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DuPont analysis and dividend policy: empirical evidence from Malaysia

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Abstract

Purpose – The purpose of this paper is to investigate the informativeness of asset turnover (ATO) and profit margin (PM) of the DuPont analysis in explaining dividend policy.

Design/methodology/approach – Annual financial data from Compustat for the period 2004-2009 were used to analyze a sample of Malaysian firms.

Findings – This study finds both PM and ATO to strongly explain contemporaneous dividends. The decomposition of return on net operating assets (RNOA) into PM and ATO also improves the explanatory power of dividends. The results of the predictive model show that PM and ATO are useful in predicting the propensity of firms to pay dividends. The results of the change dividend model, however, do not provide any significant results for PM and ATO.

Practical implications – Understanding the influence of ATO and PM on dividends could enable managers to realize the importance of these factors when making dividend policy decisions. Other market participants, such as financial analysts and lenders, could also recognize the empirical specifics related to decomposing the profitability measure into its two components, one measuring the asset efficiency and the other measuring the profitability per unit of product, in the context of dividend policy.

Originality/value – This study extends the empirical specifics of prior dividend policy studies by decomposing the popular profitability measure of return on assets into its two components of PM and ATO.

Keywords Dividend policy, Asset turnover ratio, DuPont analysis, Profit margin

Paper type Research paper

1. Introduction

Dividend policy is one of the most thoroughly researched subjects in modern corporate finance (Gonzalez *et al.*, 2014) and is likely to be a topic of ongoing debate because questions still remain unanswered (Baker and Weigand, 2015). Similarly, the DuPont analysis is a popular framework for financial analyses and has been termed "a timeless and elegant model of financial analyses" (Little *et al.*, 2009). While these two sets of rich literature have generated important insights, there has been surprisingly little or no cross-fertilization and links between them. As dividend policy continues to capture the attention of academicians and corporate managers, the decomposition of the determinant of dividend policy (i.e. profitability or return on assets) into the DuPont analysis components of asset turnover

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(ATO) and profit margin (PM) could enlighten our understanding of the unresolved dividend puzzle. DuPont analysis may have the potential to provide a fertile research framework to examine the usefulness of ATO and PM in explaining dividend policy. As determining an appropriate dividend payout policy is a difficult choice because of the need to balance many potentially conflicting forces (Baker and Weigand, 2015), understanding the influence of ATO and PM on dividends could enable managers to realize the importance of these factors when making dividend policy decisions. A better understanding of the effect of ATO and PM on dividends will be beneficial, given the large amounts of money involved in dividend payments and the close attention that investors, financial analysts and firms give to dividends (Farre-Mensa *et al.*, 2014). Furthermore, our examination of ATO and PM with dividends is apt because solving the dividend puzzle has become more challenging. In this study, we explore the empirical specifics related to decomposing the popular profitability measure of return on assets into its two components of operating characteristics, one measuring the asset efficiency or ATO and the other measuring the profitability per unit of product or PM.

Specifically, our study investigates the usefulness of information that is contained in ATO and PM ratios in explaining dividend policy in Malaysia. In the past, ATO and PM in the context of the DuPont analysis (hereafter DuPont) has been used to examine their informativeness in predicting future earnings (Fairfield and Yohn, 2001; Penman and Zhang, 2006; Soliman, 2008). However, prior dividend studies have largely ignored the examination of any explicit associations between ATO and PM in explaining dividends. Measuring the comparative contributions of ATO (or asset utilization) and PM (or operating performance) is valuable in giving insights into firms' "strategy" (Fairfield and Yohn, 2001), and in this study, we extend the scope of that "strategy" to encompass firms' dividend policy. It is logical to expect ATO, which measures firms' ability to generate revenues from its assets and PM, which represents firms' ability to control their costs that is incurred to generate revenues, to be associated with dividends. This is because return on net operating assets (RNOA), which essentially comprises of the DuPont components of ATO and PM (Soliman, 2008), has been widely documented to be associated with dividends (Farinha, 2003; Chen *et al.*, 2005)[1]. ATO and PM are subject to the influence of different internal and external factors that underlie a firm's profitability. In other words, these two measures of accounting ratios measure different constructs and have different properties (Fairfield and Yohn, 2001; Soliman, 2008). This obvious difference between ATO and PM could imply that they both possess different degrees of informativeness on dividends. The objective of our study is to explore the usefulness of the DuPont components of ATO and PM in determining dividends policy. Additionally, we also examine whether RNOA captures more information on dividends than is contained in its parts (i.e. PM and ATO) or vice versa.

This study is conducted in Malaysia, which is located in a region that continues to be the engine driving the global economy (World Bank, 2013). In addition to the fact that the topic of ATO and PM with dividends has not been examined in any other market, the study of Malaysia is particularly interesting because, unlike Western markets, the Malaysian capital market is still at a developing or infancy stage. The dividend policy of emerging markets additionally has certain unique characteristics in relation to other markets (Aivazian and Booth, 2003), and therefore Malaysia could be a fertile market to examine the interplay between ATO and PM with dividends[2]. There is also a dearth of literature on dividend policy in an emerging market such as Malaysia. Finally, the focus of this study solely on Malaysia allows us to hold the legal regime and country-specific factors constant, thus enabling investigation of the effects of ATO and PM on dividends more precisely.

Our results generally show that both PM and ATO are informative in explaining dividends. Specifically, we find that PM and ATO at the levels significantly explain the contemporaneous dividend policy and the decomposition of RNOA into ATO and PM improves the explanatory power of dividends. The results of the predictive dividend model are mixed and reveal that the significance of PM and ATO is only true in predicting the propensity to pay dividends and not the level of dividend payout. The results of our change models generally show that only RNOA significantly predicts the changes in the one-year-ahead dividends. Our final analyses of the influence of growth on the relationship between RNOA, PM and ATO on dividend policy also produce mixed results that show that these tested relationships are generally stronger and significant in firms with low growth, but only ATO seems to be informative in firms with high growth. This paper contributes to the literature on the determinants of dividends by demonstrating the explanatory power of ATO and PM. Specifically, this study contributes to the literature in two ways:

(1) it extends the use of the ATO and PM (made popular through the DuPont analysis) to explain dividends where such analysis appears to be lacking; and

(2) it demonstrates that the decomposition of RNOA into PM and ATO improves the explanatory power of contemporaneous dividends.

This study not only contributes to the literature by examining the relationship between the DuPont analysis components and dividend policy, it also offers world markets empirical evidence that will influence the debate on the unresolved dividend puzzle.

The remainder of the paper is organized as follows. Section 2 presents the background of the study. Section 3 lays out the research design, particularly the sampling procedure and research methodology. The results and discussion are presented in Section 4, and the limitations are outlined in Section 5. Finally, the last section provides summary and concluding remarks.

2. Background of the study

2.1 Prior studies on ATO and PM

E.I. du Pont de Nemours and Company are largely credited for popularizing the use of ATO and PM in financial analysis in the early twentieth century, and it eventually became known as the DuPont analysis. In relation to the DuPont analysis study, Fairfield and Yohn (2001) examine the association between the composition of ATO and PM in the earnings forecasting context. Their result suggests that disaggregating the current *level* of RNOA into the *level* of ATO and the *level* of PM is not informative about changes in one-year-ahead RNOA. Furthermore, they demonstrate that ATO is a more substantial and persistent component of RNOA than PM, which suggests that analysts could be more interested in ATO when forecasting for future earnings. Likewise, Soliman (2008) examines the association of the DuPont components of ATO and PM and, using a sample of many industries, supports the findings of Fairfield and Yohn (2001) that the *change* in ATO and not the *change* in PM is predictive of future *changes* in RNOA. However, contrary to the previous studies, Chang *et al.* (2014) find that the informativeness of ATO over PM about future probability is reduced in the health care industry. Their result suggests that *change* in PM is more persistent than the *change* in ATO in predicting future *change* in RNOA among profit-based health care providers in the USA. Chang *et al.* (2014) attribute their contradictory findings in comparison with earlier studies to the unique characteristics of the health care industry, which is heavily regulated with unique operational characteristics that may affect the information content of accounting signals derived from financial statements. In summary, the results of prior studies suggest that the DuPont components of ATO and

PM are vital in predicting a firm's future earnings across multiple industries. However, the usefulness of ATO and PM in the assessment and explanation of a firm's dividend policy remains largely untested in the existing literature.

2.2 ATO, PM and dividends

Our intention to examine the explanatory power of ATO and PM for dividends is both logical and plausible. This is because the ATO and PM of the DuPont analysis are essentially decomposed from RNOA. RNOA, which is essentially a measure of firms' profitability, is a well-established determinant of dividend payout (DeAngelo and DeAngelo, 1990). In a survey of corporate managers, Baker (1989) finds "poor earnings" is an important factor that drives firms' decision to not pay dividends. After the lagged one-year value of dividend payout, profitability is the second most important determinant of dividends. In unreported results, we regress dividend payout on each of its most pertinent determinants, i.e. lagged one-year value of dividend payout, profitability ($RNOA_t$), firm size, cash resources, debt, growth, capital expenditure and research and development expenditure, in separate regressions and observe the Adjusted R^2 to be 65.5, 16.3, 2.1, 11.9, 8.5, 1.4, 1.2 and 0.9 per cent, respectively.

As mentioned earlier, Lintner (1956) shows that firms follow deliberate dividend payout strategies and are engaged in "dividend smoothing". In other words, managers are concerned about dividend changes over time and thus adopt a smoothing policy (Fairchild, 2003). Lintner (1956) also finds dividends are functions of current, past and expected future earnings. Therefore, disaggregating RNOA into the ATO and PM components could enable market participants to recognize the sources of superior or inferior drivers of dividend policy. In other words, ATO or PM warrants further investigation in dividend-determinant studies.

In a region which is characterized by fast-paced economic growth, such as Malaysia, ATO might be more useful than PM in explaining dividends. The reasoning in support of this intuition is that firms in a fast-paced economy could place more importance on revenue-generation capacity and, hence, ATO could be a more significant factor as compared with PM in explaining dividends. Developed markets, such as the USA, are faced with saturated markets in many industries and the traditionally effective geographical expansion strategy is being abandoned in favor of profit-driven product selection and customer-targeting strategies (Werner *et al.*, 2004). Firms which continue to focus on sales growth are expected to experience shrinking PMs in the USA (Evans, 2005). Hofstede *et al.* (2002, pp. 791-794) also suggest that businesses in the Asian region treat the "growth of the business and continuity of the business" as among the top three most important goals of a business. Firms in growing economies might also favor asset utilization and efficiency strategies over PM to increase their market share. The line of argument above might lead one to surmise that ATO could possibly possess a stronger explanatory force on dividends in Malaysia.

In terms of the relative importance of PM and ATO, prior literature indicates that changes in ATO are more useful in predicting future profitability than changes in PM (Soliman, 2004, 2008; Fairfield and Yohn, 2001). The argument invoked in these studies is that earnings contain both permanent and transitory components, and therefore NOA are less volatile than earnings, leading to more persistence in ATO than in PM (Chang *et al.*, 2014). On the other hand, PM might be useful in explaining dividends when certain conditions prevail. A high proportion of variable costs in relation to fixed costs generates lower operational leverage and less earnings volatility and, as a result, makes PM less volatile and more persistent (Chang *et al.*, 2014). Empirical evidence shows that the proportion of fixed or overhead costs represents only approximately 17 per cent to 25 per cent of the total operating costs of companies in Malaysia (Chun *et al.*, 1996; Maelah *et al.*, 2013). Labor costs are normally considered variable, whereas capital costs are considered fixed, and labor-intensive companies can better control earnings volatility during market downturns and upturns by controlling their labor costs. In Malaysia, the key sectors of the economy and companies listed in the Malaysian Stock Exchange mainly comprise the manufacturing, consumer products, industrial products, retail and plantation sectors that are largely labor-intensive as opposed to being capital-intensive (Bank Negara Malaysia, 2013). Given the conditions discussed above, the relative importance of PM might be higher than ATO in explaining dividends, as the latter does not capture information about the main production input (i.e. labor cost) in a labor-intensive economy such as Malaysia. Thus, the actual effect of ATO and PM on dividend policy remains an empirical question.

The empirical tests of our study will thus be centered on the following research questions:

RQ1. Are the level and changes in ATO and PM useful in explaining or predicting dividend policy?

RQ2. Between PM and ATO, which one is more informative in explaining or predicting dividend policy?

RQ3. Does RNOA capture more information on dividend policy than is contained in its parts?

3. Research methodology

3.1 Sample

Our empirical analyses use publicly available data from Compustat. The sample consists of 500 Malaysian firms randomly selected from a total of 994 listed firms in Bursa Malaysia (the Malaysian Stock Exchange) over a period of six years from 2004 to 2009. Consistent with prior dividend studies, all firms from the finance industry of Bursa Malaysia that are excluded as firms from this sector are highly regulated and do not exhibit similar firm-specific characteristics with other industries in general. Our sample consists of firms from the eight industries (excluding financial industries) of the Bursa Malaysia as shown in Table I[3]. In addition, all firm-year observations with missing data and with zero or negative total assets and sales values are also removed. These criteria result in a final sample size of 2,466 firm-year observations after further eliminating firms without a minimum of three years of observations.

3.2 Measurement of variables

3.2.1 Dependent variable. The first dependent variable is dividend payout ratio and is measured as dividends divided by net income after tax (DIV). Dividend payout (dividend to net income) is censored at zero for firms that do not pay dividends. The second dependent variable is a dummy variable that measures the propensity to pay dividends and denoted as 1 if a firm pays dividends in year t, 0 if otherwise. The fact that dividend payouts are sticky (Lintner, 1956) makes the decision to pay dividends as crucial as the decision to change the amount of payouts (Jiraporn and Chintrakarn, 2009). Furthermore, as long as the decision to pay dividends is non-random, any analyses based on dividend-paying firms only may suffer from a self-selection problem, and the failure to account for the correlation between these two decisions is susceptible to inconsistent estimation (Jiraporn and Chintrakarn, 2009;

Description	No. of observations (*N*)
Sample	
Original sample size (500 firms – 6 years)	3,000
Less	
financial institutions, regulated utilities sectors, REITS and closed-end funds	−180
missing annual reports and sample without minimum 3 years of firm-year observations	−109
firms with zero or negative book value of total assets, cash	−245
N	2,466
Distribution of sample by industry	
Plantation (6.8%)	167
Construction (7.3%)	180
Trading/Services (22.1%)	544
Property (3.2%)	80
Industrial products (39.9%)	983
Consumer products (17.0%)	419
Technology (3.8%)	93
N	2,466

Table I.
Sample description of Malaysian firms

Heckman, 1979). In this paper, we examine the propensity to pay dividends and the level of dividend payout; both these dividend decisions are hereafter called dividend policy.

3.2.2 Experimental variables – ATO and PM. We measure ATO and PM following prior DuPont analysis studies (Soliman, 2008; Chang *et al.*, 2014). ATO is measured as sales (Compustat item no.12)/average net operating assets ($(NOA_t + NOA_{t-1})/2$). NOA is operating assets–operating liabilities, where operating assets is total assets (Compustat item no.6) less cash and short-term investments (Compustat item no.1 and item no.32). Operating liabilities is total assets (Compustat item no.6) less long- and short-term portions of debt (Compustat items no.9 and no.34), less the book value of total ordinary and preference equity (Compustat item no.60 and item no.130), less minority interest (Compustat item no.38) is $(TA_t + TA_{t-1})/2$). PM is measured as operating income (Compustat item no.178)/sales (item no.12). $\Delta ATO_t = (ATO_t - ATO_{t-1})$ and $\Delta PM_t = (PM_t - PM_{t-1})$[4].

3.2.3 Control variables. The choice of control variables is driven by dividend studies, and they are found to be significant factors in influencing the dividend decision. The lagged one year of the dividends is used as an independent variable, as firms paying dividends attempt to maintain stable dividends over time (Lintner, 1956), and is consistent with prior studies (Adjaoud and Ben-Amar, 2010). Other common and well-studied determinants of dividends in international and Malaysian studies are profitability, size, cash, debt, growth, capital expenditure and research and development costs (Farinha, 2003; Chen *et al.*, 2005; Adjaoud and Ben-Amar, 2010; Choy *et al.*, 2011; Benjamin and Zain, 2015; Benjamin *et al.*, 2016a, 2016b). Profitability (NROA) is decomposed into ATO and PM as shown in Section 3.2.2 above, and cash resources *(*CASH*)* is measured as the five-year mean of the ratio of cash plus cash equivalents deflated by total assets. Firm size *(*SIZE*)* is measured as the natural log of the book value of the firm's assets. DEBT is measured as total debt divided by total assets. GROWTH is measured as the average growth rate of net sales in for each of the last five years ($\sum (Sales_t/Sales_{t-1})/5$). CAPEX is measured as capital expenditure deflated by total assets. R&D is measured as research and development expenditure deflated by total assets and is set equal to zero when R&D is missing. The full list of variables and definitions are provided in the Appendix AI section below.

3.3 Regression models

Our choice of regression models is motivated by prior dividend studies and DuPont analysis studies. Dividend studies typically examine the explanatory power of dividend determinants at the level. Prior studies (Farinha, 2003; Adjaoud and Ben-Amar, 2010) find the *levels* of determinants of dividends do significantly explain the *level* of dividends. In our first series of regressions, we examine the informativeness of RNOA on ATO and PM on dividend policy at the level. However, prior DuPont analysis studies examining the effects of the levels of PM and ATO on earnings prediction do not observe any significant results (Fairfield and Yohn, 2001; Soliman, 2008; Chang *et al.*, 2014). In the interest of continuity with prior studies on DuPont analysis (Soliman, 2008; Chang *et al.*, 2014), we next examine the informativeness of:

- RNOA, PM and ATO at the level in predicting one-year-ahead dividends;
- RNOA, PM and ATO at the level in predicting one-year-ahead change in dividends; and
- change in RNOA, PM and ATO in explaining the *change* in one-year-ahead dividends.

We estimate the following series of regressions to determine the usefulness of ATO and PM in explaining dividends:

- The usefulness of RNOA on ATO and PM at the level in explaining dividend policy at the level following the baseline regressions below:

$$DIV_t = {}_{a0}INTERCEPT_t + {}_{a1}DIV_{t-1} + {}_{a2}RNOA_t + {}_{a3}PM_t + {}_{a4}ATO_t + {}_{a5}SIZE_t + {}_{a6}CASH_t + {}_{a7}DEBT_t + {}_{a8}GROWTH_t + {}_{a9}CAPEX_t + {}_{a10}R\&D_t + \varepsilon_t \quad (1)$$

$$DIV\ dummy_t = {}_{a0}INTERCEPT_{t-1} + {}_{a1}DIV_{t-1} + {}_{a2}RNOA_t + {}_{a3}\mathrm{PM}_t + {}_{a4}ATO_t + {}_{a5}SIZE_t + {}_{a6}CASH_t + {}_{a7}DEBT_t + {}_{a8}GROWTH_t + {}_{a9}CAPEX_t + {}_{a10}R\&D_t + \varepsilon_t \quad (2)$$

Equation (1) (using DIV$_t$) is a Tobit regression and equation (2) (using DIV *dummy*$_t$) is a logit regression. From each of the baseline equations above, we run a set of three separate regressions in which we examine RNOA$_t$ without PM$_t$ and ATO$_t$; PM$_t$ and ATO$_t$ without RNOA$_t$; and all the three RNOA$_t$, PM$_t$ and ATO$_t$ in a single regression as in equations (1) and (2).

- The usefulness of RNOA on ATO and *PM* at the level in predicting the one-year-ahead dividend policy at the level following the baseline regressions below:

$$\mathrm{DIV}_{t+1} = {}_{a0}INTERCEPT_t + {}_{a1}DIV_{t-1} + {}_{a2}RNOA_t + {}_{a3}PM_t + {}_{a4}ATO_t + {}_{a5}SIZE_t + {}_{a6}CASH_t + {}_{a7}DEBT_t + {}_{a8}GROWTH_t + {}_{a9}CAPEX_t + {}_{a10}R\&D_t + \varepsilon_t \quad (3)$$

$$DIV\ dummy_{t+1} = {}_{a0}INTERCEPT_t + {}_{a1}DIV_{t-1} + {}_{a2}RNOA_t + {}_{a3}PM_t + {}_{a4}ATO_t + {}_{a5}SIZE_t + {}_{a6}CASH_t + {}_{a7}DEBT_t + {}_{a8}GROWTH_t + {}_{a9}CAPEX_t + {}_{a10}R\&D_t + \varepsilon_t \quad (4)$$

From each of the baseline equations above, we again run a set of three separate regressions in which we examine $RNOA_t$ without PM_t and ATO_t; PM_t and ATO_t without $RNOA_t$; and all the three $RNOA_t$ PM_t and ATO_t in a single regression as in equations (3) and (4).

- The usefulness of RNOA, *change* in RNOA, PM, *change* in PM, ATO and *change* in ATO in predicting one-year-ahead change in dividend payout following the baseline regression below:

$$\Delta\ DIV_{t+1} = {}_{a0}INTERCEPT_t + {}_{a1}DIV_t + {}_{a1}\Delta DIV_t + {}_{a2}RNOA_t + {}_{a3}PM_t + {}_{a3}\Delta PM_t + {}_{a4}ATO_t + {}_{a4}\Delta ATO_t + {}_{a2}\Delta RNOA_t + {}_{a5}\Delta SIZE_t + {}_{a6}\Delta CASH_t + {}_{a7}\Delta DEBT_t + {}_{a8}\Delta GROWTH_t + {}_{a9}\Delta CAPEX_t + {}_{a10}\Delta R\&D_t + \varepsilon_t \quad (5)$$

From each of the baseline equations above, we run a set of three separate regressions in which we examine (1) $RNOA_t$ without ΔPM_t and ΔATO_t, (2) ΔPM_t and ΔATO_t without $RNOA_t$ and (3) all the six $RNOA_t$, PM_t, ΔPM_t and ATO_t and ΔATO_t in a single regression as in equation (5).

All continuous variables are winsorized at the 1st and 99th percentiles to control for extreme values.

4. Empirical results

4.1 Descriptive statistics

Table II, Panel A, introduces descriptive statistics of the variables examined in our regression analyses. The mean, median, standard deviation and variances are presented for DIV, ΔDIV, RNOA, ΔRNOA, PM, ΔPM, ATO, ΔATO, NOA, SIZE, CASH, DEBT, GROWTH, CAPEX and R&D. The mean and median of DIV are 0.172 and 0.076, respectively, while the mean of PM and ATO is 0.063 and 0.955, respectively. The mean and median values for RNOA are 0.067 and 0.059, respectively. Table II, Panel B, shows the distribution of firms that pay dividends versus firms that do not pay any dividends, and the breakdown is 45 and 55 per cent, respectively. In unreported means difference tests, we also contrast RNOA, ΔRNOA, PM, ΔPM, ATO and ΔATO between firms that pay dividends with firms that do not pay dividends and find the means for all these variables to be higher and statistically significant for firms that pay dividends.

4.2 Multivariate analysis

Our first series of regressions are presented in Table III. Models 1 and 2 adopt the approach of Fairfield and Yohn (2001) and Soliman (2008) to test the explanatory power of the DuPont components of PM and ATO in predicting future earnings using the Malaysian setting. Consistent with prior literature, neither PM nor ATO predicts future changes in RNOA in Model 1. Model 2 is similarly consistent with prior studies and shows that only ΔATO is positive and significant in predicting future changes in RNOA. Taken together, Models 1 and 2 show that prior reported evidence from the USA demonstrating the usefulness of

Variables	Mean	Median	SD	Variance
Panel A: Firm characteristics				
DIV_t	0.172	0.076	0.255	0.065
$RNOA_t$	0.067	0.059	0.117	0.013
PM_t	0.063	0.070	0.198	0.039
ATO_t	0.955	0.847	0.646	0.418
ΔDIV_t	−0.003	0.000	0.240	0.057
ΔPM_t	−0.010	−0.001	0.177	0.031
ΔATO_t	−0.012	0	0.255	0.065
$\Delta RNOA_t$	−0.001	0	0.083	0.006
NOA_t	901.109	249.005	2191.711	4,803,597
$SIZE_t$	2.548	2.461	0.576	0.332
$CASH_t$	0.114	0.079	0.118	0.013
$DEBT_t$	0.420	0.419	0.207	0.042
$GROWTH_t$	0.104	0.070	0.043	0.214
$CAPEX_t$	0.043	0.026	0.048	0.002
$R\&D_t$	0.001	0.000	0.004	0.000
Panel B: Proportion of dividend payers and non-payers			*No. of observations (N)*	*(%)*
Paying firms			1,109	45
Non-paying Firms			1,357	55

Note: Definitions of all variables are presented in Appendix AI

Table II.
Descriptive statistics

disaggregating RNOA into PM and ATO in explaining future changes in earnings is robust to the Malaysian setting[5].

4.2.1 DIV_t and DIV $dummy_t$. Model 3 presents the results of DIV_t on $RNOA_t$, where the coefficient is 0.660 and significant at the 1 per cent level and the Pseudo R^2 is 43.3 per cent. The result of $RNOA_t$, in Model 3 is consistent with prior studies (Farinha, 2003; Chen *et al.*, 2005) and indicates that profitability influences dividend positively and significantly. In Model 4, we examine the explanatory power of PM_t and ATO_t on DIV_t and the results suggest that both PM_t and ATO_t are useful and highly significant in explaining dividends. PM_t and ATO_t are significant at the 1 per cent level in explaining dividends in Model 4 and seem to indicate that between these two variables, neither one of these outperforms the other in explaining dividends. When $RNOA_t$ in Model 3 is replaced with PM_t and ATO_t in Model 4, the Pseudo R^2 increases from 43.3 per cent to 45.3 per cent, respectively. Thus, these results partially show that PM_t and ATO_t are incremental to $RNOA_t$ in explaining dividends. Although the Pseudo R^2 in Model 4 is greater than the pseudo R^2 in Model 3, we also conduct another examination in Model 5 to further explore whether the decomposition of $RNOA_t$ into PM_t and ATO_t improves their explanatory model of dividends. As RNOA is the product, not the sum, of ATO and PM, all three variables are included in the regression, as in Fairfield and Yohn (2001). In Model 5, we show that the coefficients of PM_t and ATO_t are reasonably consistent with Model 4 and are still highly significant, but $RNOA_t$ loses its significance. These findings provide further support to the results in Model 4 that the decomposition of RNOA into PM and ATO improves the explanatory power of dividends.

Next, we examine the explanatory power of PM and ATO on the propensity to pay dividends in Models 6, 7 and 8 and their sequence mirror Models 3, 4 and 5. Model 6 shows that $RNOA_t$ positively explains the propensity of firms to pay dividends at the 1 per cent level and the Pseudo R^2 is 47.0 per cent. Model 7 examines the explanatory power of PM_t and ATO_t and the results show that both PM_t and ATO_t are useful in explaining the propensity of firms to pay dividends, but between the two neither one of these outperforms the other in

Model	1	2	3	4	5	6	7	8	9	10
Dependent variable	$\Delta RNOA_{t+1}$	$\Delta RNOA_{t+1}$	DIV_t	DIV_t	DIV_t	DIV $dummy_t$	DIV $dummy_t$	DIV $dummy_t$	DIV_{t+1}	DIV $dummy_{t+1}$
Independent variables										
INTERCEPT	0.011	−0.009	−0.196**		−0.470***	−2.302***	−4.954***	−4.185***	−0.149*	−3.017***
	1.61	−0.2	−2.63		−3.67	−3.76	−4.84	−4.97	−1.9	−3.98
$RNOA_t$	−7.619***	−11.079***	0.660***		0.096	6.319***		4.914**	0.373***	0.713
	−4.72	−14.57	6.31		0.79	5.76		2.06	3.07	0.61
DIV_{t-1} / DIV $dummy_{t-1}$			0.609***	0.606***	0.605***	2.755***	2.742***	2.729***	0.549***	2.653***
			13.63	13.26	13.28	17.46	17.09	17.1	12.21	14.57
PM_t	−0.055			0.579***	0.525***		7.074***	5.069***	0.064	1.937***
	−1.63			7.11	5.07		7.82	3.14	0.76	3.42
ΔPM_t		0.006								
		0.04								
ATO_t	−0.008			0.097***	0.089***		0.974***	0.623***	0.015	0.535***
	−1.88			5.9	4.6		5.75	3.46	0.94	3.12
ΔATO_t		0.033**								
		2.88								
$\Delta RNOA_t$	−0.146	−0.202***								
	−1.58	−3.04								
ΔNOA_t	−0.063***	−0.007**								
	−3.38	−2.89								
$SIZE_t$			0.130***	0.125***	0.125***	0.611***	0.680***	0.646***	0.054***	0.849***
			6.43	6.03	6.04	4.5	4.83	4.64	3.08	5.01
$CASH_t$			0.099*	0.123	0.136	1.073*	1.129	1.412*	0.059	0.805***
			1.78	1.19	1.32	1.76	1.42	1.8	0.64	1.79
$DEBT_t$			−0.055***	−0.566***	−0.565***	−2.296***	−2.699***	−2.567***	−0.252***	−2.103***
			−7.99	−8.18	−8.15	−5.16	−5.69	−5.45	−4.23	−4.48

(continued)

Table III.
Regressions results for DuPont components with earnings and dividends ($\Delta RNOA_{t+1}$, DIV_t, DIV $dummy_t$, DIV_{t+1} and DIV $dummy_{t+1}$)

Table III.

Model	1	2	3	4	5	6	7	8	9	10
Dependent variable	$\Delta RNOA_{t+1}$	$\Delta RNOA_{t+1}$	DIV_t	DIV_t	DIV_t	DIV $dummy_t$	DIV $dummy_t$	DIV $dummy_t$	DIV_{t+1}	DIV $dummy_{t+1}$
$GROWTH_t$			−0.001	−0.002	−0.002	−0.004	−0.004	−0.004	−0.004*	−0.001
			−0.53	−0.93	−0.94	−1.61	−1.55	1.39	−1.69	−0.4
$CAPEX_t$			−0.379*	−0.416	−0.400*	−0.415	−0.905	−0.072	−0.332*	−0.024
			−1.93	−1.46	1.93	−0.26	−0.55	0.04	−1.81	−1.02
$R\&D_t$			1.679	2.928	2.777	12.863	13.651	14.334	4.204	20.101
			0.77	1.41	1.32	0.59	0.52	0.59	1.09	0.81
Industry indicators			√	√	√	√	√	√	√	√
Year indicators			√	√	√	√	√	√	√	√
Adjusted R^2/Pseudo R^2	16.6%	15.6%	43.3%	45.3%	45.4%	47.0%	47.4%	48.0%	0.2494	41.4%
No. of observations (*N*)	2,016	2,016	2,466	2,466	2,466	2,466	2,466	2,466	2,016	2,016

Notes: Table III represents a series of OLS (Models 1-2), Tobit (Models 3, 4, 5, 9) and logit (Models 6, 7, 8, 10) regressions. It provides the coefficient estimates, the *t*-statistics and *z*-statistics below and is robust to clustering by firm. ***, ** and * represent significance at 1, 5, 10 per cent levels, respectively. Definitions of all variables are presented in Appendix AI explaining dividends. In Model 8, when we include $RNOA_t$ alongside its decomposed factors of PM_t and ATO_t, we find that although $RNOA_t$ is still significant at the 1 per cent level, PM_t and ATO_t both remain significant at the 1 per cent level. The results in Model 8 seem to indicate that RNOA captures somewhat similar information on the propensity of firms to pay dividends than is contained in its parts (PM and ATO).

4.2.2 Future DIV_t and DIV $dummy_t$. The prediction of future dividends is presented in Models 9 and 10 of Table III. Models 9 and 10 examine DIV_{t+1} and DIV $dummy_{t+1}$, respectively, and both models include $RNOA_t$ and its decomposed factors of PM_t and ATO_t. Model 9 shows that only $RNOA_t$ is positive and significant in predicting the one-year-ahead dividends. Model 10 shows that unlike $RNOA_t$, both PM_t and ATO_t are positive and significant in predicting the propensity to pay dividends but between PM_t and ATO_t, neither one of these outperform the other. Thus, the results of the one-year-ahead DIV_t and DIV $dummy_t$ models are both mixed and interesting. It appears that:

- neither PM_t nor ATO_t possesses a higher explanatory power in predicting firms' propensity to pay dividends; and
- $RNOA_t$ is more useful than PM_t and ATO_t in predicting the level of dividend payout (DIV_{t+1}).

4.2.3 Future change in DIV (ΔDIV_{t+1}). Table IV presents the set of analyses that are used to ascertain whether:

- PM and ATO at the levels or change are associated with future change in dividends; and whether
- RNOA at the level or change is a better predictor than PM and ATO in predicting future change in dividends.

We first regress ΔDIV_{t+1} on the levels of PM, ATO and RNOA in Model 1. Recall that only RNOA positively explains DIV_{t+1} in Model 9 of Table III. We find that only $RNOA_t$ is positive and significant in explaining future change in dividends. Next, we examine the informativeness of the *change* in PM and *change* in ATO in explaining future change in dividends. Model 2 shows that neither ΔPM_t nor ΔATO_t significantly predict ΔDIV_{t+1}. Regression Model 3 introduces $RNOA_t$ and also adds PM_t and ATO_t to the analysis. Although the change variables of PM and ATO do not show any significant effects in explaining dividends thus far, we add PM_t and ATO_t to Model 3 because prior DuPont analysis literature suggests that both the level and change variables of PM and ATO may contain different operating information. The coefficient of $RNOA_t$ is positive and significant in Model 3, but PM_t, ATO_t, ΔPM_t and ΔATO_t are not significant. Overall, the results for the one-year-ahead change in dividend analysis suggest that the level and change variables of PM and ATO lack the predictive ability and are outperformed by $RNOA_t$.

Overall, the results of the contemporaneous dividend models indicate that PM and ATO are informative in explaining dividend policy. The predictive dividend models using the levels or changes of PM and ATO generally do not provide any significant results. One reason for the failure of the predictive dividend change models to produce any strong results could be attributed to the fact that dividend decisions are often sticky in nature and remain fairly stable over time (Lintner, 1956).

4.2.4 Dividends in the context of low and high growth. Firms that experience high growth pay low or no dividends (Fama and French, 2001) because these firms have lower free cash flow (Jensen, 1986). Thus, the importance of dividends diminishes as firms experience higher growth. Based on prior studies on dividend policy in Malaysia (Benjamin and Zain, 2015;

Model	1	2	3
Dependent variable	ΔDIV_{t+1}	ΔDIV_{t+1}	ΔDIV_{t+1}
Independent variables			
INTERCEPT	−0.438***	−0.435***	−0.365***
	−5.59	−5.31	−4.84
$RNOA_t$	0.275**		0.282**
	2.06		1.98
DIV_{t-1}	−0.127	−0.088*	−0.135***
	−2.55	−1.87	−2.67
ΔDIV_t	−0.080	−0.099*	−0.085
	−1.32	−1.71	−1.44
PM_t	0.034		0.068
	0.38		0.68
ΔPM_t		0.020	−0.029
		0.24	−0.29
ATO_t	−0.023		−0.016
	−1.09		−0.76
ΔATO_t		−0.078	−0.070
		−1.57	−1.36
$\Delta RNOA_t$		−0.108	−0.178
		−0.53	−0.83
$\Delta SIZE_t$	0.144	0.259**	0.151
	1.29	2.32	1.37
$\Delta CASH_t$	0.109	0.155	0.186
	0.48	0.69	0.81
$\Delta DEBT_t$	−0.200	−0.310**	−0.212
	−1.32	−2.09	−1.41
$\Delta GROWTH_t$	−0.004	−0.006*	−0.006
	−1.19	−1.69	−1.68
$\Delta CAPEX_t$	−0.574	−0.602*	−0.552*
	−1.63	−1.81	−1.65
$\Delta R\&D_t$	−0.175	−1.111	0.121
	−0.06	−0.3	0.04
Industry indicators	√	√	√
Year indicators	√	√	√
Pseudo R^2	5.95%	5.81%	6.40%
No. of observations (*N*)	2,016	2,016	2,016

Notes : Table IV represents a series of Tobit regressions. It provides the coefficient estimates, the *t*-statistics and *z*-statistics below and is robust to clustering by firm. ***, ** and * represent significance at 1, 5, 10 per cent levels, respectively. Definitions of all variables are presented in Appendix AI

Table IV.
Regression results for DuPont components with dividends (ΔDIV_{t+1})

Benjamin *et al.*, 2016a, 2016b), we expect the explanatory power of ATO and PM, if any, on dividends to be stronger in firms which experience lower growth. The median sales growth for each year is calculated, and then firms are classified high or low, according to their growth rate. Finally, the low- and high-growth firms for all six years are combined.

Table V investigates the usefulness of ATO and PM of the DuPont analysis components in explaining dividends in the context of firms' growth. Models 1 and 2 examine the effect of PM_t, ATO_t and $RNOA_t$ on DIV_t, and the results show that the coefficients of PM_t, and ATO_t are positive and significant at the 1 per cent level in firms which experience low growth, but only ATO_t still retains this significance in firms which experience high growth. $RNOA_t$ does not exhibit any significant relationship in either low- or high-growth firms. Recall that

Table V. Regression results for DuPont components with dividends (by level of growth)

Model	1	2	3	4	5	6	7	8	9	10
	DIV$_t$ Growth		DIV dummy$_t$ Growth		DIV$_{t+1}$ Growth		DIV dummy$_{t+1}$ Growth		ΔDIV$_{t+1}$ Growth	
Dependent variable	Low	High	Low	High	Low	High	Low	High	Low	High
Independent variables										
INTERCEPT	−0.330***	−0.233***	−3.145***	−3.790***	−0.327**	−0.074	−0.359	0.398	−0.474***	−0.110**
	−2.96	−2.83	−3.53	−3.31	−1.97	−0.83	−0.58	0.47	−4.75	−2.62
RNOA$_t$	0.483	0.218	5.698***	2.446	0.529**	0.054	−0.178	−1.260	0.435*	−0.103
	1.59	1.47	3.82	1.07	2.19	0.45	−0.16	−1.46	1.89	−0.57
DIV$_{t-1}$/DIV dummy$_{t-1}$	0.726***	0.492***	3.194***	2.447***	0.518***	0.572***	−0.069	−0.062	−0.151*	−0.135*
	10.22	8.85	12.9	12.24	7.86	9.06	−0.41	−0.38	−1.85	−1.77
ΔDIV$_t$									−0.003	−0.146*
									−0.04	−1.94
PM$_t$	0.719***	0.066	6.602***	3.953	0.009	0.441	0.519	0.579	−0.01	0.542
	3.96	0.56	2.99	1.39	0.1	1.6	1.03	0.77	−0.08	1.43
ΔPM$_t$									0.002	0.103
									0.02	0.67
ATO$_t$	0.110***	0.051***	0.558***	0.550**	−0.007	0.058***	−0.219	0.056	−0.063*	0.035
	3.04	2.6	2.57	2.12	−0.26	3.24	−1.6	0.45	−1.85	1.18
ΔATO$_t$									−0.132	−0.025
									−1.57	−0.28
ΔRNOA$_t$									−0.194	−0.477
									−0.66	−1.57
SIZE or ΔSIZE$_t$	0.129***	0.140***	0.578***	0.790***	0.049	0.091***	0.094	0.129	0.196	0.098
	3.56	5.09	2.18	2.77	1.28	3.14	0.55	0.75	1.06	0.65
CASH or Δ*CASH*$_t$	0.156	0.168	1.137	2.301*	0.244	−0.375***	−0.957*	0.857	0.238	0.023
	0.98	1.44	1.05	1.83	1.61	−3.15	1.73	1.15	0.64	0.07
DEBT or ΔDEBT$_t$	−0.720***	−0.488***	−3.342***	−2.382***	−0.119	−0.417***	−0.157	−0.430	−0.143	−0.353

(*continued*)

Table V.

Model	1	2	3	4	5	6	7	8	9	10
	DIV_t Growth		DIV $dummy_t$ Growth		DIV_{t+1} Growth		DIV $dummy_{t+1}$ Growth		ΔDIV_{t+1} Growth	
Dependent variable	Low	High	Low	High	Low	High	Low	High	Low	High
	−6.19	−6.35	−4.53	−3.45	−1.32	−5.46	−0.43	0.95	−0.67	−1.63
GROWTH or $\Delta GROWTH_t$	−0.003	−0.006**	−0.009	−0.001**	−0.001	−0.002	−0.003	−0.002	−0.005	−0.007
	−0.44	−2.51	−0.17	−2.03	−1.67	−0.86	−0.66	−0.97	−1.36	−1.22
CAPEX or $\Delta CAPEX_t$	0.889***	−0.025	−1.067	−1.131	0.718**	−0.010	−1.972	−0.499	0.695	−0.261
	2.4	−0.13	−0.35	−0.56	2.32	−0.05	−1.4	−0.37	1.33	−0.66
R&D or $\Delta R\&D_t$	0.352	5.625***	−14.607	92.309*	6.773*	−1.387	−17.179	−40.784	−0.619	2.23
	0.12	2.55	−0.65	1.77	1.77	−0.27	−0.81	−1.27	−0.09	0.534
Industry indicators	√	√	√	√	√	√	√	√	√	√
Year indicators	√	√	√	√	√	√	√	√	√	√
Pseudo R^2	46.2%	47.8%	58.4%	36.2%	19.6%	41.7%	2.49%	0.93%	9.07%	7.47%
No. of observations (N)	1,233	1,233	1,233	1,233	1,008	1,008	1,008	1,008	1,008	1,008

Notes: Table V represents a series of Tobit (Models 1, 2, 5, 6, 9 and 10) and logit (Models 3, 4, 7 and 8) regressions. It provides the coefficient estimates, the *t*-statistics and *z*-statistics below and is robust to clustering by firm. ***, ** and * represent significance at 1, 5, 10 per cent levels, respectively. The control variables in Models 9 10 employ the change variables; that is, $\Delta SIZE_t$, $\Delta CASH_t$, $\Delta DEBT_t$, $\Delta GROWTH_t$, $\Delta CAPEX_t$ and $\Delta R\&D_t$. Definitions of all variables are presented in Appendix AI similarly, $RNOA_t$ does not explain DIV_t significantly in Model 5 of Table III when PM_t, and ATO_t are included in the regression. It is interesting that while the explanatory power of PM_t, and ATO_t are both significant in low-growth firms, only ATO_t significantly explains DIV_t in high-growth firms. ATO, which contains information on operational efficiency, appears to more relevant in explaining DIV_t in high-growth firms.

Models 3 and 4 examine the explanatory power of PM_t and ATO_t alongside $RNOA_t$ on the propensity to pay dividends (DIV $dummy_t$). The coefficients of PM_t, ATO_t and $RNOA_t$ are positive and significant at the 1 per cent level in firms with low growth, but only ATO_t is significant in firms with high growth. The significance of ATO_t in explaining the propensity to pay dividends in Model 4 seems to suggest that ATO is relevant in explaining DIV $dummy_t$ in firms with high growth.

Next, we examine the predictive power of PM and ATO on future dividends. The results in the preceding section on the predictive power of PM and ATO are insignificant, as shown in Tables III and IV. Models 5 and 6 present the set of analyses that are used to ascertain the predictive power of PM_t, ATO_t and $RNOA_t$ on DIV_{t+1}. Only $RNOA_t$ is positively and significantly associated with DIV_{t+1} in firms with low growth. As observed in the preceding paragraph, only ATO_t is positively associated with DIV_{t+1} in firms with high growth and further supports the results in the preceding paragraph on the apparent relevance of ATO in explaining dividends when firms experience high growth. Models 7 and 8 of Table V present the results of the examination of PM_t, ATO_t and $RNOA_t$ on DIV $dummy_{t+1}$. None of the coefficients of PM_t, ATO_t and $RNOA_t$ are significantly associated with DIV $dummy_{t+1}$ in firms with low or high growth. Finally, Models 9 and 10 examine whether PM, ATO and RNOA predict future change in dividends when we split the sample into firms with low and high growth. The results show that the DuPont components at the level (PM_t, and ATO_t) and their change variables (ΔPM_t and ΔATO_t) do not significantly predict future change in dividends in firms with low or high growth. The coefficient of $RNOA_t$ is positive but mildly significant at the 10 per cent level in firms with low growth only, as would be expected based on the earlier findings in Model 3 of Table IV, in spite its reduced significance.

4.3 Additional robustness tests

With several robustness tests, we address the possible concerns regarding the quality of our data and analyses. First, to test the sensitivity of the results to other commonly used measures of dividend payout, all the regressions are re-examined using two other popular measures:

(1) dividends divided by total assets; and

(2) dividends divided by sales – and the results are not different from the earlier analysis.

Second, to examine whether the results are sensitive to other commonly used regression analysis, the dividend payout estimates are retested using the robust OLS regression clustered-at-firm. These results are also rerun with the commonly used Fama–MacBeth regressions approach of averaging coefficients and calculating Newey–West corrected *t*-statistics in DuPont analysis studies (Chang *et al.*, 2014; Soliman, 2008), and our results remain unchanged to these different regressions.

5. Limitations

This study, however, is not without limitations. Our sample only covers six years of Malaysian data (2004-2009), and therefore, our results may not be generalizable across different time periods and locations. Second, our sample focuses on publicly traded firms in Bursa Malaysia and, as such, the results may not extend to private or smaller firms, which may exhibit their own unique characteristics. Despite their limitations, our findings are relevant for countries with an economic environment similar to that of Malaysia, especially East Asian countries which are generally regarded as emerging economies.

6. Conclusion

The objective of this study is to build upon the use of ATO and PM to explain dividend policy. Our paper extends dividend studies to date to explore whether ATO and PM are useful factors that explain dividends. The results of this study show that both ATO and PM at the level are useful in explaining the propensity to pay dividends and the level of dividend payout. Our analyses also show that between ATO and PM, neither one of these outperform the other in explaining dividend policy. These findings shed light on the components of RNOA itself; while RNOA is an established factor that explains dividends, its decomposition into ATO and PM improves the explanatory power of dividends. Our results on the ability of RNOA, PM and ATO to predict the one-year-ahead dividend produce mixed results. RNOA seems to be more informative than its decomposed components of PM and ATO in predicting the level of dividend payout. Unlike RNOA, only PM and ATO are significant in predicting the propensity to pay dividends. Similarly, the tests of our change models generally find that only RNOA significantly predicts the changes in the one-year-ahead dividends. Our final analyses of the influence of growth on the relationship between RNOA, PM and ATO on dividend policy produce mixed results. When we examine RNOA, PM and ATO at the level, these tested relationships are generally stronger and significant in firms with low growth. Specifically, we find that RNOA, PM and ATO all significantly explain dividend policy in firms with low growth. In firms with high growth, only ATO shows a significant and positive effect on dividend policy, and this seems to suggest that it is relevant in explaining dividends when firms have high growth. Our results also show that RNOA and ATO are generally more informative in predicting the one-year-ahead dividends in firms with low growth and high growth, respectively. Overall, our findings suggest that the contemporaneous relationships between PM and ATO with dividend policy is informative and superior over RNOA, and one where both PM and ATO exhibit strong explanatory power on dividends. The results of the prediction model are mixed and show that ATO and PM have some predictive ability on the one-year-ahead dividends, but the outputs of the prediction-change model show no clear effects on dividends.

These results could spur fertile avenues for future research. Subsequent studies may uncover how the use of the DuPont analysis components of ATO and PM impact dividends in the context of ownership structure, corporate governance, shareholder protection law and political connection (all of which have been documented to influence dividend policy). Our findings might also have useful implications for managers who are interested in understanding influences of PM and ATO when making dividend policy decisions. Other market participants, such as financial analysts and lenders, could also recognize the empirical specifics related to decomposing the popular profitability measure into two components, one measuring the asset efficiency and the other measuring the profitability per unit of product, in the context of dividend policy.

Notes

1. ROA in prior dividend studies is measured simply as earnings divided by total assets at year-end (Farinha, 2003; Chen *et al.*, 2005; DeAngelo *et al.*, 2006). RNOA in DuPont analysis studies is measured as operating income dividend by net operating assets (NOA), where NOA is operating assets – operating liabilities (Soliman, 2008). In essence, both ROA and RNOA are proxies of earnings and very closely approximate each other and are used interchangeably.
2. Aivazian and Booth (2003) report that although profitability, debt and market-to-book ratio in general influence dividends of emerging markets in similar fashion as the US market, emerging markets are still structurally different, indicating different sensitivities to these variables. While globally, reduction in the propensity to pay dividends by firms is relatively small (Denis and Osobov, 2008), Malaysia has been reported to be the second largest dividend payout country in Asia ex-Japan (Yap, 2012). Dividend has become an increasingly important requirement among investors in Malaysia and most of the listed companies announce their dividend payout periodically.
3. The distribution of our sample by industry type approximates the actual distribution of firms listed in Bursa Malaysia. Firms from the Industrial Product category and Trading and Services make up the largest group, while Technology is the smallest group.
4. As a robustness check, we also measure ΔPM_t and ΔATO_t in identical fashion as Fairfield and Yohn (2001) (i.e. $\Delta PM_t = [PM_t - PM_{t-1}] * ATO_{t-1}$) and $\Delta ATO_t = [ATO_t - ATO_{t-1}] * PM_{t-1}$). Inferences are not changed.
5. Note that both Models (1) and (2) are also estimated using the Abarbanell and Bushee (1997) and Richardson *et al.* (2005) controls as in Fairfield and Yohn (2001) and Soliman (2008), and our results (untabulated) remained unchanged.

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Appendix AI

Table AI Definition of variables

Variables	Definitions
DIV_t	Common dividend divided by net income after tax
ΔDIV_t	$DIV_t - DIV_{t-1}$
ΔDIV_{t+1}	$DIV_{t+1} - DIV_t$
DIV $dummy_t$	A dummy variable is set to 0 if the firm does not pay dividends and 1 if it pays a dividend (of any size)
PM_t	Operating income (Compustat item no.178) divided by sales (item no.12)
ΔPM_t	$PM_t - PM_{t-1}$
ATO_t	Sales (Compustat item no.12) divided by Average Net operating assets $(NOAt + NOA_{t-1})/2)$
ΔATO_t	$ATO_t - ATO_{t-1}$
$RNOA_t$	Return on net operating assets measured as $PM_t \times ATO_t$
$\Delta RNOA_t$	$RNOA_t - RNOA_{t-1}$
NOA_t	Net operating assets (NOA) is operating assets – operating liabilities; where operating assets is total assets (Compustat item no.6) less cash and short-term investments (Compustat item no.1 and item no.32) and operating liabilities is total assets (Compustat item no.6) less long and short-term portions of debt (Compustat item no.9 and item no.34), less book value of total ordinary and preference equity (Compustat item no.60 and item no.130), less minority interest (Compustat item no.38)
ΔNOA_t	$NOA_t - NOA_{t-1}$
$SIZE_t$	The natural logarithm of the book value of total assets
$\Delta SIZE_t$	$SIZE_t - SIZE_{t-1}$
$CASH_t$	The five years mean of the ratio of cash plus cash equivalents deflated by total assets
$\Delta CASH_t$	$CASH_t - CASH_{t-1}$
$DEBT_t$	Total debt divided by total assets
$\Delta DEBT_t$	$DEBT_t - DEBT_{t-1}$
$GROWTH_t$	The average growth rate of net sales in previous five years
$\Delta GROWTH_t$	$GROWTH_t - GROWTH_{t-1}$
$CAPEX_t$	Capital expenditure deflated by total assets
$\Delta CAPEX_t$	$CAPEX_t - CAPEX_{t-1}$
$R\&D_t$	Research and development expenditure deflated by total assets
$\Delta R\&D_t$	$R\&D_t - R\&D_{t-1}$
Industry indicators	Dummy variables that equal 1 if the observation is from each of the industry classification of Bursa Malaysia (Malaysian Stock Exchange) and 0 otherwise
Year indicators	Dummy variables that equals to 1 if the data are from each of the fiscal years from 2004 to 2009

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