48)	-1.476*** (6.62)	0.192 (0.86)	0.190 (0.87)
PPE/Assets	0.055 (0.31)	0.052 (0.29)	0.195 (1.10)	0.064 (0.37)	0.047 (0.27)
Cash flow uncertainty	-1.064*** (4.45)	-0.962*** (4.01)	-1.192*** (4.83)	-1.083*** (4.50)	-1.038*** (4.28)
Industry dummies	Included	Included	Included	Included	Included
Time dummies	Included	Included	Included	Included	Included
# Observations	1,810	1,810	1,810	1,810	1,810
R-Squared	0.343	0.343	0.240	0.344	0.349
Growth vs. mature			**		
Mature vs. shake-out/decline			***		
	Dependent variable is Div-Assets (%)				
	Lifecycle measure				
	RE/TE	RE/TE LC	MLDA	Dickinson (2011)	Firm age

Table 5

Regression estimates of the dividend-lifecycle relationship

This table reports pooled ordinary least squares estimates for the full sample of firms. The sample period is 1998 to 2004. The dependent variable is dividend payout. Dividend payout is either dividends-to-sales (%) or dividends-to-assets (%), as indicated. The standard errors are clustered by firm. RE/TE is the ratio of retained to total equity. RE/TE LC classifies firms as young (bottom quartile), mature (second and third quartile), or old (top quartile), using RE/TE. MLDA classifies firms into one of four lifecycle stages (introduction, growth, mature, and shake-out/decline) using multiclass linear discriminant analysis. The Dickinson (2011) lifecycle approach groups firm-years into one of four lifecycle stages, namely introduction, growth, maturity, and shake-out/decline. Firm age is size and industry adjusted. Corporate governance is from Black et al. (2014). All other variables are defined in the text. Firm-growth is proxied using the market-to-book of assets (MBA). MBA decile is the rank decile of the average market-to-book of assets based on the previous three years. All regressions include an intercept term, industry and time dummies but are not reported.

RE/TE	0.329*** (4.26)			0.342*** (4.47)	0.334*** (4.40)
Growth			0.138** (2.41)	-0.063 (1.33)	
Mature		0.209*** (4.63)	0.346*** (5.69)	0.013 (0.27)	
Shake-out/decline			-0.010 (0.20)	0.021 (0.45)	
Old		0.314*** (4.43)			
Firm age					-0.0001*** (3.21)
Industry dummies	Included	Included	Included	Included	Included
Time dummies	Included	Included	Included	Included	Included
Controls	Included	Included	Included	Included	Included
# Observations	1,810	1,810	1,810	1,810	1,810
R-Squared	0.343	0.380	0.279	0.344	0.349
Growth vs. mature			***	*	
Growth vs. shake-out/decline			***	**	
Mature vs. shake-out/decline			***		

Table 6

Payer regression estimates of the dividend-lifecycle relationship

This table reports marginal effects from a series of logit regressions for the full sample of firms. The sample period is 1998 to 2004. The dependent variable is Div-Payer, which is 1 if the firm pays a dividend in time t , zero otherwise. The standard errors are clustered by firm. The marginal effects are evaluated at the means of each variable. RE/TE is the ratio of retained to total equity. RE/TE LC classifies firms as young (bottom quartile), mature (second and third quartile), or old (top quartile), using RE/TE. MLDA classifies firms into one of four lifecycle stages (introduction, growth, mature, and shake-out/decline) using multiclass linear discriminant analysis. The Dickinson (2011) lifecycle approach groups firm-years into one of four lifecycle stages, namely introduction, growth, maturity, and shake-out/decline. Firm age is size and industry adjusted. Corporate governance is from Black et al. (2014). All other variables are defined in the text. Firm-growth is proxied using the market-to-book of assets (MBA). MBA decile is the rank decile of the average market-to-book of assets based on the previous three years. All regressions include an intercept term, industry and time dummies but they are not reported.

	Dependent variable is Div-Payer				
	Lifecycle measure				
	RE/TE	RE/TE LC	MLDA	Dickinson (2011)	Firm age
RE/TE	0.335*** (10.57)			0.321*** (7.09)	0.334*** (8.22)
Growth			0.115*** (8.03)	0.010 (0.35)	
Mature		0.148*** (6.48)	0.204*** (8.44)	0.008 (0.41)	
Shake-out/decline			0.064*** (4.47)	-0.056* (1.95)	
Old		0.149*** (7.21)			
Firm age					0.000 (0.86)
MBA decile	-0.002 (0.86)	-0.002 (0.78)		-0.004 (1.29)	-0.002 (0.74)
Corporate governance	0.002 (1.45)	0.001 (1.20)	0.001 (1.10)	0.002 (1.56)	0.001 (1.43)
Chaebol dummy	0.009 (0.50)	0.001 (0.06)	0.003 (0.12)	0.008 (0.44)	0.011 (0.59)
Size decile	0.011*** (2.95)	0.014*** (3.25)	0.011*** (2.25)	0.011*** (2.76)	0.011*** (2.84)
Cash/Assets	0.076 (0.68)	0.143 (1.10)	0.383*** (3.18)	0.060 (0.54)	0.085 (0.77)
Profitability	1.169*** (4.46)	1.362*** (4.77)		1.099*** (3.98)	1.165*** (4.20)
TE/TA	0.295*** (4.05)	0.317*** (3.85)		0.312*** (3.93)	0.288*** (3.79)
Leverage	-0.093 (1.33)	-0.132* (1.65)	-0.381*** (5.23)	-0.086 (1.21)	-0.093 (1.35)
PPE/Assets	-0.013 (0.27)	-0.014 (0.24)	0.041 (0.70)	-0.027 (0.53)	-0.014 (0.29)
Cash flow uncertainty	-0.816*** (3.81)	-0.863*** (3.44)	-1.131*** (2.78)	-0.780*** (3.77)	-0.817*** (3.64)
Industry dummies	Included	Included	Included	Included	Included
Time dummies	Included	Included	Included	Included	Included
# Observations	1,810	1,810	1,810	1,810	1,810
R-Squared	0.378	0.402	0.306	0.379	0.386
Growth vs. mature				***	
Growth vs. shake-out/decline				***	
Mature vs. shake-out/decline				***	

Table 7

The determinants of dividend payout in each MLDA lifecycle stage

This table reports separate pooled ordinary least squares estimates for each lifecycle stage. The sample period is 1998 to 2004. The dependent variable is dividends-to-sales (%). The standard errors are clustered by firm. Lifecycle stages are determined using Multiclass Linear Discriminant Analysis (MLDA). MLDA classifies firms into one of four lifecycle stages (introduction, growth, mature, and shake-out/decline) using multiclass linear discriminant analysis. RE/TE is the ratio of retained to total equity. Corporate governance is from Black et al. (2014). Firm-growth is proxied using the market-to-book of assets (MBA). MBA decile is the rank decile of the average market-to-book of assets based on the previous three years. All other variables are defined in the text. All regressions include an intercept term, industry and time dummies but are not reported. The bottom panel outlines the amount of the variation in dividend payout explained by each right hand side variable as a percentage of the variation in dividend payout explained by the right hand side variables as a whole.

	Dependent variable is Div-Sales (%)			
	Lifecycle stage according to MLDA			
	Introduction	Growth	Mature	Shake-out/decline
MBA decile	0.033*** (2.96)	0.089*** (3.79)	0.109*** (5.50)	0.051*** (3.05)
RE/TE	0.660*** (5.75)	0.476*** (2.16)	0.408* (1.79)	0.149 (0.99)
Corporate governance	0.004 (1.10)	-0.010 (1.36)	0.014** (2.08)	0.006 (1.10)
Chaebol dummy	-0.079 (0.90)	-0.088 (0.61)	-0.137 (0.94)	-0.175 (1.58)
Size decile	0.040*** (2.64)	0.038* (1.66)	-0.013 (0.44)	0.021 (0.84)
Cash/Assets	0.398 (0.82)	-0.186 (0.21)	-0.003 (0.01)	2.480*** (2.85)
Profitability	0.008 (0.02)	-5.403* (1.69)	-0.376 (0.34)	5.928*** (4.02)
TE/TA	1.770*** (5.52)	2.430*** (5.16)	3.182*** (6.37)	1.470*** (3.54)
Leverage	-0.120 (0.55)	-0.034 (0.07)	0.780 (1.58)	-0.262 (0.64)
PPE/Assets	0.240 (1.47)	0.126 (0.32)	-0.077 (0.20)	0.321 (0.97)
Cash flow uncertainty	-0.170 (0.38)	-1.885*** (2.74)	-0.597 (1.33)	-1.139*** (2.98)
Industry dummies	Included	Included	Included	Included
Time dummies	Included	Included	Included	Included
# Observations	506	193	681	430
R-Squared	0.284	0.336	0.329	0.306
Median MBA decile	5	6	7	4
	Analysis of Variance (ANOVA)			
	Introduction	Growth	Mature	Shake-out/decline
MBA decile	6.31	20.28	32.82	13.41
RE/TE	39.05	7.13	4.05	1.21
Corporate governance	0.76	3.12	5.77	1.61
Chaebol dummy	0.70	0.54	1.14	3.50
Size decile	5.18	2.87	0.30	1.19
Cash/Assets	0.67	0.09	0.00	25.94
Profitability	0.00	3.65	0.10	18.05
TE/TA	37.12	32.19	41.69	17.27
Leverage	0.18	0.01	1.87	0.47
PPE/Assets	1.20	0.15	0.04	1.66
Cash flow uncertainty	0.10	17.17	0.94	6.03
Industry dummies	3.37	4.77	5.82	3.77
Time dummies	5.36	8.03	5.47	5.88

Table 8

The lifecycle model of dividends by level of growth opportunities

This table examines the lifecycle model of dividends for firms with high MBA (above-median) and low MBA (below-median). Firm-growth is proxied using the market-to-book of assets (MBA). MBA decile is the rank decile of the average market-to-book of assets based on the previous three years. Panel A reports median dividend payout in each lifecycle stage by level of firm growth. Dividend payout is either dividends-to-sales (%) or dividends-to-assets (%), as indicated. Lifecycle stages are determined using Multiclass Linear Discriminant Analysis (MLDA). MLDA classifies firms into one of four lifecycle stages (introduction, growth, mature, and shake-out/decline) using multiclass linear discriminant analysis. Panel B reports separate pooled ordinary least squares estimates for firms classified as high (above-median) or low (below-median) MBA. The sample period is 1998 to 2004. The standard errors are clustered by firm. All regressions include an intercept term, control variables, industry and time dummies but are not reported.

Panel A: Dividend payouts in each MLDA lifecycle stage by level of growth opportunities

	High MBA		Low MBA	
	Div-Sales (%)	Div-Assets (%)	Div-Sales (%)	Div-Assets (%)
Introduction	0.06	0.06	0.19	0.10
Growth	0.59	0.65	0.31	0.31
Mature	1.16	1.16	0.66	0.66
Shake-out/decline	0.31	0.29	0.37	0.27

Panel B: Regression based tests of the dividend-lifecycle model by level of growth opportunities

	Dependent variable is Div-Sales (%)		Dependent variable is Div-Assets (%)	
	High MBA	Low MBA	High MBA	Low MBA
Growth	0.102 (1.06)	0.026 (0.29)	0.199** (2.29)	0.041 (0.68)
Mature	0.261*** (2.34)	0.169** (2.00)	0.369*** (3.88)	0.215*** (3.34)
Shake-out/decline	0.117 (1.43)	0.070 (1.04)	0.083 (1.17)	0.012 (0.26)
Industry dummies	Included	Included	Included	Included
Time dummies	Included	Included	Included	Included
Controls	Included	Included	Included	Included
# Observations	904	906	904	906
R-Squared	0.298	0.140	0.334	0.195
Growth vs. mature			*	**
Growth vs. shake-out/decline				
Mature vs. shake-out/decline			***	***

Appendix 1

Dickinson (2011) lifecycle cash flow patterns classification scheme

Dickinson (2011) lifecycle approach groups firm-years into one of five lifecycle stages, namely introduction, growth, maturity, shake-out, and decline. Each lifecycle stage is determined by the combined signs on net cash flow from operating, investing, and financing activities. There are eight different net cash flow permutations.

Net cash flow and predicted sign:	Intro	Growth	Mature	Shake-out			Decline	
NCF from operating activities	-	+	+	-	+	+	-	-
NCF from investing activities	-	-	-	-	+	+	+	+
NCF from financing activities	+	+	-	-	+	-	+	-

Appendix 2
Variable descriptions

Variable	Description	Source	Mean	Median	Std. Dev	Min	Max
Dividends-to-assets (%)	Total common dividends to total assets	Worldscope	0.67	0.45	0.77	0.00	4.09
Dividends-to-sales (%)	Total common dividends to net sales	Worldscope	0.74	0.48	0.89	0.00	4.52
Payer	1 if the firm pays a dividend in year t, 0 otherwise	Worldscope	0.71	1.00	0.45	0.00	1.00
MBA	Three-year average market to book value of assets	Worldscope	0.66	0.45	0.69	0.09	6.35
RE/TE	Retained equity to total equity	Worldscope	0.40	0.36	0.32	0.00	4.74
RE/TA	Retained equity to book assets	Worldscope	0.20	0.17	0.17	0.00	0.83
MLDA lifecycle	Lifecycle measure using multiclass linear discriminant analysis	Worldscope	n.m.	n.m.	n.m.	n.m.	n.m.
Dickinson (2011) lifecycle	Dickinson (2011) lifecycle measure	Worldscope	n.m.	n.m.	n.m.	n.m.	n.m.
Age	Age of firm: year less establishment year plus 1	Black et al. (2014)	35.05	34.00	13.04	1	107
Corporate governance	Corporate governance index	Black et al. (2014)	34.40	32.95	10.58	0.00	84.59
TE/TA	Ratio of total equity to book assets	Worldscope	0.48	0.47	0.19	(0.04)	0.88
Size	Size rank decile using book assets (in div-sales and governance regressions) and sales (in div-assets regressions)	Worldscope	n.m.	n.m.	n.m.	n.m.	n.m.
Cash/Assets	Ratio of cash to book assets	Worldscope	0.12	0.08	0.10	0.00	0.64
Profitability	Ratio of earnings before interest and taxation to book assets	Worldscope	0.03	0.03	0.06	(0.41)	0.24
Leverage	Ratio of total debt to book assets	Worldscope	0.28	0.28	0.17	0.00	0.76
PPE/Assets	Ratio of property plant and equipment (PPE) to book assets	Worldscope	0.41	0.41	0.17	0.00	0.86
Chaebol dummy	1 if the firm belongs to business group in year t, 0 otherwise	Black et al. (2014)	0.31	0.00	0.46	0	1
Cash flow uncertainty	Standard deviation of (operating income/total assets) over the most recent four years	Worldscope	0.05	0.03	0.08	0.00	1.29
Industry Dummies	Industry codes mapped to US 2-digit SIC codes	Worldscope	n.m.	n.m.	n.m.	n.m.	n.m.
Lifecycle descriptors for Dickinson (2011) and MLDA:							
Variable	Description	Source	Mean	Median	Std. Dev	Min	Max
Sales growth	One-year sales growth	Worldscope	0.08	0.08	0.12	(0.36)	0.50
NCFO	Net cash flows from operating activities	Worldscope	0.06	0.06	0.09	(0.63)	0.69
NCFI	Net cash flows from investing activities	Worldscope	0.04	0.04	0.11	(2.52)	0.55
NCFF	Net cash flows from financing activities	Worldscope	(0.02)	(0.02)	0.10	(1.45)	0.46

Appendix 3

The dividend-lifecycle relationship using alternative MLDA specifications

This table reports regression based tests of the lifecycle model of dividends using alternative multiple linear discriminant analysis (MLDA) specifications. MLDA2 uses sales growth and profitability; MLDA3 uses sales growth, profitability, and RE/TE; MLDA4 uses sales growth, profitability, RE/TE, and size; MLDA5 uses sales growth, profitability, RE/TE, age, and size. Panel A reports the number of firms in each lifecycle stage and the percentage of overlapping firms in each lifecycle stage according to MLDA and Dickinson (2011, DK). 1,810 firm-year observations are included in each regression.

Panel A: Comparison between Dickinson (2011) lifecycle and alternative MLDA lifecycle specifications

	Lifecycle stage			
	Introduction	Growth	Mature	Shake-out/decline
Dickinson (2011)	152	412	760	486
MLDA2	364	332	639	475
% same as DK (2011)	34.87	25.24	46.97	31.89
MLDA3	389	370	561	490
% same as DK (2011)	40.79	29.13	42.11	32.51
MLDA4	378	405	553	474
% same as DK (2011)	48.68	33.50	42.63	33.95
MLDA5	414	398	550	448
% same as DK (2011)	47.37	32.28	42.11	31.28

Panel B: Regression based tests of the dividend-lifecycle model using alternative MLDA specifications

	Dependent variable is Div-Sales (%)			
	MLDA2	MLDA3	MLDA4	MLDA5
Growth	0.030 (0.61)	0.216*** (2.90)	0.214*** (3.32)	0.096 (1.41)
Mature	0.160** (2.14)	0.363*** (5.02)	0.372*** (5.05)	0.226*** (2.93)
Shake-out/decline	0.106** (2.15)	0.199*** (4.12)	0.223*** (4.39)	0.042 (0.74)
RE/TE	0.425*** (4.63)			
Industry and time dummies	Included	Included	Included	Included
Controls	Included	Included	Included	Included
R-Squared	0.308	0.246	0.247	0.237
Growth vs. mature	**	*	**	*
Growth vs. shake-out/decline	*			
Mature vs. shake-out/decline		**	**	**
	Dependent variable is Div-Assets (%)			
	MLDA2	MLDA3	MLDA4	MLDA5
Growth	0.102** (2.50)	0.254*** (4.66)	0.211*** (4.02)	0.106* (1.93)
Mature	0.350*** (5.98)	0.502*** (8.43)	0.485*** (7.84)	0.326*** (5.22)
Shake-out/decline	0.096*** (2.67)	0.147*** (4.13)	0.189*** (4.61)	0.000 (0.01)
RE/TE	0.338*** (4.33)			
Industry and time dummies	Included	Included	Included	Included
Controls	Included	Included	Included	Included
R-Squared	0.331	0.294	0.291	0.276
Growth vs. mature	***	***	***	***
Growth vs. shake-out/decline		*		*
Mature vs. shake-out/decline	***	***	***	***