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# The association between dividend payout and firm growth: Australian evidence

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**Abstract**

We report that whereas firms with high earnings distributions tend to have low-to-moderate growth (consistent with conventional theory), firms with low earnings distributions run the range between high and low performers. We interpret our findings for firm growth and payout policy in relation to the firm's location on the Boston Consulting Group (BCG) matrix that combines high/low growth with high/low market share. Our findings suggest that the market has difficulty in distinguishing between these types of firms. A concern is that investor preferences as an outcome may be focussed on dividend-paying firms at the expense of younger growing firms in need of retained earnings.

*Key words*: Dividend payout; Firm growth; BCG matrix; Firm life cycle; P/E ratio

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## 1. Introduction

This paper addresses the relation between a firm's rate of growth and its dividend payout policy. The traditional view adopted by corporate finance textbooks is that the growth rate of the firm ($g$) is a product of the retention ratio ($b$) and the return on assets ($ROA$): $g = b \times ROA$, implying that a high dividend payout is associated with a low growth rate for the firm. By contrast, the agency theory perspective is that a low dividend payout ratio allows self-motivated managers to invest free cash flows in value-destroying projects that harm the firm's growth, thus imparting a positive relationship between dividend payout and firm growth.

On a fundamental level, we lack a consensus as to whether dividends can reveal meaningful information as to the firm's prospects.[1] The literature is divided between findings that confirm conventional theory with a negative relation between the firm's dividend payout ratio and growth and findings by, for example, Arnott and Asness (2003) that report the reverse, with a division between prospering firms that combine high dividend payouts with growth and declining firms that combine low dividend payouts with declining growth.

In this study, we argue that the relation between current dividends and future growth can more meaningfully be understood in relation to a 2 × 2 matrix of high/low growth and high/low market share as represented by the Boston Consulting Group (BCG) growth matrix. Thus, many of the contradictions are alleviated when we identify firms not on a *line* as the outcome of a linear regression of growth against dividend payout, but allow that firms may lie in each of the quadrants of (i) high growth–high market share ('stars'), (ii) low growth–high market share ('cash cows'), (iii) high growth–low market share ('question marks') and (iv) low growth–low market share ('dogs'), with firm growth versus dividend payout conditioned on the location of firms on the matrix.

The BCG matrix allows that firms may move in their life cycle from low-dividend-payout firms that either develop to become 'stars' and, thereafter, 'cash cows' or fail and become the low payout–low growth 'dogs'. Such approach has the additional advantage of allowing a natural link of management and financial theories of the firm.

We find that a linear regression through the data can switch to either a positive or negative relation depending on the relative preponderance of firms within the quadrants. For example, the positive relation between the firm's dividend payout ratio and growth reported by, for example, Arnott and Asness

[1] While papers such as Aharony and Dotan (1994), Nissim and Ziv (2001), Arnott and Asness (2003) and Dhillon *et al*. (2003) determine that dividends and dividend changes impart credible information about the future prospects of firms, other papers such as Watts (1973), Penman and Sougiannis (1998), Garret and Priestley (2000) and Benartzi *et al*. (2005) report the absence of such a relationship.

(2003) can be accounted for by firms allocated on a line from the 'dogs' quadrant to the 'stars' quadrant, whereas the findings that accord with traditional theory are located on the line that is tilted to run from the 'cash cows' quadrant to the 'question marks' quadrant. For Australian firms, we find that high-payout-ratio firms tend to have low subsequent growth (consistent with traditional theory); that is, our data have substantially more 'cash cows' than 'stars'.[2] However, low-payout firms may *either* have high growth (prospering 'question mark' firms, consistent with traditional theory) *or* have low growth rates – as the outcome either of 'ineffectual' reinvestments by the firm or of the firm's inability to finance a payout (struggling 'dog' firms).

Thereafter, we turn to consider the extent to which the market is able to distinguish between the firms *ex ante*. To this end, we consider both the Tobin's $Q$ ratio and P/E ratio as indicating the costliness of the firm's shares in relation to the firm's subsequent growth. It appears that the market is unable to distinguish adequately between low-dividend-payout firms that subsequently prosper to grow and those that fail to do so. This is of concern. It suggests that investment managers may be more inclined to invest in firms paying dividends rather than seek to invest in low-dividend-payout firms about which the market is unable to determine their prospects for growth. It may then be that small entrepreneurial firms suffer market neglect and are starved of finance.

These ideas are explored in the reminder of the paper as follows. In the following section (Section 2), we summarise the background literature in relation to whether or not higher dividend payouts are associated with higher or lower subsequent earnings performances by the firm. Section 3 outlines the data sources and methodology of the paper. Section 4 presents the results. Section 5 concludes the paper.

## 2. Background literature

To the extent that dividends and investments that determine the firm's future growth are competing uses of limited internal corporate funds, we should observe a negative relationship between current dividend payout ratios and future growth (Dhrymes and Kurz, 1967; McCabe, 1979; Jensen *et al*., 1992; Abeyatna *et al*., 1996). Consistently, Higgins (1972), Rozeff (1982), Myers (1984), Fama and French (2001, 2002) and Ibbotson and Chen (2003) provide evidence that higher dividend payout ratios are inversely related to investment opportunities, and thereby lower earnings growth.

Conventional understanding is that the above relations are imposed by the market. Thus, firms that either fail to reinvest their earnings in competitive

[2] We attribute this traditional theory to the textbook explanation that to achieve future growth, companies have to invest in high-return investment opportunities; a high dividend payout policy therefore impedes future growth in company earnings (e.g. also, Dhrymes and Kurz, 1967; Berk and DeMarzo, 2007, p. 250; Parrino *et al*., 2013, p. 312).

projects or, alternatively, fail to divest of them to shareholders to reinvest themselves are penalised by unfavourable market downgrades of their share price, thereby drawing attention of management inefficiency to the firm's shareholders.[3] Thus, in relation to dividend payouts, it has long been believed that a *lower* dividend payout ratio should be associated with *higher* future earnings growth – on the basis that the discipline of markets obliges firms to make payouts unless retentions can be justified by positive net present value reinvestments. Consistently, Farsio *et al*. (2004) report evidence that firms paying higher dividends without due allowance for their investment needs ultimately experience lower future earnings. Gill *et al*. (2010) report a negative relationship between sales growth and dividend payout, consistent with firms that experience or are anticipating higher growth rates wishing to keep dividend payments low to avoid external financing.

Nevertheless, Gill, Biger and Tibrewala (above) also report a positive relationship between dividend payout and profitability. In agreement, Nissim and Ziv (2001), Amidu (2007), Howatt *et al*. (2009), Ajanthan (2013) and Leon and Putra (2014) confirm that higher profitability relates to higher dividend payments. Bhattacharya (1979) suggests that higher growth firms may commit to higher dividends to dispel the relatively greater information disparity of growth firms. John and Muthusamy (2010) find that while firms with larger profits tend to pay higher dividends, firms facing uncertainty about future profits adopt lower dividend payments. Chen *et al*. (2018) take advantage of a US SEC pilot programme (2005–2007) that suspended the uptick rule for short selling for selected pilot firms, to argue that firms regard paying dividends as a more reliable signal of stock value than stock repurchases. These findings are consistent with the signalling hypothesis, whereby companies choose dividend payouts to signal their confidence in future growth.

Arnott and Asness (2003) go further and report that expected future earnings grow fastest when current payout ratios are high and slowest when payout ratios are low. They go so far as to advance a 'wasteful reinvestment hypothesis'. They argue that their findings support the contention that 'good' firms can 'do both', that is pay dividends while continuing to grow, while 'bad' firms are revealed as paying low dividends while exhibiting sluggish growth at best – suggesting that firms with low dividend payouts, at least on aggregate, tend to be laggards and should be avoided. The Arnott and Asness results

[3] Francis *et al*. (2005) go so far as to argue that the market is sophisticated and is capable of differentiating between levels of earnings quality. They argue, for example, that the market is capable of differentiating across levels of accruals quality as a proxy for the information risk associated with earnings and that assets are priced accordingly in the market. Lower quality earnings are thereby associated with larger costs of debt and equity. In this view, accounting earnings are effectively mapped into potential cash flows by the market, and the level of information risk as a non-diversifiable factor is an additional priced risk factor to the book equity-to-market equity ratio and firm size factors proposed by Fama and French (1993).

appear dramatic. They report that the average 10-year subsequent earnings growth for the lowest starting payout quartile is actually negative (−0.4 percent); is a positive 1.3 percent for the second lowest starting payout ratio quartile; is a positive 2.7 percent for the third highest payout ratio quartile; and is a positive 4.2 percent for the highest payout ratio quartile. Zhou and Ruland (2006) follow the Arnott and Asness (2003) study with a company-by-company analysis. Again, they find that high-dividend-payout companies tend to experience strong, not weak, future earnings growth, with the relation between current dividend payout and future earnings growth being most positive for companies with limited growth opportunities. The findings are reported to be robust to alternative measures of payout and earnings, sample composition, mean reversion in earnings, the effects of particular industries, time periods and share repurchases. Gwilym *et al*. (2006) endorse the findings in an international setting across different institutional tax and legal environments. Importantly, stocks with dividends appear to have significantly outperformed the overall stock market, a conclusion that is verified by Williams and Miller (2013) in both the recessionary and recover periods relating to the recessions of the dot.com of 2001 and the GFC of 2008–2009.

In support of the ‘wasteful reinvestment’ hypothesis, a good deal of research finds that corporate events associated with asset expansion (acquisitions, public equity offerings, public debt offerings and bank loan initiations) tend to be followed by periods of abnormally *low* returns, whereas events associated with asset contractions (spinoffs, share repurchases, debt repayments and dividend initiations) tend to be followed by periods of abnormally *high* returns.[4] For example, Cooper *et al*. (2008) document a negative relationship between various forms of corporate investment and the cross section of returns, with capital investment, accruals, sales growth rates and capital raising all found to be negatively correlated with future returns.

Using questionnaire surveys from the financial managers of large US firms, Pruitt and Gitman (1991) find that the direction of causality is from the firm’s investment decisions to its financing decisions, and dividend decisions are driven by profits and prior year’s dividends rather than by the firm’s investment and financing actions, while Baker and Powell (1999), following a questionnaire survey with managers of regulated and unregulated US industries, confirm that the most important determinants of the firm’s dividend payout policy are the level of past dividends, current earnings and anticipated earnings.

Floyd *et al*. (2015) confirm that dividends have increased steadily over 30 years with stable payout ratios. Nevertheless, Fama and French (2001) report a decline after 1978 in the percentage of firms paying dividends due in part to an increasing number of small, publicly traded firms with low reported

[4] Lakonishok *et al*. (1994); Titman *et al*. (2004); Sloan (1996); Fairfield *et al*. (2003); Hirshleifer *et al*. (2004); Broussard *et al*. (2005); and Anderson and Garcia-Feijoo (2006).

earnings and high growth. Larger, more profitable firms are more likely to pay dividends, and high-growth firms are less likely to. DeAngelo *et al.* (2004) confirm that the dividends of industrial firms are highly concentrated and that dividend concentration had increased over the previous two decades. Thus, as few as 25 firms paying the largest dividends account for the majority of the aggregate dividends and earnings of industrial firms, which suggests a two-tier structure in which a very limited number of firms with very high earnings collectively generate the majority of earnings and dominate the dividend supply, while the vast majority of firms have at best a modest collective impact on aggregate earnings and dividends. The outcome is that the aggregate dividends paid by industrial firms over these decades have increased even as the number of dividend-paying firms had decreased. The tendency appears to be that of low-dividend-payout firms ceasing to pay dividends altogether. DeAngelo *et al.* (2008) find that the payouts for large firms have been increasing rapidly leading up to the GFC with dividends increasingly concentrated in firms that also repurchased their shares. They consider that the high degree of dividend payments in large, mature firms is explained by the ability of dividends to address the agency problems of free cash flow (as opposed to the signalling explanation). Nevertheless, for firms initiating dividend payments, signalling is the likely explanation (Lang and Litzenberger, 1989; Kale *et al.*, 2012).

Such findings suggest that major changes in corporate payout policies have been occurring over the last 30 years, so that the challenge to understand such polices is a moving target. The findings of an increased dividend concentration in large firms cast doubt on both the signalling hypothesis and the dividend clientele hypothesis (a preference for either dividends or capital gains based on investor tax considerations). Baker and Wurgler (2004) introduce a catering theory of dividends whereby firms respond to investor demands for dividends, which demand may vary through time, which is endorsed by Michaely and Qian (2017) in relation to investor liquidity needs. The firm's financial performance – and, hence, ability to pay dividends – is also related to size because of the benefits associated with economies of scale and economies of scope, so that profitability, growth and size affect the likelihood that a firm pays dividends (Fama and French, 1997, 2001). In addition, Cheng *et al.* (2014) find that cross-listing for Chinese companies implies both greater dividend payouts in relation to free cash flow and lower dividends in relation to growth opportunities. Choi *et al.* (2011), based on a study of South Korean firms, consider that the information content of dividends is dependent on the firm's growth stage and corporate governance. Such findings suggest that the firm's dividend policy will vary as the firm moves through its life cycle as captured by the BCG growth matrix.

In Australia, which has an imputation tax system, corporate tax paid by the firm is 'imputed' as a prepayment of shareholders' tax obligations at the personal level. The outcome lower tax burden at the personal level means that the underlying driving relation between firm growth and dividend payout is less likely to be restricted by the 'tax veil' that separates firm payouts from shareholders' after-tax benefit.[5] Consistently, Akhtar (2018a,b) finds that firms operating within an imputation tax system have higher dividend payout ratios than firms operating in a classical tax system. For this reason, a good deal of research has investigated the motivation for Australian dividends (signalling theory, agency theory, life-cycle theory) as well as the relation between dividends and buybacks for Australian firms.

In accordance with conventional theory, Coulton and Ruddock (2011) report that Australian firms with relatively low payout ratios tend to be in growth or capital infusion stages, whereas firms with high payout ratios tend to be more mature and can generate cash but have fewer growth opportunities and are therefore good candidates for dividends, consistent with the maturity hypothesis advanced by Grullon *et al*. (2002). The authors find that dividend-paying firms are larger, are more profitable and have less growth options than non-dividend-paying firms (which contrasts with the 'disappearing dividends' interpretation of Fama and French, 2001). For Australian firms, Michayluk *et al*. (2018) find that the firm's initial three dividends are the most important, with subsequent increases serving to confirm the market expectation established by the first dividends. These papers confirm a life-cycle theory of cash disbursements as firms mature from low-payout firms with growth expectations to becoming large firms, which then disburse retained earnings more freely with regular dividends. Thus, regular dividend payments are dominated by the largest firms.

Brown *et al*. (2015) report that increases in dividend yields are positively associated with share buybacks, which is consistent with their observation that Australian firms do not alter their dividend policy to generate funds for buybacks. The extent and motivation of share buybacks as stated by Australian firms in their ASX announcements appear to be (i) signalling of future expectations and (ii) an attempt to increase earnings per share (Mitchell and Robinson, 1999). Nevertheless, Coulton and Ruddock (2011) allow that notwithstanding the growing importance of share buybacks as a mode of cash distribution, for most firms in Australia, dividends remain the most important mechanism for distributing cash to shareholders.

The above findings motivate us to hypothesise that the dependence of corporate growth on dividend payout is related to the firm's position in its life cycle in relation to market dominance and growth potential. Thus, it is possible that as an outcome of their positioning on the matrix of market dominance x growth, one segment of companies may display a negative dependence of firm

[5] Davies (2016) argues that corporate financial policies are less distorted by an imputation tax system than by a classical tax system. Sweden's 2006 dividend tax cuts appear to have affected the allocation of corporate investment but not the aggregate investment (Alstadsaeter *et al*., 2017).

growth on dividend payout (consistent with conventional theory), while another segment contemporaneously appears to display a positive dependence (as advanced above by Arnott and Asness, 2003; Zhou and Ruland, 2006; and Gwilym *et al.*, 2006).

## 3. Sample, data and methodology

Our analytical period spans 15 years from 2000 to 2014.[6] We avail of the DataStream database for companies listed on the Australian Securities Exchange (ASX) for net income, sales/total revenue, dividend payout, market capitalisation, total debt, total assets, net income available to common, and earnings-to-price ratio on an annual basis. To avoid survivorship bias, we include both delisted companies and new entrants. Considering the long-term nature of the dividend decision and to facilitate panel data analysis, we require that a company have the required data for a consecutive 3-year period.[7]

Prior studies are generally restricted to companies that report positive earnings and positive dividend payout. The restriction is justified by the ambiguity that surrounds the concept of a growth rate calculated from a negative base. For Australian companies, such constraint is problematic on account of that many Australian companies are small and report negative earnings and do not pay dividends. Accordingly, we have incorporated sales growth as a proxy for firm growth (which, unlike earnings, cannot be reported as negative) and we analyse the impact of dividend payout on short-term firm growth (1-year-ahead sales growth), medium-term firm growth (3-year-ahead sales growth) and long-term firm growth (5-year-ahead sales growth). The number of observations used is a decreasing function of the duration over which sales growth is measured. For 1-year sales growth, we have 20,290 firm-year observations; for 3-year sales growth, we have 16,780 firm-year observations; and for 5-year sales growth, we have 11,195 firm-year observations. To reduce the effect of outliers in our analyses, we winsorise data at the top and bottom 1 percent of observations.

We use a general class of panel regression models that account for firm fixed effects and clustered standard errors. As different companies can have different time series of observations (ranging between a minimum of 3 and a maximum of 15), we allow standard errors to cluster at the firm level. The regression model takes the form:

[6] Prior to 2000, the required data are available only for a minority of listed companies from the DataStream database.

[7] The requirement that data be available for three consecutive years implies a potential bias. Nevertheless, we allow such imposition taking into account the long-term nature of the dividend decision and to facilitate a panel regression analysis.

$$G_{i,t\ to\ t+n} = \alpha_i + \beta_1 DPO_{i,t} + \beta_2 LNMC_{i,t} + \beta_3 LEV_{i,t} + \beta_4 ROA_{i,t} + \beta_5 EPR_{i,t} + \beta_6 PAG_{i,t-1tot} + \beta_7 GFCDUMMY_{i,t} + \beta_7 RECOVERYDUMMY_{i,t} + \varepsilon_{i,t} \quad (1)$$

where $G_{i,t\ to\ t+n}$ is the compounded annual growth in sales (DataStream item WC01001) for firm $i$ from year $t$ to year $t+n$, represented by 1-year-ahead sales growth ($SG1_{i,t\ to\ t1}$), 3-year-ahead sales growth ($SG3_{i,t\ to\ t3}$) and 5-year-ahead sales growth ($SG5_{i,t\ to\ t5}$)[8]; $DPO_{i,t}$ is the dividend payout ratio (DataStream item POUT) for firm $i$ in year $t$; $LNMC_{i,t}$ is the natural logarithm of market capitalisation (DataStream item WC08001) for firm $i$ in year $t$; $LEV_{i,t}$ is the financial leverage (the ratio of total debt (DataStream item WC03255) to total assets (DataStream item WC02999)) for firm $i$ in year $t$; $ROA_{i,t}$ is the return on assets (the ratio of net income available to ordinary equity (DataStream item WC01751) to total assets (DataStream item WC02999)) for firm $i$ in year $t$; $EPR_{i,t}$ is the earnings-to-price ratio (DataStream item WC09204) for firm $i$ in year $t$; and $PAG_{i,t}$ is the growth in total assets (DataStream item WC02999) for firm $i$ from year $t-1$ to year $t$ (referred to as past assets growth in tables). The $GFCDUMMY_{i,t}$ variable takes the value of 1 for the observations that come from year 2008 and 2009, while the $RECOVERYDUMMY_{i,\mathrm{t}}$ variable takes the value of 1 for the observations that belong to the post-GFC period.[9] The $\varepsilon_{i,t}$ is the error term. The controls for firm characteristics are as in Zhou and Ruland (2006).

Our observation from a simple 'dividend payout versus growth graph' (discussed in detail in Section 4.3) reveals that dividend payout ratios are greatest at zero growth and decline with increasing growth rate (as traditional theory predicts). However, the dividend payout ratio also declines with increasingly negative growth rates. This side of the data therefore provides the *opposite* relation, namely that of dividend payouts increasing with greater (less negative) growth rates. A reporting of a linear relation in the data is meaningful only to the extent that the phenomenon being observed is actually linear in

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[8] The sales growth for a firm $i$ at time $t$ is calculated as $Sales\ Growth_{i,t} = \left[\left(\frac{Sales_{i,N}}{Sales_{i,t}}\right)^{\frac{1}{N}}\right] - 1$, where $N$ = 1, 3 and 5 for 1-year-ahead, 3-year-ahead and 5-year-ahead periods. These growth periods represent short-term, medium-term and long-term growth of the firm, as in Arnott and Asness (2003). Thus, we maintain a direct comparison between US and our Australian studies.

[9] These two variables are included in the model to take account of the effect of the economic cycle on firm growth. Our sample period encompasses a complete business cycle that includes a growth period (2000–2007), a recession period (GFC period 2008–2009) and a recovery period (2010–2014). Following Claessens *et al*. (2010), the majority of advanced economies experienced a recession that began in late 2007 and lasted until the end of 2009. As the accounting year of Australian companies ends in June of the year, we classify 2008–2009 as the GFC period. The results remain similar when we use 2008–2010 as the GFC period.

some underlying economic manner. The outcome is that our findings are more nuanced than those of previous research that reports either a linear ‘positive’ or a linear ‘negative’ relationship of dividend payout with growth.

Following from the above, we consider that the firm’s payout–growth relationship can be conditioned on a company’s market maturity and stage of growth. To address the issue, we avail of the typology of the BCG matrix that classifies companies as (i) stars (high-market-share–high-growth firms), (ii) cash cows (high-market-share–low-growth firms), (iii) question marks (low-market-share–high-growth firms) and (iv) dogs (low-market-share–low-growth firms).[10] We capture growth as a relative growth rate (the difference between the firm’s growth rate and the market’s growth rate) and relative market share (the firm’s market share divided by the market share of the industry’s third ranked firm) to allocate companies into the four categories. Thus, for example, we anticipate that a stable firm in a non-growth market (a ‘cash cow’) should have a high dividend payout ratio due to an absence of growth opportunities, whereas a firm with declining market position also without growth opportunities (a ‘dog’) will be unable to mimic such dividend payouts without a further deterioration in its market position. To capture such influences, we apply the following panel regression model:

$$\begin{aligned} G_{i,t\,to\,tn} = \alpha_i &+ \beta_1(DPO_{i,t} \times STARDUMMY_{i,t}) \\ &+ \beta_2(DPO_{i,t} \times CASHCOWDUMMY_{i,t}) \\ &+ \beta_3(DPO_{i,t} \times QUESTIONMARKDUMMY_{i,t}) \\ &+ \beta_4(DPO_{i,t} \times DOGDUMMY_{i,t}) + \beta_5 LNMC_{i,t} + \beta_6 LEV_{i,t} \\ &+ \beta_7 ROA_{i,t} + \beta_8 EPR_{i,t} + \beta_9 PAG_{i,t-1tot} + \beta_{10} GFCDUMMY_{Ii,t} \\ &+ \beta_{11} RECOVERYDUMMY_{Ii,t} + \varepsilon_{i,t} \end{aligned} \qquad (2)$$

where $STARDUMMY_{i,t}$, $CASHCOWDUMMY_{i,t}$, $QUESTIONMARKDUMMY_{i,t}$ and $DOGDUMMY_{i,t}$ are dummy variables that represent the four categories introduced above.

## 4. Results

### 4.1. Descriptive statistics

Table 1 provides a history of the number of companies used in the analysis in each year, together with mean figures for sales growth and dividend payout. We observe that the annual number of companies has increased gradually up to the global financial crisis (GFC), drops slightly during the GFC period and continues to decline during the recovery period. The growth of Australian

[10] We are grateful to the reviewer for bringing the BCG matrix to our attention (see Reeves *et al.* (2014) for an explanation on BCG’s methodology).

Table 1
Sample distribution, firm growth and dividend payout

| | One-year-ahead sales growth (SG1) sample | | | Three-year-ahead sales growth (SG3) sample | | | Five-year-ahead sales growth (SG5) sample | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | #Companies | SG1 mean | DPO mean | #Companies | SG3 mean | DPO mean | #Companies | SG5 mean | DPO mean |
| 2000 | 443 | 0.6978 | 0.3565 | 599 | 0.1371 | 0.2728 | 355 | 0.1126 | 0.3545 |
| 2001 | 714 | 1.0301 | 0.2637 | 1,003 | 0.2763 | 0.2027 | 586 | 0.1589 | 0.2505 |
| 2002 | 1,118 | 1.4664 | 0.2059 | 1,057 | 0.3599 | 0.1939 | 914 | 0.2577 | 0.1953 |
| 2003 | 1,159 | 1.7739 | 0.2034 | 1,093 | 0.3871 | 0.1964 | 944 | 0.2926 | 0.1918 |
| 2004 | 1,232 | 1.8311 | 0.2103 | 1,157 | 0.4781 | 0.2067 | 1,011 | 0.2428 | 0.1979 |
| 2005 | 1,357 | 1.6848 | 0.2124 | 1,242 | 0.4997 | 0.2014 | 1,115 | 0.2167 | 0.2026 |
| 2006 | 1,409 | 1.8893 | 0.2045 | 1,338 | 0.3457 | 0.1961 | 1,171 | 0.2096 | 0.1921 |
| 2007 | 1,523 | 1.9925 | 0.16901 | 1,504 | 0.2147 | 0.1816 | 1,272 | 0.1476 | 0.1854 |
| 2008 | 1,681 | 0.6909 | 0.1766 | 1,595 | 0.1553 | 0.1671 | 1,374 | 0.0467 | 0.1738 |
| 2009 | 1,703 | 1.2157 | 0.1441 | 1,553 | 0.2552 | 0.1419 | 1,312 | 0.0612 | 0.1559 |
| 2010 | 1,673 | 1.7246 | 0.1494 | 1,548 | 0.2345 | 0.1513 | 1,141 | 0.0457 | 0.1758 |
| 2011 | 1,667 | 1.2191 | 0.1534 | 1,457 | 0.0436 | 0.1612 | | | |
| 2012 | 1,674 | 0.9078 | 0.1572 | 1,258 | −0.0061 | 0.1759 | | | |
| 2013 | 1,586 | 1.2385 | 0.1618 | | | | | | |
| 2014 | 1,351 | 1.2023 | 0.1781 | | | | | | |

The table reports the year-by-year distribution of sample companies together with average annual figures for sales growth (SG1, SG3 and SG5, respectively) and dividend payout (DPO) reported as fractions for three samples.

companies improves up to the GFC, is hampered during the GFC period and shows slight improvements during the post-GFC period. We note high mean values for 1-year-ahead growth figures (due to the inclusion of very high annual growth rates), which are moderated over medium-term and long-term periods. The dividend payout remains around 20 percent prior to the GFC, drops during the crisis period and shows sign of an increase in the recovery period.

Table 2 provides summary statistics for sales growth, dividend payout and control variables.[11] As observed in Table 1, mean 1-year-ahead sales growth figures are high (138.52 percent), which reduces to an annualised 15.74 percent over a 5-year period. The range of values across individual firms is considerable, as indicated by the standard deviations and the range from large negative to large positive growth figures across the quartile partitions. The mean dividend payout is 18.46 percent, the median is zero, and the cut-off separating the top 25 percent dividend payouts from the lower 75 percent is 37.35 percent. For the earnings-to-price (E/P) ratio, the cut-off separating the top 25 percent values from the lower 75 percent is 6.19 percent.

[11] To conserve space, we report the statistics for the explanatory and control variables only for the 1-year-ahead sales growth sample.

Table 2
Descriptive statistics

| Variable | Mean | Standard deviation | Quartile 1 | Median | Quartile 3 |
|---|---|---|---|---|---|
| Dependent variable | | | | | |
| SG1 | 1.3852 | 6.8559 | −0.2431 | 0.0584 | 0.4265 |
| SG3 | 0.2541 | 0.9291 | −0.1521 | 0.0599 | 0.3158 |
| SG5 | 0.1574 | 0.5636 | −0.1142 | 0.0600 | 0.2608 |
| Explanatory variable | | | | | |
| DPO | 0.1846 | 0.3021 | 0 | 0 | 0.3735 |
| Control variables | | | | | |
| LNMC | 17.4676 | 9.0935 | 15.8507 | 17.0912 | 18.8013 |
| LEV | 0.1517 | 0.2423 | 0 | 0.0258 | 0.2408 |
| ROA | −0.3106 | 0.9055 | −0.2911 | −0.0499 | 0.0506 |
| EPR | −0.2677 | 0.8200 | −0.2449 | −0.0400 | 0.0619 |
| PAG | 0.4782 | 1.9608 | −0.1251 | 0.0454 | 0.3107 |

The table reports descriptive statistics (mean, standard deviation, quartile 1, median and quartile 3) for the sales growth (SG1, SG3 and SG5), dividend payout (DPO), natural logarithm of market capitalisation (LNMC), leverage (LEV), return on assets (ROA), earnings-to-price ratio (EPR) and past assets growth (PAG). Quartile 1 (3) is the cut-off separating the lowest 25 percent (75 percent) of the sample and the remaining sample.

Table 3 presents the correlation analysis for three samples. We note a consistent and negative relation of sales growth with dividend payout ratio across all three samples (5 percent level of significance). Similar consistency is observed for the correlation of sales growth with leverage and firm size (higher sales growth correlated negatively with leverage and firm size), and for sales growth with past assets growth (positive, implying that growth is sustained over subsequent years).

### 4.2. Dividend payout and firm growth

We commence our analyses by modelling the direct relationship between dividend payout and sales growth as estimated by Equation (1). The analysis allows for a comparison with the findings of, for example, Arnott and Asness (2003), Zhou and Ruland (2006) and Gwilym *et al*. (2006). The regression outputs are presented in Table 4. Panel A reports the coefficient estimates when the regression is estimated with firm fixed effect, and panel B reports the coefficient estimates when the model is estimated with random effect.

In panel A of Table 4, we observe that earnings growth over one-, 3- and 5-year periods has a significant *negative* dependence on the dividend payout variable. The magnitude of the dividend payout coefficient declines as the length of the period used to calculate the compound growth rate increases (nevertheless, the level of significance of the coefficient remains at the 1 percent

Table 3
Correlation analysis

Panel A: One-year-ahead sales growth (SG1) sample

| | SG1 | DPO | EPR | LEV | LNMC | PAG | ROA |
|---|---|---|---|---|---|---|---|
| SG1 | 1 | | | | | | |
| DPO | −0.1024*** (−14.66) | 1 | | | | | |
| EPR | −0.0192*** (−2.72) | 0.2361*** (34.62) | 1 | | | | |
| LEV | −0.0034 (−0.49) | 0.1175*** (16.86) | −0.1871*** (−27.13) | 1 | | | |
| LNMC | −0.0618*** (−8.82) | 0.5847*** (102.67) | 0.3444*** (52.25) | 0.0947*** (13.55) | 1 | | |
| PAG | 0.0870*** (12.44) | −0.0723*** (−10.33) | 0.1170*** (16.78) | −0.0650*** (−9.28) | 0.0307*** (4.36) | 1 | |
| ROA | −0.0529*** (−7.54) | 0.2558*** (37.68) | 0.5531*** (94.58) | −0.1819*** (−26.35) | 0.3242*** (48.82) | 0.1172*** (16.82) | 1 |

Panel B: Three-year-ahead sales growth (SG3) sample

| | SG3 | DPO | EPR | LEV | LNMC | PAG | ROA |
|---|---|---|---|---|---|---|---|
| SG3 | 1 | | | | | | |
| DPO | −0.1011*** (−13.16) | 1 | | | | | |
| EPR | 0.0667 (0.86) | 0.0498*** (6.46) | 1 | | | | |
| LEV | −0.0531*** (−6.89) | 0.1533*** (20.09) | −0.0458*** (−5.93) | 1 | | | |
| LNMC | −0.0478*** (−6.19) | 0.5832*** (93.01) | 0.0880*** (11.45) | 0.1309*** (17.11) | 1 | | |
| PAG | 0.3024*** (41.09) | −0.0751*** (−9.75) | 0.0062 (0.81) | −0.0009 (−0.11) | −0.0801*** (−10.49) | 1 | |
| ROA | 0.0035 (0.45) | 0.0117 (1.52) | 0.0090 (1.17) | −0.0193** (−2.50) | 0.0145* (1.88) | −0.0155** (−2.00) | 1 |

Panel C: Five-year-ahead sales growth (SG5) sample

| | SG5 | DPO | EPR | LEV | LNMC | PAG | ROA |
|---|---|---|---|---|---|---|---|
| SG5 | 1 | | | | | | |
| DPO | −0.0955*** (−10.15) | 1 | | | | | |

(continued)

**Table 3** (continued)

Panel C: Five-year-ahead sales growth (SG5) sample

| | SG5 | DPO | EPR | LEV | LNMC | PAG | ROA |
|---|---|---|---|---|---|---|---|
| EPR | 0.0364*** (3.86) | 0.2550*** (27.91) | 1 | | | | |
| LEV | −0.0818*** (−8.68) | 0.1566*** (16.77) | −0.1776*** (−19.09) | 1 | | | |
| LNMC | −0.0492*** (−5.21) | 0.5989*** (79.12) | 0.3415*** (38.48) | 0.1441*** (15.41) | 1 | | |
| PAG | 0.1146*** (12.21) | −0.0751*** (−7.97) | 0.1045*** (11.13) | −0.0702*** (−7.45) | 0.0168 (1.78) | 1 | |
| ROA | −0.0425*** (−4.50) | 0.2791*** (30.74) | 0.5821*** (75.75) | −0.1284*** (−13.71) | 0.3185*** (35.56) | 0.1139*** (12.13) | 1 |

The table reports correlation matrix for the variables used in the study. The $t$-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10, 5 and 1 percent level, respectively.

Table 4
Firm growth and dividend payout

| Explanatory and control variables | Panel A: Fixed-effect model estimates | | | Panel B: Random-effect model estimates | | |
|---|---|---|---|---|---|---|
| | SG1 sample | SG3 sample | SG5 sample | SG1 sample | SG3 sample | SG5 sample |
| Constant | 3.2536*** (4.36) | 0.9773*** (5.99) | 1.3618*** (9.91) | 2.5511*** (6.18) | 0.3589*** (3.13) | 0.6406*** (4.63) |
| Dividend payout | −0.9266*** (−5.64) | −0.1812*** (−4.51) | −0.0816*** (−2.77) | −1.4313*** (−7.88) | −0.1994*** (−4.92) | −0.0305 (−0.98) |
| Natural logarithm of market capitalisation | −0.1550** (−2.56) | −0.0595*** (−4.09) | −0.1064*** (−8.63) | −0.0357 (−0.94) | 0.0014 (0.20) | −0.0376*** (−3.89) |
| Leverage | 0.5146 (1.43) | −0.5104*** (−6.59) | −0.2596*** (−9.20) | 0.5357** (2.10) | −0.2055*** (−4.82) | −0.1835*** (−4.59) |
| Return on assets | −0.3011*** (−3.07) | 0.0001 (0.29) | −0.0980*** (−9.50) | −0.3382*** (−3.70) | 0.0001 (1.42) | −0.0794*** (−6.57) |
| Earnings-to-price ratio | 0.2459** (2.56) | 0.0018*** (4.05) | 0.1071*** (7.79) | 0.1598 (1.70) | 0.0006 (0.85) | 0.0792*** (6.22) |
| Past assets growth | 0.2042*** (4.33) | 0.1488*** (15.73) | 0.0199*** (5.63) | 0.2780*** (4.87) | 0.1724*** (18.44) | 0.0174*** (6.00) |
| GFC period dummy | −0.7550*** (−3.25) | −0.0929*** (−2.80) | −0.1148*** (−10.62) | −0.8291*** (−3.83) | −0.1230*** (−2.98) | −0.1434*** (−8.85) |
| Recovery period dummy | −0.3528** (−2.29) | −0.1812*** (−3.43) | −0.1153*** (−11.80) | −0.5692*** (−4.46) | −0.2269*** (−3.93) | −0.1481*** (−8.76) |
| Consumer goods industry dummy | N/A | N/A | N/A | −1.2011*** (−5.26) | −0.1136** (−2.13) | −0.0594 (−1.08) |
| Consumer services industry dummy | N/A | N/A | N/A | −0.9199*** (−3.36) | −0.0631 (−0.97) | −0.0135 (−0.30) |
| Financials industry dummy | N/A | N/A | N/A | −0.6295*** (−2.82) | −0.0792 (−1.30) | −0.0392 (−0.60) |
| Healthcare industry dummy | N/A | N/A | N/A | −0.4737 (−1.45) | −0.0163 (−0.20) | −0.0610 (−0.79) |
| Industrials industry dummy | N/A | N/A | N/A | −0.9296*** (−4.55) | −0.0559 (−0.99) | −0.0161 (−0.46) |
| Oil & Gas industry dummy | N/A | N/A | N/A | 0.0882 (0.51) | 0.0991*** (2.99) | 0.0529* (1.77) |

(continued)

**Table 4** (continued)

| Explanatory and control variables | Panel A: Fixed-effect model estimates | | | Panel B: Random-effect model estimates | | |
|---|---|---|---|---|---|---|
| | SG1 sample | SG3 sample | SG5 sample | SG1 sample | SG3 sample | SG5 sample |
| Technology industry dummy | N/A | N/A | N/A | −0.9312*** (−3.33) | −0.1236 (−1.51) | −0.1221* (−1.86) |
| Telecommunications industry dummy | N/A | N/A | N/A | −0.6902** (−2.00) | −0.0013 (−0.02) | 0.0407 (0.73) |
| Utilities industry dummy | N/A | N/A | N/A | −0.5672 (−1.19) | −0.0523 (−0.39) | 0.0822 (0.80) |
| Model statistics: | | | | | | |
| $R^2$ | 0.1272 | 0.3261 | 0.4700 | 0.0238 | 0.0999 | 0.0534 |
| *F*-statistic | 1.17*** | 3.57*** | 5.30*** | 29.16*** | 109.51*** | 37.09*** |
| No. of observations | 20,289 | 16,780 | 11,195 | 20,289 | 16,780 | 11,195 |

The table reports coefficient estimates for the regression Equation (1). The panel regression models were estimated with both firm fixed effect (panel A) and random effect (panel B). We allow standard errors to cluster at the firm level. The *t*-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10, 5 and 1 percent level, respectively.

level in all three models). Thus, our findings here are aligned with conventional theory (greater distribution of corporate earnings as dividends is associated with a lower firm growth), as opposed to, for example, Arnott and Asness (2003) and Zhou and Ruland (2006).

We find, on average, that firm characteristics such as size, leverage and profitability have a significant negative influence on firm growth, while earnings-to-price ratio and past assets growth having a significant positive influence. Not surprisingly, the GFC has a significant negative influence on firm growth, which impact appears to have been sustained as revealed by the negative and significant coefficients generated for the recovery period dummy. Our models explain 13 percent to 47 percent of the variation in firm growth; all the models are significant at the 1 percent level.

Panel B reports the estimates for the random-effect models aimed at determining whether industry membership has an influence on the relationship between dividend payout and firm growth. We find no consistent evidence to suggest that industry membership has a significant influence on the growth of the firm. Thus, the remainder of the paper estimates only fixed-effect models. As observed in the above fixed-effect models, the dividend payout coefficient enters with negative coefficients (two of the coefficients are significant at the 1 percent level).

### 4.3. *Graphical presentation of dividend payout and firm growth*

The BCG matrix suggests that the firm's dividend payout might be recognised in relation to both the firm's market life-cycle position and its future growth. The Australian market is characterised by a small number of large companies that generate sufficient funds for both paying dividends and investing in new projects, alongside a large number of small companies whose internal funds compete for dividends and investments. Figures 1–3 graph the dividend payout ratio against sales growth for the cross section of listed

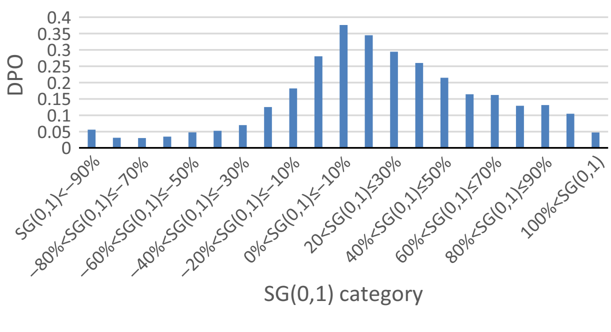



Figure 1 Graphical presentation of dividend payout and 1-year-ahead sales growth.

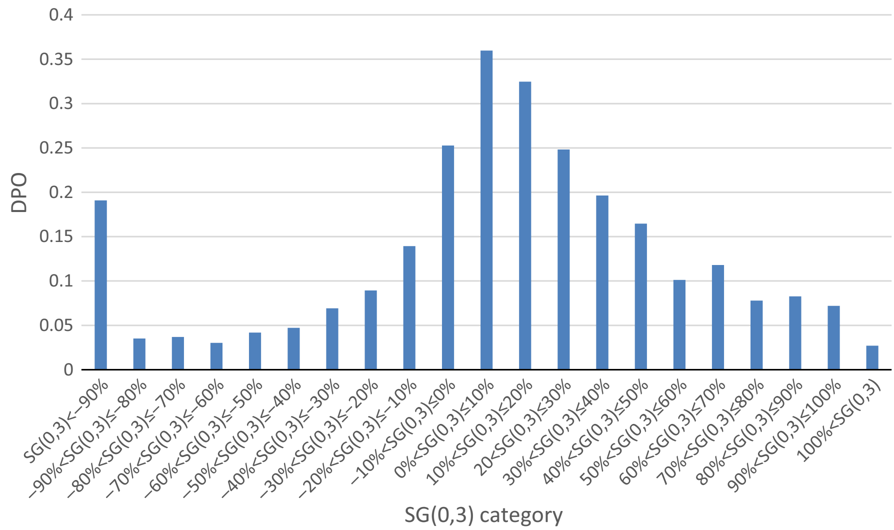



Figure 2 Graphical presentation of dividend payout and 3-year-ahead sales growth.

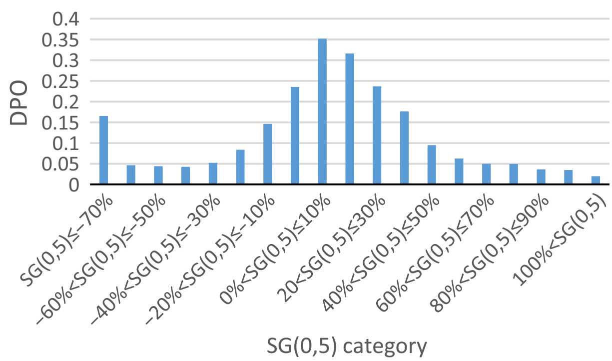
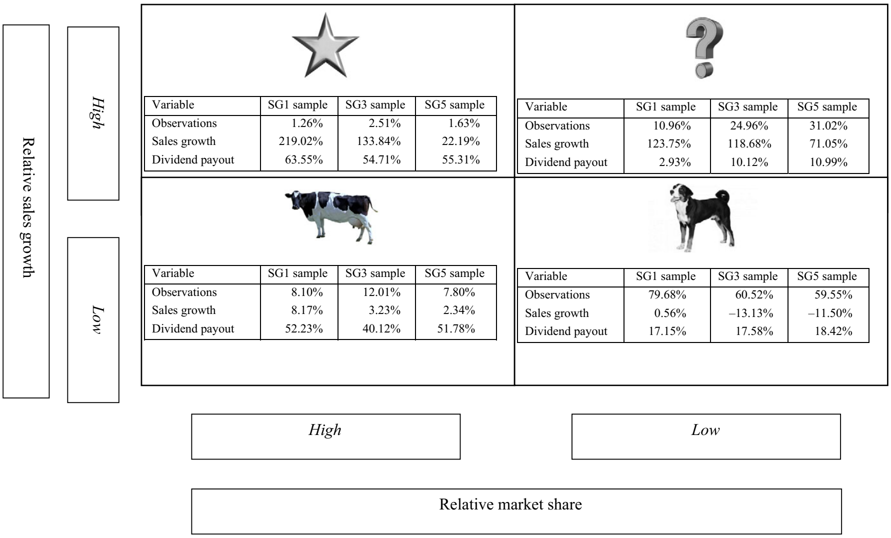



Figure 3 Graphical presentation of dividend payout and 5-year-ahead sales growth.

Australian companies. The figures reveal that the highest dividend payouts occur at the zero growth point. Specifically, it appears that firms with zero growth rates are indeed ‘cash cows’ and make the highest dividend payouts, with higher levels of growth associated with lower dividend payouts, as predicted by conventional theory. However, many firms report *negative* growth rates. Such firms curtail dividend payouts, which is how we might expect – firms that are increasingly struggling and/or ineffectively managed are observed to have increasingly weak dividend payouts. An interesting addition to the




| Variable | SG1 sample | SG3 sample | SG5 sample |
|---|---|---|---|
| Observations | 1.26% | 2.51% | 1.63% |
| Sales growth | 219.02% | 133.84% | 22.19% |
| Dividend payout | 63.55% | 54.71% | 55.31% |

| Variable | SG1 sample | SG3 sample | SG5 sample |
|---|---|---|---|
| Observations | 10.96% | 24.96% | 31.02% |
| Sales growth | 123.75% | 118.68% | 71.05% |
| Dividend payout | 2.93% | 10.12% | 10.99% |

| Variable | SG1 sample | SG3 sample | SG5 sample |
|---|---|---|---|
| Observations | 8.10% | 12.01% | 7.80% |
| Sales growth | 8.17% | 3.23% | 2.34% |
| Dividend payout | 52.23% | 40.12% | 51.78% |

| Variable | SG1 sample | SG3 sample | SG5 sample |
|---|---|---|---|
| Observations | 79.68% | 60.52% | 59.55% |
| Sales growth | 0.56% | –13.13% | –11.50% |
| Dividend payout | 17.15% | 17.58% | 18.42% |

Figure 4 Percentage of observations, average sales growth and average dividend payout for four market share–sales growth categories.

observation of an almost symmetrical distribution of payout ratios around the zero growth point in the figures (on the *x*-axis) is the actual upswing of dividend payout at more extreme values of negative growth. It is possible that firms here are engaged in a window-dressing exercise, so that a small preserved dividend divided by an increasingly small earnings figure leads to a notionally higher recorded dividend payout.[12]

The BCG matrix classifies companies as 'stars' (high growth, high market share), 'cash cows' (low growth, high market share), 'question marks' (high growth, low market share) and 'dogs' (low growth, low market share). On such allocation, Figure 4 reveals that the 'stars' category has the lowest number of firms (1.26–1.63 percent, depending on the growth period as 1-year, 3-year or 5-year growth), while the 'dogs' category has the largest number of firms (59.55–79.68 percent). The 'question marks' (10.96–31.02 percent, depending on the growth period as 1-year, 3-year or 5-year growth), the 'cash cows' (7.80–12.01 percent, depending on the growth period as 1-year, 3-year or 5-year growth).

In Figure 4, we also reveal that the 'stars' are capable of paying generous dividends (55.31 percent payout ratio) while maintaining high growth rates (22.19 percent) over 5 years, while 'cash cows' are capable of paying

[12] He *et al.* (2016) also report that although Chinese firms that are financially constrained generally adhere to more conservative dividend payouts, firms that are highly financially constrained appear to allow more liberal dividend payouts.

generous dividends (51.78 percent payout ratio) but do not have growth opportunities (growth rate 2.34 percent) over 5 years. We note that the ‘question marks’ and ‘dogs’ have the lowest dividend payouts, with the ‘question marks’ combining a low dividend payout (10.99 percent) with high growth (71.05 percent) over 5 years, and the ‘dogs’ combining a somewhat higher dividend payout (18.42 percent) with *negative* growth (−11.50 percent) over 5 years.

### *4.4. Dividend payout and firm growth for market share–sales growth categories*

To capture dividend payout in relation to the firm’s life-cycle position (market share) and (sales) growth, we estimate Equation (2). The results presented in Table 5 indicate a marked distinction between high-growth companies as either ‘stars’ or ‘question marks’, and low-growth firms as either ‘cash cows’ or ‘dogs’. The former two groups appear to signal their growth potential with dividend payout ratios that are *positively* related to their subsequent growth (consistent with Arnott and Asness, 2003; Zhou and Ruland, 2006; and Gwilym *et al*., 2006), while for the latter two groups, we observe a conventional *negative* relation between dividend payout ratio and the firm’s subsequent growth. The findings are consistent over 1-, 3- and 5-year periods. The signs and significances of the coefficients generated for the control variables are similar to those reported in Table 4. Thus, we support our hypothesis that the dependence of corporate growth on dividend payout does not apply equally across all firms, but, rather, is dependent on the firm’s position on the BCG growth matrix.

### *4.5. Firm size and the payout–growth relationship*

In the 1-year-ahead sales growth sample, the two high-market-share groups ‘stars’ and ‘cash cows’ have a larger market capitalisation (average AU$1,479 million and AU$1,850 million, respectively) than ‘question marks’ and ‘dogs’ (average AU$18.7 million and AU$29.3 million, respectively). This is consistent with the hypothesis that higher firm performances are related positively to firm size due to benefits of economies of scale and economies of scope. Nevertheless, only the large-size group of ‘stars’ appears to be capable of paying dividends while achieving high growth.

To address the possibility that our findings are a manifestation of a firm size effect, we divide the sample into two groups as ‘large firms’ (defined as those firms that belong to the top quarter market capitalisation group in a given year) and ‘small firms’ (defined as those firms that belong to the remaining three quarters by market capitalisation) and re-estimate the regression Equation (2). The findings are presented in Table 6, which reveals that the signs and significances of the four interaction terms (dividend payout*star dummy, dividend payout*cash cow dummy, dividend payout*question mark dummy

Table 5
Firm growth and dividend payout for four market share–sales growth ('Star', 'Cash Cow', 'Question Mark' and 'Dog') categories

| Explanatory and control variables | SG1 sample | SG3 sample | SG5 sample |
|---|---|---|---|
| Constant | 3.1970*** (4.13) | 0.9677*** (5.88) | 1.3451*** (9.64) |
| Dividend payout*Star dummy | 1.4253* (1.92) | 0.2782** (2.23) | 0.1464*** (5.04) |
| Dividend payout*Cash Cow dummy | −0.5141*** (−2.89) | −0.2056*** (−4.14) | −0.0741*** (−3.56) |
| Dividend payout*Question Mark dummy | 8.9181*** (4.63) | 0.2209*** (2.95) | 0.1688*** (3.04) |
| Dividend payout*Dog dummy | −1.3097*** (−6.42) | −0.3127*** (−7.41) | −0.1821*** (−5.23) |
| Natural logarithm of market capitalisation | −0.1487** (−1.97) | −0.0581*** (−3.98) | −0.1044*** (−8.39) |
| Leverage | 0.5231 (1.49) | −0.3410*** (−6.42) | −0.2564*** (−9.25) |
| Return on assets | −0.2980*** (−3.03) | 0.0001 (0.31) | −0.0976*** (−9.50) |
| Earnings-to-price ratio | 0.2453*** (2.56) | 0.0018*** (4.03) | 0.1068*** (7.74) |
| Past assets growth | 0.1988*** (4.21) | 0.1468*** (15.31) | 0.0195*** (5.52) |
| GFC period dummy | −0.7620*** (−3.27) | −0.0911*** (−2.70) | −0.1254*** (−11.41) |
| Recovery period dummy | −0.3606** (−2.28) | −0.1987*** (−3.17) | −0.1307*** (−12.64) |
| Model statistics: | | | |
| $R^2$ | 0.1311 | 0.3303 | 0.4748 |
| *F*-statistic | 1.21*** | 3.63*** | 5.39*** |
| No. of observations | 20,289 | 16,780 | 11,195 |

The table reports coefficient estimates for the regression Equation (2). The panel regression models were estimated with firm fixed effect allowing standard errors to cluster at the firm level. The *t*-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10, 5 and 1 percent level, respectively.

and dividend payout*dog dummy) reported in panels A (large-size firms) and B (small-size firms) remain qualitatively similar to those reported in Table 5.[13] We also observe that the signs and significance levels of the control variables are similar for the two firm size samples. Thus, our findings remain independent of a size effect.

[13] The only exception is the insignificant coefficient generated for the 'dividend payout*star dummy' variable in panel A and the non-availability of 'star' firms among small companies in panel B.

Table 6
Sales growth and dividend payout for large versus small companies

| Explanatory and control variables | SG1 sample | SG3 sample | SG5 sample |
|---|---|---|---|
| Panel A: Large companies sample | | | |
| Constant | 1.4590 (0.79) | 1.8410*** (5.13) | 1.5873 (4.71) |
| Dividend payout*Star dummy | 1.2848 (1.11) | 0.2695** (2.47) | 0.1634*** (4.81) |
| Dividend payout*Cash Cow dummy | −0.4277*** (−3.08) | −0.1273*** (−3.84) | −0.0634** (−2.51) |
| Dividend payout*Question Mark dummy | 8.5890*** (3.66) | 0.2313** (2.39) | 0.2049*** (3.90) |
| Dividend payout*Dog dummy | 0.8202*** (−3.53) | −0.2227*** (−5.32) | −0.0876** (−2.15) |
| Firm-specific control variables | Included | Included | Included |
| GFC & Recovery dummies | Included | Included | Included |
| Model statistics: | | | |
| $R^2$ | 0.3703 | 0.5831 | 0.7003 |
| $F$-statistic | 2.79 | 6.21 | 9.10 |
| No. of observations | 5,079 | 4,201 | 2,802 |
| Panel B: Small companies sample | | | |
| Constant | 3.8434*** (4.37) | 0.9130*** (5.60) | 0.7849*** (5.32) |
| Dividend payout**Star dummy | N/A | 0.5311*** (2.78) | 0.1492*** (6.63) |
| Dividend payout*Cash Cow dummy | −0.5436*** (−2.61) | −0.2923*** (−4.30) | −0.0952*** (−3.60) |
| Dividend payout*Question Mark dummy | 10.5415*** (4.02) | 0.3434*** (4.82) | 0.2999*** (8.90) |
| Dividend payout*Dog dummy | −1.3485*** (−4.73) | −0.3109*** (−5.24) | −0.2489*** (−9.52) |
| Firm-specific control variables | Included | Included | Included |
| GFC & Recovery dummies | Included | Included | Included |
| Model statistics: | | | |
| $R^2$ | 0.1451 | 0.3519 | 0.0567 |
| $F$-statistic | 1.10*** | 3.23*** | 45.82*** |
| No. of observations | 15,210 | 12,579 | 8,393 |

The table reports coefficient estimates for the regression Equation (2) when the sample is split into two groups as large (panel A) and small (panel B) companies. The panel regression models were estimated with firm fixed effect allowing standard errors to cluster at the firm level. The $t$-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10, 5 and 1 percent level, respectively.

## 4.6. Earnings growth as an alternative measure of firm growth

We have observed that a restriction with identifying the firm's growth as *earnings* growth (as opposed to sales growth as above) is the need to restrict the

Table 7
Earnings growth and dividend payout for four market share–sales growth ('Star', 'Cash Cow', 'Question Mark' and 'Dog') categories

| Explanatory and control variables | SG1 sample | SG3 sample | SG5 sample |
|---|---|---|---|
| Constant | −1.4356 (−0.61) | 3.0896*** (5.24) | 1.9385*** (3.95) |
| Dividend payout*Star dummy | 6.1895* (1.89) | 0.6881*** (3.50) | 0.1776 (1.16) |
| Dividend payout*Cash Cow dummy | 0.4461 (1.08) | −0.0547 (−0.47) | −0.0009 (−0.01) |
| Dividend payout* Question Mark dummy | 3.5771** (4.73) | 0.2581*** (2.98) | 0.1869** (2.04) |
| Dividend payout*Dog dummy | 0.3010 (1.13) | −0.2405 (−2.27) | −0.0657 (−0.62) |
| Natural logarithm of market capitalisation | 0.0137 (0.07) | −0.2918*** (−5.53) | −0.2059*** (−5.04) |
| Leverage | 1.9885** (2.27) | 0.3125** (2.13) | 0.4412*** (3.11) |
| Return on assets | 1.9507 (1.41) | 0.5857* (1.90) | 0.1731 (0.72) |
| Earnings-to-price ratio | 0.4491 (0.50) | −0.9808*** (−2.85) | −0.5187 (−2.60) |
| Past assets growth | 0.0882 (1.30) | −0.0055 (−0.33) | 0.0127 (0.73) |
| GFC period dummy | −0.5946 (−1.39) | −0.1086 (−1.38) | −0.1569*** (−3.93) |
| Recovery period dummy | −0.7578*** (−2.76) | −0.2647** (−2.34) | −0.2193*** (−3.56) |
| Model statistics: | | | |
| $R^2$ | 0.42 | 0.54 | 0.58 |
| *F*-statistic | 3.25*** | 4.68*** | 5.02*** |
| No. of observations | 8445 | 6577 | 4812 |

The table reports coefficient estimates for the regression Equation (2). The panel regression models were estimated with firm fixed effect allowing standard errors to cluster at the firm level. The *t*-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10, 5 and 1 percent level, respectively.

analysis to firms with positive earnings. With such restriction, we repeat the analysis of Table 5 so as to achieve a conformity of comparison with previous work (Arnott and Asness, 2003; Zhou and Ruland, 2006). We proceed to model growth as compounding annual earnings growth for firms designated as 'star', 'cash cow', 'question mark' and 'dog' firms. Equation (2) is then estimated with 1-year-ahead, 3-year-ahead and 5-year-ahead earnings growth (*EG1*, *EG3*, *EG5*) as the dependent variable.[14] The regression estimates are presented in Table 7.

[14] The numbers of observations in the earnings growth regressions 4,812 (5-year growth) and 8,445 (1-year growth) compare with 11,195 and 20,290 observations, respectively, for the sales growth regressions (see Table 5). Furthermore, the excluded companies are likely to be non-dividend-paying and struggling firms, thereby skewing the study to large and well-established companies. The exclusion of negative earnings companies may also result in dropping early life-cycle companies.

We find that earnings growth over 1-, 3- and 5-year periods has a significant *positive* dependence on the dividend payout variable for 'stars' and 'question marks', whereas the relationship is insignificant for 'cash cows' and 'dogs'. As Zhou and Ruland (2006), we determine positive and significant coefficients for leverage and past assets growth variables for earnings growth. It appears that the findings of a Zhou and Ruland-style analysis are representative of a sample that mainly consists of 'stars' and 'question marks', whereas the findings reported in Section 4.5 are representative of a cross section of companies in different stages of their life cycle. We also determine that firm size, profitability and earnings-to-price ratio enter the regression models with significant positive coefficients.

### *4.7. Market valuation of firm growth*

In this section, we address the extent to which the market is able to differentiate *ex ante* between 'stars', 'cash cows', 'question marks' and 'dogs'. To this end, we consider both the firm's Tobin's $Q$ ratio (calculated as market capitalisation (DataStream item WC08001) plus total liabilities (DataStream item WC03351) divided by total assets (DataStream item WC08326)) and P/E ratio (DataStream item PE) as representing the market's relative pricing of market shares. In effect, we ask: Is the market able to distinguish between low-payout firms that are growing and those that will fail to do so? We regress Tobin's $Q$ on sales growth and three dummies to represent 'cash cows', 'question marks' and 'dogs'. Our objective is to test whether the market assigns higher/lower values for Tobin's $Q$ to companies in the above three groups relative to those in the 'star' group. The results are reported in Table 8.

In Table 8, for short-term, medium-term and long-term growth, the sales growth coefficients enter the regression models for Tobin's $Q$ with positive coefficients in panels A, B and C, significant at the one percent level. Nevertheless, the coefficients on growth are quite weak. Thus, in relation to growth over a 5-year period, we have Tobin's $Q$ as

$$\text{Tobin's } Q = 2.0556 + 0.5395 \times \text{annual growth rate},$$

so that a 10 percent annual growth rate has the effect of increasing Tobin's $Q$ from 2.0556 to only 2.1056 (2.0556 + 0.05395). Further, the coefficients on the 'cash cow', 'question mark' and 'dog' dummies reveal that the market is unable to distinguish between 'stars' and 'dogs' and actually awards a higher Tobin's $Q$ to 'question mark' firms than it does to 'stars'.

We employ a similar approach to analyse the price–earnings (P/E) multiple for firms with reported positive earnings in year 0 of growth calculation horizon. The results are reported in Table 9. Subsequent growth over 3 and 5 years does appear to have a positive and significant impact on P/E. However, the constant

Table 8
Sales growth and Tobin's $Q$ for four market share–sales growth ('Star', 'Cash Cow', 'Question Mark' and 'Dog') categories

| Explanatory and control variables | Panel A: SG1 sample | | Panel B: SG3 sample | | Panel C: SG5 sample | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 | Model 1 | Model 2 |
| Constant | 1.9763*** (100.59) | 2.1271*** (23.33) | 1.9944*** (92.13) | 2.0053*** (33.15) | 2.0556*** (78.84) | 1.9849*** (26.72) |
| One-year-ahead sales growth | 0.0304*** (10.57) | 0.0097*** (2.80) | | | | |
| Three-year-ahead sales growth | | | 0.2971*** (12.51) | 0.1681*** (5.68) | | |
| Five-year-ahead sales growth | | | | | 0.5395*** (11.49) | 0.3366*** (5.36) |
| Cash Cow dummy | | −0.8179*** (−7.17) | | −0.4356*** (−5.03) | | −0.9658*** (−9.08) |
| Question Mark dummy | | 0.5873*** (5.03) | | 0.3956*** (4.94) | | 0.3894*** (3.97) |
| Dog dummy | | −0.1580* (−1.69) | | −0.0354 (−0.53) | | 0.0606 (0.74) |
| Model statistics: | | | | | | |
| $R^2$ | 0.01 | 0.01 | 0.01 | 0.01 | 0.01 | 0.02 |
| $F$-statistic | 111.62*** | 78.25*** | 156.56*** | 63.95*** | 132.08*** | 52.05*** |
| No. of observations | 20,289 | 20,289 | 16,780 | 16,780 | 11,195 | 11,195 |

The table reports coefficient estimates for the regressions when the dependent variable is the Tobin's $Q$. The panel regression models were estimated with firm fixed effect allowing standard errors to cluster at the firm level. The $t$-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10, 5 and 1 percent level, respectively.

Table 9
Sales growth and positive P/E multiple for four market share–sales growth (‘Star’, ‘Cash Cow’, ‘Question Mark’ and ‘Dog’) categories

| Explanatory and control variables | Panel A: SG1 sample | | Panel B: SG3 sample | | Panel C: SG5 sample | |
|---|---|---|---|---|---|---|
| | Model 1 | Model 2 | Model 1 | Model 2 | Model 1 | Model 2 |
| Constant | 26.2777*** (56.23) | 79.7332** (2.12) | 25.9936*** (59.68) | 23.6789*** (11.82) | 24.8214*** (43.92) | 24.3593*** (7.72) |
| One-year-ahead sales growth | 0.2195 (1.11) | −0.0779 (−0.30) | | | | |
| Three-year-ahead sales growth | | | 7.3257*** (5.29) | 6.1251*** (4.65) | | |
| Five-year-ahead sales growth | | | | | 12.4175*** (5.05) | 9.6631*** (3.93) |
| Cash Cow dummy | | −57.2346 (−1.52) | | 1.5810 (0.71) | | −1.3556 (−0.48) |
| Question Mark dummy | | −43.0374 (−1.14) | | 6.1677** (2.51) | | 4.3331 (1.39) |
| Dog dummy | | −53.0056 (−1.40) | | 1.8548 (0.87) | | −0.0588 (−0.02) |
| Model statistics: | | | | | | |
| $R^2$ | 0.39 | 0.39 | 0.43 | 0.43 | 0.47 | 0.47 |
| *F*-statistic | 2.95*** | 2.96*** | 3.28*** | 3.28*** | 3.35*** | 3.34*** |
| No. of observations | 8,447 | 8,447 | 7,077 | 7,077 | 4,841 | 4,841 |

The table reports coefficient estimates for the regression Equation (2). The panel regression models were estimated with firm fixed effect allowing standard errors to cluster at the firm level. The *t*-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10, 5 and 1 percent level, respectively.

(approximately 24.0 in both cases) and the coefficients indicate that only a very small proportion of the P/E ratio is actually determined by subsequent growth. Thus, in relation to growth over a 5-year period, we have P/E as

$$P/E = 24.8214 + 12.4175 \times \text{annual growth rate},$$

so that a 10 percent annual growth rate has the effect of increasing the P/E from 24.8214 to only 26.06315 (24.8214 + 1.24175). In addition, it appears that the market assigned P/E is unable to distinguish significantly between the groupings of the firms as 'stars', 'cash cows', 'question marks' or 'dogs'.

### *4.8. Sensitivity tests*

In this section, we report the findings of two sensitivity tests. Williams and Miller (2013) provide evidence that dividend-paying stocks perform better than the aggregate market during recessionary and recovery periods. We have observed that the GFC period dummy and the recovery period dummy generated significant negative coefficients implying that firm growth has been hampered during these periods. We examine more closely the impact that the recession/recovery period of the business cycle has on the payout–growth relationship by splitting the sample into three periods – growth period (2000–2007), GFC period (2008–2009) and recovery period (2010–2014).[15] To conserve space, we report the findings for the SG3 sample only in panel A of Table 10 (nevertheless, the results remain essentially the same for the other two samples). We observe that the payout–growth relationship across all three periods remains the same as in Table 5 for three categories ('question marks', 'cash cows' and 'dogs'). Interestingly, for the 'star' group, the positive relationship holds only during the growth period, disappearing during the recessionary and recovery periods. It appears that the 'stars' have encountered financial constraints during the recessionary and recovery periods thereby hampering their ability to pay dividends while investing in growth.

We anticipate that the dependent 'sales growth' variable of the regression models is explained in part by the additional independent variables that contribute to the regressions, particularly in relation to return on assets (ROA) and earnings-to-price ratio, as well as the natural logarithm of market capitalisation, which as a continuously compounded measure can correlate with growth. To reveal such possibilities, we estimate a reduced form of the regressions by excluding the above three variables from the regression models. The coefficient estimates generated are reported in panel B of Table 10. Our findings for three groups – 'cash cows', 'question marks' and 'dogs' – remain similar to those reported in Table 5. The only difference is that the coefficients generated for the companies categorised as 'stars' are now less significant.

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[15] The results remain similar when we consider 2008–2010 as the GFC period.

Table 10
Sensitivity tests

Panel A: Payout–growth relationship for different phases of business cycle

| Explanatory and control variables | Growth period (SG3 sample) | GFC period (SG3 sample) | Recovery period (SG3 sample) |
|---|---|---|---|
| Constant | 0.3074*** (5.34) | −0.1120 (−1.24) | −0.2948*** (−4.28) |
| Dividend payout*Star dummy | 0.4194*** (2.67) | −0.0814 (−0.18) | −0.1111 (−0.78) |
| Dividend payout*Cash Cow dummy | −0.4180*** (−6.70) | −0.4475*** (−4.14) | −0.3269*** (−3.46) |
| Dividend payout*Question Mark dummy | 0.2865*** (3.50) | 0.2969* (1.70) | 0.1308* (1.74) |
| Dividend payout*Dog dummy | −0.4712*** (−11.32) | −0.4511*** (−6.19) | −0.3206*** (−5.38) |
| Firm-specific control variables | Included | Included | Included |
| Model statistics: | | | |
| $R^2$ | 0.13 | 0.09 | 0.08 |
| *F*-statistic | 151.59*** | 39.09*** | 48.32*** |
| No. of observations | 9,369 | 3,148 | 4,263 |

Panel B: Estimates for the reduced form regression

| Explanatory and control variables | SG1 sample | SG3 sample | SG5 sample |
|---|---|---|---|
| Constant | 1.6860 (17.80) | 0.3656*** (9.53) | 0.2692*** (12.50) |
| Dividend payout**Star dummy | 1.2994* (1.69) | 0.2090 (1.58) | 0.0330 (1.16) |
| Dividend payout*Cash Cow dummy | −0.6783*** (−6.05) | −0.2825*** (−6.29) | −0.1998*** (−8.73) |
| Dividend payout*Question Mark dummy | 8.8799*** (4.56) | 0.1734** (2.44) | 0.1256*** (2.19) |
| Dividend payout*Dog dummy | −1.4105*** (−7.54) | −0.3721*** (−8.86) | −0.2626*** (−7.65) |
| Controls for leverage and assets growth | Included | Included | Included |
| GFC & Recovery dummies | Included | Included | Included |
| Model statistics: | | | |
| $R^2$ | 0.13 | 0.33 | 0.45 |
| *F*-statistic | 1.20*** | 3.59*** | 4.84*** |
| No. of observations | 20,289 | 16,780 | 11,195 |

The table reports coefficient estimates for the regression Equation (2). Panel A reports regression estimates for three phases of the business cycle, while panel B reports estimates for the reduced form of the regression. The *t*-statistics are reported in parentheses. *, ** and *** indicate statistical significance at the 10, 5 and 1 percent level, respectively.

## 5. Discussion and conclusion

We observe that, on aggregate, firms with (i) high dividend payout are likely to have low future growth ('cash cows') (consistent with conventional theory); that is, only a relatively small group ('stars') appear capable of achieving high dividend payouts combined with high growth. Firms with (ii) low dividend payouts may fall into *either* category of firms with high growth prospects ('question marks') (consistent with conventional theory) *or* category of firms with low growth ('dogs').

We conclude that the dividend payout–growth relationship is not adequately represented on a single linear 'one-size-fits-all' relationship. Thus, we confirm that firms with high growth prospects – either as 'star' high-market-share or as 'question mark' low-market-share firms – tend to exhibit growth as a positive relation with dividend payout (consistent with a signalling hypothesis explanation), whereas firms with low growth prospects – either as 'cash cow' high-market-share or as 'dog' low-market-share firms – conform to a negative relation between growth and dividend payout (consistent with conventional theory). Our results are robust when – in addition to controls for firm size and attributes of financial health (earnings-to-price ratio, return on assets and past sales growth) – we also control for industry and year effects.

An interesting question is: To what extent is the market able to differentiate between these groups of firms? Of some concern is that the markets appear unable to distinguish adequately between low-dividend-payout firms with growth prospects ('question marks') and their continuing-to-underperform 'dog' counterparts. The fact that not all firms can be successful at all times is a necessary feature of capital markets. The concern, however, is that when the market is unable to differentiate between 'question mark' firms with potential for growth and firms that remain as struggling 'dog' firms, investor preference is likely to be focussed on dividend-paying firms at the expense of younger growing firms in need of retained earnings.

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