DuPont Analysis and Firm Life Cycle

Abstract

We extend Soliman's (2008) study of the incremental information provided through DuPont analysis of return on net operating assets (RNOA) by examining pricing and mispricing of profit margin (PM) and asset turnover (ATO) across life-cycle stages (Dickinson 2011). We obtain additional insights by examining the incremental information provided by sub-components of RNOA for PM and ATO in different life-cycle stages. Consistent with life-cycle theory, we find that change in ATO is priced more strongly for mature firms than for other firms. This is due mainly to operating efficiency reflected in property, plant and equipment (PP&E) turnover and partially due to accounts receivable turnover. We find that change in PM is positively priced for both growth and mature firms. This reflects negative pricing of changes in cost of goods sold (COGS), selling, general and administrative (SG&A) expense and depreciation expense as a percentage of sales. Changes in research and development (R&D) costs as a percentage of sales are positively priced for mature firms but not positively or negatively priced for growth firms. We also find evidence that PM is underpriced for growth firms. This underpricing is due to mispricing of depreciation expense and R&D expense for growth firms, indicating that market participants do not fully value the information provided by these variables for future earnings.

Keywords: DuPont analysis, financial statement analysis, firm life cycle, market returns

JEL Classification: M4

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1. Introduction

Solimon (2008) provides a comprehensive examination of investor reactions to the multiplicative components of return on net operating assets (RNOA) under DuPont analysis (Nissim and Penman 2001): profit margin on sales (PM) and asset turnover (ATO). We extend his examination in two ways. Following Dickinson (2011), we examine whether and how the components PM and ATO are priced differently across life-cycle stages. In particular, we consider the predictions based on life-cycle theory that change in PM is priced more strongly for growth firms and change in ATO is priced more strongly for mature firms. We also extend the analysis to include sub-components of RNOA, sometimes referred to as drivers of PM and activity ratios, including various expense items as a percentage of sales (cost of goods sold (COGS), selling, general and administrative (SG&A) expense, depreciation expense, and research and development (R&D) expense), and various turnover measures (receivables, inventory, and property, plant and equipment (PP&E) turnover).

Previous research has demonstrated the usefulness of conditioning the interpretation of accounting variables on life-cycle stage (Richardson and Gordon 1980; Anthony and Ramesh 1992; Black 1998; Piotroski 2000; Mohanram 2005; Hribar and Yehuda 2015; Vorst and Yohn 2018). Using life-cycle information enables investors and analysts to control for differences in available resources, investment patterns, obsolescence rates, product differentiation, and production efficiencies between firms in different phases (Dickinson, 2011; Vorst and Yohn, 2018). Therefore, we investigate whether additional incremental information to RNOA can be derived from DuPont analysis when the analysis is conditioned on life-cycle stage. Dickinson (2011) provides a parsimonious way to incorporate life-cycle stage into financial analysis using information derived from the statement of cash flows. Dickinson (2011) observed, "Economic theory predicts a nonlinear relation between life cycle stages and performance variables such as earnings, return on net operating assets (RNOA), asset turnover (ATO), profit margin (PM), sales revenue, leverage, dividend payout, size, and age, which is consistent with the distribution that results from using cash flow patterns as a life cycle proxy."

Sub-components of RNOA may be priced differently from each other and these differences may vary with life-cycle stage. Previous research documents that components of earnings are differentially related to stock returns due to differences in persistence across components (Lipe 1986; Kormendi and Lipe 1987; Fairfield et al. 1996). Previous research also indicates that specific components of PM may be priced differently because they represent different mixtures of consumption and investment spending. For instance, R&D expense as a percentage of sales primarily represents investment (Lev and Sougiannis 1996) whereas COGS as a percentage of sales primarily represents consumption. SG&A expense comingles consumption and investment spending (Enache and Srivistava 2017; Lev and Radhakrishnan 2005; Banker et al. 2011). Because both the persistence properties and the mixture of such components may differ with life-cycle stage, we examine how changes in sub-components of RNOA for PM and ATO (Nissim and Penman 2001) are related to stock returns across life-cycle stages.

Our results, based on panel analysis of contemporaneous long-window stock returns, confirm that change in ATO is priced more strongly for mature firms than growth firms but we find that change in PM is priced similarly for mature firms and growth firms. Our analysis of sub-components indicates that changes in COGS, SG&A and depreciation as a percentage of sales are priced similarly (negatively) for mature and growth firms, but change in R&D expense is priced positively for mature firms and is not priced positively or negatively for growth firms. We find that change in PP&E turnover is priced for both mature and growth firms, but is priced more strongly for mature firms, and that change in receivables turnover is priced positively for mature firms. With respect to the relations between future stock returns and the components of RNOA, we find evidence that PM is underpriced for growth firms. Relating future stock returns to the sub-components, we observe that the underpricing of PM is due to mispricing of depreciation expense and R&D expense as a percentage of sales for growth firms, indicating that market participants do not fully anticipate how capital investment and R&D expenditures affect future earnings for growth firms.

We contribute to the literature by demonstrating the usefulness of conditioning DuPont analysis on firm life-cycle and the information value of examining the sub-components of RNOA for profit margin and asset turnover. Soliman (2008) provides evidence of pricing but not mispricing of PM. Dickinson (2011) predicts but does not find that the influence of increases in PM on future RNOA is higher for growth firms versus mature firms. We document that changes in PM are priced similarly for growth and mature firms, and we find evidence that changes in PM are underpriced for growth firms. Soliman (2008) provides evidence of pricing and mispricing of ATO. Dickinson (2011) finds that the influence of increases in ATO on future RNOA is greatest for mature firms, consistent with her prediction based on life-cycle theory. We document that the pricing and mispricing of changes in asset turnover is concentrated in later stage firms (mature and decline firms) and this is driven by the sub-components of receivables turnover and PP&E turnover. We find no evidence of pricing or mispricing of changes in ATO for earlier stage firms (introduction and growth firms).

In the next section, we review the literature on firm life cycle and DuPont analysis and provide support for life-cycle hypotheses regarding the DuPont components of profit margin on sales (PM) and asset turnover (ATO). We then present our methodology and research design used to test our hypotheses. Following the section on research design and analysis, the results are presented. Finally, in the conclusions section, we summarize our findings.

2. Background and hypotheses development

2.1 Firm life cycle

The economics literature has addressed attributes of life cycle such as production behavior (Spence 1977, 1979, 1981; Wernerfelt 1985; Jovanovic and MacDonald 1994), investment (Spence 1977, 1979; Jovanovic 1982; Wernerfelt 1985), market entry and exit patterns (Caves 1998), and market share (Wernerfelt 1985) (see Dickinson 2011, p. 1970). In the accounting literature, Richardson and Gordon (1980) suggest that different performance measures should be used for different product life cycles because the critical tasks of manufacturing change as products move through the life cycle.

Anthony and Ramesh (1992) investigate the market reaction to accounting performance measures in each life-cycle stage of the firm. They document a declining stock market response to unexpected sales growth and unexpected capital investment as the firm matures. Black (1998) examines the value-relevance of changes in operating, investing, and financing cash flows by life-cycle stage and, in particular, documents that investing cash flows are more value-relevant when firms are in the growth stage. Piotroski (2000) demonstrates that a simple accounting-based fundamental analysis strategy, when applied to a broad portfolio of high book-to-market firms (value firms), can shift the distribution of returns earned by an investor. Mohanram (2005) shows that a fundamental analysis-based approach, appropriately tailored for low book-to-market firms (growth firms), is successful in differentiating between winners and losers in terms of ex-post stock returns. Hribar and Yehuda (2015) demonstrate that free cash flows and total accruals convey different information at various stages of the firm's development, by showing that the correlation between free cash flows and total accruals is weakest in the growth stage and becomes stronger as the firm matures. Vorst and Yohn (2018) find that analyzing firms by life cycle stage improves the accuracy of profitability and growth forecasts, and the improvement in accuracy is greatest for firms in the introduction and decline stages.

Dickinson (2011) developed and validated a firm-level life cycle proxy based on the behavior of operating, investing, and financing cash flows across different life-cycle stages. This cash flow pattern proxy has advantages in that it uses the entire financial information set contained in operating, investing, and financing cash flows rather than a single metric, such as sales growth, capital expenditures, dividend payout, or age that are widely used in previous studies to determine firm life cycle. Dickinson demonstrates that the cash flow pattern proxy outperforms other life cycle proxies commonly used in the literature (e.g., age), and better explains future profitability such as rates of return and stock returns. This proxy for firm life-cycle stages benefits information users by helping them to better understand how economic fundamentals related to firm life cycle affect the level and convergence properties of future profitability.

The firm life-cycle concept provides an interesting foundation for DuPont analysis because the DuPont components may convey different incremental information at different stages of the firm's development. We use Dickinson's cash flow proxy as a parsimonious way to condition on firm life cycle for financial analysis.

2.2 DuPont analysis and the DuPont components

Nissim and Penman (2001) outline a structural approach to financial statement analysis for use in equity valuation. They decompose return on net operating assets (RNOA) into profit margin (PM) and asset turnover (ATO), following the standard DuPont analysis. Specifically, RNOA = PM × ATO where PM = Operating Income/Sales and ATO = Sales/Net Operating Assets. RNOA captures a firm's operating profitability and is commonly used in the valuation literature (e.g., Fairfield and Yohn 2001; Nissim and Penman 2001; Penman and Zhang 2006; Fairfield et al. 2003; Richardson et al. 2006). PM captures a company's pricing power, product differentiation efforts, and brand identity. ATO measures a company's efficiency in utilizing its assets that generally include property, plant and equipment (PP&E), inventory and accounts receivable.

Soliman (2008) suggests that the DuPont components of PM and ATO measure different constructs and have different properties. He shows that investors react to changes in the DuPont components and the information in these ratios is incremental to earnings and change in earnings, but investors appear to underreact to changes in ATO, suggesting that they do not fully use the information in it. Curtis et al. (2015) extend Soliman's (2008) study and find that the underreaction is partially due to the effect of the historical cost measurement bias on ATO, making it difficult for investors to forecast future profitability based on current period asset utilization. Previous studies (e.g., Farifield and Yohn 2001; Nissim and Penman 2001; Penman and Zhang 2006; Soliman 2008; Curtis et al. 2015) also provide evidence that asset turnover is more persistent than profit margin.

Financial accounting researchers have examined the financial statement information that is useful in predicting future earnings and returns, which is considered the primary goal of fundamental analysis (Penman 1992; Lee 1999). Lipe (1986) decomposes earnings into six commonly reported components and find that the components explain more of the variation in returns than is explained by earnings. Strong and Walker (1993) divide earnings into ordinary and unusual components and find that the partition increases the returns-earnings association. Fairfield et al. (1996) use the line items on the income statement to decompose earnings to improve future profitability forecasts. Sloan (1996) decomposes earnings into accruals and cash flows and finds that earnings performance attributable to the accrual component of earnings exhibits lower persistence than earnings performance attributable to the cash flow component of earnings. These findings highlight the usefulness of breaking down earnings into meaningful components for financial information analysis.

Nissim and Penman (2001) suggest that "PM can be broken down into the gross margin ratio and expense/sales ratios, and ATO into turnover ratios for individual operating assets and liabilities", extending the standard DuPont analysis (p. 116). These sub-components of RNOA for PM and ATO are referred to as "profit margin drivers" and "activity ratios or asset utilization ratios" (Penman 2012, p. 376 – 377). We examine the incremental information provided by some of these sub-components across life-cycle stages. For profit margin, the sub-components include cost of goods sold (COGS), selling, general and administrative expenses (SG&A), research and development expense (R&D), and depreciation and amortization expense relative to sales.[1] For asset turnover, the sub-components include property, plant and equipment (PP&E) turnover, inventory turnover, and receivables turnover.

Previous research documents that components of earnings contain differential information about stock returns due to differences in persistence across components (Lipe 1986; Kormendi and Lipe 1987; Fairfield et al. 1996). Previous research also indicates that specific components of PM may be priced differently because they represent different mixtures of consumption and investment spending. For instance, R&D expense as a percentage of sales primarily represents investment (Lev and Sougiannis 1996) whereas COGS as a percentage of sales primarily represents consumption. The R&D expense is typically commingled with operating expenses in the SG&A expense (Enache and Srivistava 2017; Lev and Radhakrishnan 2005; Banker et al. 2011). Because both the persistence properties and the mixture of such components may differ with life-cycle stage, we examine how changes in sub-components of RNOA for PM and ATO (Nissim and Penman 2001) are related to stock returns across life-cycle stages.

2.3 Hypothesis development

Following Soliman (2008), we look at incremental information in the DuPont components across life-cycle stages. Based on life-cycle theory, we make predictions about the incremental information provided by changes in profit margin and asset turnover for growth versus mature firms.

Improving competitiveness and product strength is essential to the growth and development of the firm. Firms enjoy higher profit margins when they make successful efforts in product differentiation – they are able to design and produce unique and higher quality products that attract

[1] Instead of gross margin, we use the informationally equivalent ratio of COGS to sales because it aligns better with the other sub-components for PM.

a wider following of customers and yield higher profitability (Gale 1972; Selling and Stickney 1989; Ittner and Larcker 1998; Anderson et al. 2004). Gaining a larger market share is important for firms in the growth stage, when they are trying to demonstrate long run viability and gain market presence to support their business models. Therefore, they are likely to exert greater effort to establish their brand identity and market share (Spence 1977, 1979, 1981), and are expected to benefit more from investments in product differentiation (Dickinson 2011). In addition, Dickinson (2011) argues that, because increases in profitability due to increases in profit margin are not sustainable (Penman and Zhang 2006), the incremental benefit of the product differentiation strategy is expected to be mitigated by the time a firm reaches maturity. This suggests that mature firms are less likely to benefit from product differentiation, compared with growth firms.

Hypothesis 1 (H1): Increase in profit margin (PM) is more valuable for growth versus mature firms.

Economic theory suggests that operating efficiency is improved through increased knowledge of operations and that mature firms should benefit most from improvements in efficiency (Spence 1977, 1979, 1981; Wernerfelt 1985). As a firm matures, efficiency becomes critical to sustaining the profitability in both the current and future periods because more efficient operations provide a competitive advantage (Porter 1980, 1985; Fairfield and Yohn 2001; Soliman 2008; Baik et al. 2013). Compared with firms in the growth stage, although mature firms have diminished growth opportunities (Mueller 1972; Grabowski and Mueller 1975; Porter 1980), they generally enjoy higher profits which intensifies competition from existing firms and new entrants into the market. In order to maintain the level of current profitability, mature firms must concentrate more on cost management and production efficiency as competition increases (Dickinson 2011). Since operational gains in efficiency are reflected in improvements in asset turnover (Selling and Stickney 1989; Dickinson 2011), we expect that increase in asset turnover is more valuable for mature versus growth firms.

Hypothesis 2 (H2): Increase in asset turnover ATO is more valuable for mature versus growth firms.

We extend Soliman (2008)'s analysis by examining the incremental information provided by sub-components of RNOA for profit margin and asset turnover. We do not make separate hypotheses for the sub-components but interpret them in relation to the hypotheses for the primary components PM and ATO.

3. Sample data and methodology

3.1 Sample data

We obtained the accounting data of firms listed on the NYSE, AMEX, and NASDAQ exchanges from COMPUSTAT annual files for North American firms and stock return data from the Centre for Research in Securities Prices (CRSP) monthly files.

We winsorized the data at the top and bottom 1% for each variable used in our analysis. We excluded financial services firms (SIC 6000-6999) because the DuPont decomposition is not meaningful for these firms (Soliman 2008), and because of the capital constraints that materially alter their cash flow structure relative to other industries (Dickinson 2011). Firm-year observations that do not have sufficient data on COMPUSTAT to compute the financial statement variables and that do not have contemporaneous and future return data on CRSP are eliminated. In addition, all firm-year observations with negative net operation assets (NOA) and operating income are removed. Our final sample contains 38,425 firm-year observations covering the period from 1991 to 2016.

3.2 Methodology

Following Soliman (2008), we first relate future change in RNOA ($\Delta RNOA_{t+1}$) to the DuPont components to examine the incremental explanatory power of changes in PM and ATO for future RNOA. We estimate equation (1) below.

$$\Delta RNOA_{t+1} = \alpha + \beta_1 RNOA_t + \beta_2 \Delta PM_t + \beta_3 \Delta ATO_t + \beta_4 \Delta RNOA_t + RSST\ controls + AB\ Controls + \upsilon_t \quad (1)$$

As Soliman (2008) did, we control for the fundamental signals used by Abarbanell and Bushee (1997, 1998) (AB controls) that are not directly related to the components and sub-components of the DuPont variables and the three accrual components in Richardson et al. (2005) (RSST controls).

Next, we regress contemporaneous returns (R_t) on the DuPont components in equation (2) to examine whether the incremental information in the components is useful to the market.

$$R_t = \alpha + \beta_1 EPS_t + \beta_2 \Delta EPS_t + \beta_3 RNOA_t + \beta_4 \Delta RNOA_t + \beta_5 PM_t + \beta_6 ATO_t + \beta_7 \Delta PM_t + \beta_8 \Delta ATO_t + \varepsilon_t \quad (2)$$

The contemporaneous returns are measured using compounded buy-and-hold market-adjusted returns (raw returns minus the corresponding value-weighted returns including all distributions) over the 12-month period beginning in the first month of the firm's fiscal year and ending at the end of the fiscal year *t* (Soliman 2008).

We investigate whether investors fully anticipate the future implications of changes in the DuPont components by relating future stock returns (R_{t+1} and R_{t+2}) to the changes in PM and ATO in equation (3).

$$R_{t+1} or\ R_{t+2} = \alpha + \beta_1 EPS_t + \beta_2 \Delta EPS_t + \beta_3 RNOA_t + \beta_4 \Delta RNOA_t + \beta_5 PM_t + \beta_6 ATO_t + \beta_7 \Delta PM_t + \beta_8 \Delta ATO_t + FamaFrench\ Risk\ Factors + e_t \quad (3)$$

R_{t+1} is defined as the compounded 12-month buy-and-hold market-adjusted return with the cumulation period running from the beginning of the fourth month of year *t* through the third month of year *t* + 1. R_{t+2} is defined as the compounded 24-month market-adjusted buy-and-hold returns with the cumulation period running from the beginning of the fourth month of year *t* through the third month of year *t* + 2[2, 3]. Starting the cumulation period at the beginning of the

[2] For firms that delist during the future return period, we use the CRSP delisting returns whenever possible. For firms that delist due to poor performance (delisting codes 500 and 520-584), we use a -35 percent delisting return for NYSE/AMEX firms and a -55 percent delisting return for NASDAQ firms (Shumway 1997; Shumway and Warther 1999; Soliman 2008).

[3] The sample is reduced to 37,133 (years 1991-2015) for the test of two-year-ahead returns (R_{t+2}) because the calculation of R_{t+2} requires two-year-ahead return data.

fourth month accommodates the release of quarterly financial information and annual financial statements during the return period (Lev and Thiagarajan 1993; Soliman 2008; Sloan 1996; Alford et al. 1994). Fama-French risk factors of book-to-market ratio, size, and beta are included as controls (Fama and French 1993). Following Soliman (2008), we use ranks of the continuous independent variables for this analysis where they are put into annual decile ranks. This is a more conservative statistical test; the variables are scale-free and the only assumption about the regression's functional form is that the relations are monotonic (Iman and Conover 1979). The decile ranks are created by sorting all the continuous variables into ten equal-sized groups numbered 0 to 9 each year and then dividing the number by 9. This makes interpretation of the absolute value of the coefficient easier (Bernard and Thomas 1989).

Finally, we extend Soliman's analysis by looking at sub-components of RNOA for PM and ATO and examining the incremental information provided separately by these sub-components. These sub-components for PM include cost of goods sold/sales (COGS), selling, general and administrative expenses/sales (SG&A), depreciation and amortization expense/sales (D&A), and research and development expense/sales (R&D). These sub-components for ATO include receivables turnover (REC_T), inventory turnover (INV_T), and property, plant and equipment (PPE_T) turnover. Therefore, we replace the DuPont components in equations (1) to (3) with these sub-components and estimate equations (4) to (6).

$$\Delta RNOA_{t+1} = \alpha + \beta_1 RNOA_t + \beta_2 \Delta COGS_t + \beta_3 \Delta SG\&A_t + \beta_4 \Delta D\&A_t + \beta_5 \Delta R\&D_t + \beta_6 \Delta REC_{T_t} + \beta_7 \Delta INV\_T_t + \beta_8 \Delta PPE\_T_t + \beta_9 \Delta RNOA_t + RSST\ contorls + AB\ Contorls + \upsilon_t \quad (4)$$

$$\Delta R_t = \alpha + \beta_1 EPS_t + \beta_2 \Delta EPS_t + \beta_3 RNOA_t + \beta_4 \Delta RNOA_t + \beta_5 COGS_t + \beta_6 SG\&A_t + \beta_7 D\&A_t + \beta_8 R\&D_t + \beta_9 REC\_T_t + \beta_{10} INV\_T_t + \beta_{11} PPE\_T_t + \beta_{12} \Delta COGS_t + \beta_{13} \Delta SG\&A_t + \beta_{14} \Delta D\&A_t + \beta_{15} \Delta R\&D_t + \beta_{16} \Delta REC\_T_t + \beta_{17} \Delta INV\_T_t + \beta_{18} \Delta PPE\_T_t + \varepsilon_t \quad (5)$$

$$\Delta R_{t+1} or\ \Delta R_{t+2} = \alpha + \beta_1 EPS_t + \beta_2 \Delta EPS_t + \beta_3 RNOA_t + \beta_4 \Delta RNOA_t + \beta_5 COGS_t + \beta_6 SG\&A_t + \beta_7 D\&A_t + \beta_8 R\&D_t + \beta_9 REC\_T_t + \beta_{10} INV\_T_t + \beta_{11} PPE\_T_t + \beta_{12} \Delta COGS_t + \beta_{13} \Delta SG\&A_t + \beta_{14} \Delta D\&A_t + \beta_{15} \Delta R\&D_t + \beta_{16} \Delta REC\_T_t + \beta_{17} \Delta INV\_T_t + \beta_{18} \Delta PPE\_T_t + FamaFrench\ Risk\ Factors + e_t \quad (6)$$

We use Arellano-Bond dynamic panel-data estimation (Arellano and Bond 1991) for equations (1) and (4) because the dependent variable ($\Delta RNOA_{t+1}$) is dynamic, depending on its past outcome ($\Delta RNOA_t$).[4] We estimate equations (2), (3), (5) and (6) using panel analysis (with firm and year fixed effects). We use panel analysis with robust standard errors adjusted for clustering on firm, as opposed to Fama-MacBeth (1973) two-stage procedures used in previous research, because Fama-MacBeth standard errors are upwardly biased for typical accounting datasets (Gow et al. 2010). Details of the variable definitions and measurement can be found in the Appendix. We estimate equations (1) to (6) for the full sample and separately for each life-cycle stage (introduction, growth, mature, shake-out, and decline).

To identify firm life cycles, we follow the life-cycle classification method developed by Dickinson (2011). The firm life cycle proxy is based on patterns of cash flows from operating, investing, and financing activities, and five theoretical life cycle stages (introduction, growth, mature, shake-out, and decline) are identified. To identify the patterns of cash flow, we use the total cash flow in each category for a three-year rolling window, which includes the previous two years and the current year. This method provides a more stable measurement of the firm's life-cycle stage, since a three-year rolling window prevents unusual events from distorting a firm's cash flow patterns. Details of the classification can be found in Table 1.

4. Results

4.1 Descriptive statistics

Table 2 provides descriptive statistics for the full sample and for each life cycle stage. Following Dickinson (2011), we exclude the shake-out stage from our discussion because there is

[4] Because dynamic panel-data estimation uses the lagged variable as instruments, the sample size is reduced to 24,158.

no economic meaning associated with the shake-out stage. Consistent with Dickinson (2011), there are many more firms in the growth and mature stages than in the introduction and decline stages. Also, the firms in the introduction and decline stages have much smaller net operating assets on average than the firms in the growth and mature stages.

A comparison of the variables across the four stages is useful for setting the background for our analysis. Mature firms have the highest profitability, represented by RNOA (26.91 percent) and EPS (0.060), consistent with the economic theory (Spence 1977, 1979, 1981; Wernerfelt 1985). Profit margin (PM) is maximized in growth (10.80 percent) and mature (11.08 percent) stages, and ATO is the highest in the decline stage (3.733). For the sub-components for PM, COGS (60.32 to 65.38 percent of sales revenue) is similar across life-cycle stages. SG&A is the lowest for mature firms (22.75 percent of revenue), indicating more cost reduction efforts as firms mature (Selling and Stickney 1989). Depreciation and amortization expense (D&A) is higher in growth and mature (5.34 percent and 4.54 percent of sales, respectively) stages, probably because of the larger size of their capital assets. R&D expense is higher in introduction and growth (3.15 percent and 3.44 percent of sales, respectively) stages, consistent with early-stage firms investing in innovations to build their initial technology (Dickinson 2011). For the subcomponents for ATO, receivables turnover (REC_T) and inventory turnover (INV_T) are higher for growth (16.69 for REC_T and 26.14 for INV_T) and mature firms (17.68 for REC_T and 22.81 for INV_T). PP&E turnover (PPE_T) is lower for growth and mature firms (9.43 and 9.15, respectively).

Penal A and B of Table 3 provide Pearson correlations among all the DuPont variables and their components. There is a strong negative correlation between PM and ATO at -0.204, consistent with Nissim and Penman (2001) and Soliman (2008).

4.2 Empirical results

Estimation results of equation (1) are reported in Table 4. The results present the predictive power of DuPont components for future change in RNOA ($\Delta RNOA_{t+1}$) for the full sample and for five subsamples of different life-cycle stages. As noted above, the shake-out stage is not economically meaningful under Dickinson's (2011) approach, so we exclude it from our discussion throughout. We control for the fundamental signals in Abarbanell and Bushee (1997, 1998) and the three accrual components in Richardson et al. (2005), following Soliman (2008). We observe that ΔPM is positive and significant in predicting future changes in RNOA for growth firms (β = 0.148, $p < 0.05$) and ΔATO is negative and significant for predicting future change in RNOA for decline firms (β = -0.032, $p < 0.01$). The positive coefficient on ΔPM in the growth stage indicates that growth in profit margin provides incremental information about factors that influence changes in future RNOA for firms in this stage. The negative coefficient on ΔATO in the decline stage suggests that a drop in asset turnover is a pre-cursor for future declines in profitability for firms in this stage.

Table 5 presents estimation results of equation (2) for contemporaneous returns (R_t). ΔPM is incrementally informative in explaining contemporaneous returns for introduction, growth, and mature firms. While it is numerically more valuable for mature firms (β = 1.943, $p < 0.01$) than for growth (β = 1.721, $p < 0.01$) and introduction firms (β = 1.207, $p < 0.01$), differences in the coefficients are not significant in an expanded model.[5] This similarity in pricing of ΔPM is not consistent with H1 that increases in PM are more valuable for growth versus mature firms. ΔATO is incrementally valuable for mature firms only and the differences between the coefficient for the mature firms and the coefficients for firms in other stages are significant in the expanded model as described in footnote 5. These results do support H2 that increases in ATO are more valuable for mature firms. EPS and RNOA are significant in explaining contemporaneous returns for firms in

[5] In an untabulated test similar to a Chow (1960) test, we estimate an expanded equation (2) with life-cycle indicators, where the life cycle indicator variables are interacted with all the independent variables in equation (2) for the introduction, growth, decline, and shake-out stages. The mature firms are captured through the intercept and independent variables, and the interaction terms measure the incremental effect of the variables for the remaining life-cycle stages, relative to the mature stage, on contemporaneous returns. We find that the coefficient on ΔATO is significantly higher for mature than for growth firms, further confirming H2.

all life cycle stages, but ΔRNOA and ΔEPS are significant in growth and mature stages only. This reflects the more transitory nature of earnings for intro and decline firms (Ali and Zarowin 1992). We also find PM priced negatively for mature firms, consistent with profit margin being difficult to defend over time (Penman and Zhang 2006; Dickinson 2011).

Table 6 reports the results of estimating equation (3) for one-year ahead future returns (R_{t+1}). We find that ΔPM is significantly positive in explaining R_{t+1} for the growth stage firms ($\beta = 0.052$, $p < 0.10$). This indicates underpricing of profit margin for firms in the growth stage, suggesting that market participants to not fully price the information about future earnings reflected in change in profit margin for firms in the growth stage.

Table 7 reports the results of estimating equation (3) for two-year ahead future returns (R_{t+2}). Here ΔPM is significantly positive in explaining R_{t+2} for firms in the introduction stage ($\beta = 0.237$, $p < 0.10$) and significantly negative for firms in the decline stage ($\beta = -1.561$, $p < 0.01$), indicating that market participants underprice changes in PM for intro-stage firms and overprice changes in PM for decline-stage firms.

Table 8 provides the estimation results for equation (4) that examines the explanatory power of the sub-components of RNOA for profit margin and asset turnover for $\Delta RNOA_{t+1}$. This table is similar to Table 4 that provides estimation results for equation (1) relating $\Delta RNOA_{t+1}$ to ΔPM and Δ ATO. The sub-components for PM, including Δ COGS/Sales ($\beta = 0.188$, $p < 0.05$), ΔSG&A/Sales ($\beta = 0.268$, $p < 0.05$), ΔD&A/Sales ($\beta = -0.459$, $p < 0.01$), and ΔR&D/Sales ($\beta = 0.397$, $p < 0.01$) are all significant for mature firms. This may seem surprising given that ΔPM was not significant for mature firms in the Table 4 analysis. However, one might notice that the coefficients do not all move in the same direction – the signals for ΔCOGS/Sales, ΔSG&A/Sales, and ΔR&D/Sales signals are positive and the coefficient for the ΔD&A/Sales ratio is negative. So, it appears that countervailing information in the sub-components may be masked in the components. The coefficient on ΔR&D/Sales is significantly negative for growth firms (β = -0.241, $p < 0.01$), indicating that higher R&D leads to lower RNOA in the first subsequent period. For the sub-components of ATO, only change in receivables turnover (ΔREC_T) is significant in the mature (β = -0.001, $p < 0.10$) and decline stage (β = -0.008, $p < 0.05$).

Table 9 presents the results from estimating the contemporaneous returns (R_t) model for the subcomponents in equation (5). ΔCOGS/Sales is incrementally valuable for both growth (β = -1.816, $p < 0.01$) and mature firms (β = -1.720, $p < 0.01$). ΔSG&A/Sales is incrementally valuable for introduction (β = -1.876, $p < 0.01$), growth (β = -2.242, $p < 0.01$) and mature firms (β = -2.038, $p < 0.01$). We also see that ΔD&A/Sales is incrementally valuable in the growth (β = -2.029, $p < 0.01$) and mature stages (β = -2.555, $p < 0.01$). These results are consistent with the results presented in Table 5 that ΔPM is positively related to contemporaneous returns for firms in the mature, growth and intro stages. They indicate that the positive pricing of ΔPM comes from various components. Of notable interest, ΔR&D/Sales is incrementally valuable for mature firms (β = 1.152, $p < 0.05$) though in the opposite direction to the other expense sub-components – an increase in R&D/Sales adds value, indicating that the market prices the change in R&D as an investment in future earnings. The positive pricing for mature firms suggests that as the firm matures and develops innovation capabilities – such as the ability to convert R&D to products and bring the products to market or the ability to improve operations through process innovations – the value of investment in R&D becomes stronger.

For the subcomponents of ATO, the change in receivables turnover (ΔREC_T) is incrementally valuable for mature firms (β = 0.001, $p < 0.10$). When velocity of sales increases (the time it takes to sell products decreases), receivables turnover increases. When velocity of sales decreases, companies may extend credit periods to boost sales or to help their customers. ΔPP&E turnover is incrementally valuable for both growth (β = 0.003, $p < 0.10$) and mature firms (β =

0.007, $p < 0.01$) but is more valuable for mature firms. This is consistent with the positive coefficient on ΔATO for mature firms in Table 5 and supports H2 that changes in asset turnover representing efficiency in operations, are most valuable for mature firms.

Table 10 reports the results of estimating equation (6) for one-year-ahead future returns (R_{t+1}). The coefficient on ΔCOGS/Sales is significantly positive for mature firms ($\beta = 0.043$, $p < 0.01$), providing evidence of overpricing of gross margin for these firms. A possible explanation is that mature firms have difficulty sustaining gains in gross margin achieved through differentiating their products. The coefficient on ΔD&A/Sales ($\beta = 0.039$, $p < 0.05$) and ΔR&D/Sales ($\beta = 0.094$, $p < 0.10$) are both significantly positive for growth firms. The former result indicates that market participants overprice ΔD&A/Sales – the coefficient on ΔD&A/Sales is significantly negative in the contemporaneous returns analysis in Table 9. A possible explanation for this overpricing is that there is an investment component to an increase in D&A that the market does not fully anticipate. In other words, an increase in D&A for a growth firm may be a positive signal about future growth. These results are consistent with the finding that ΔPM is underpriced in Table 6. The latter result – the significantly positive coefficient on ΔR&D/Sales is also interesting because it suggests that market participants do not fully value the contribution of a change R&D spending to future earnings. Maines et al. (2003, p. 179) offer a potential explanation that "investors do not quickly and in an unbiased way assess the implications of current R&D spending for the future earnings potential of the firm" and they "[correct] this undervaluation, leading to abnormal return performance" in the subsequent period. Our finding is particularly interesting because we saw in Table 9 that the market did positively price R&D spending for mature firms. One possibility is that there is higher uncertainty about the contribution of R&D to future earnings for growth firms than for mature firms.

With respect to the sub-components related to asset turnover in Table 10, we see that change in receivables turnover is negatively informative about R_{t+1} for introduction firms (β = -0.118, p < 0.05) – an increase in receivables turnover is bad news for these firms that is not fully appreciated by market participants. We also see that change in inventory turnover is positively informative for mature firms (β = 0.023, p < 0.10), indicating that faster inventory turnover is good news about future earnings that is not fully priced initially.

For two-year-ahead future returns (R_{t+2}) in Table 11, ΔD&A/Sales is significantly negative for firms in the introduction stage (β = -0.166, p < 0.10) and significantly positive for firms in the growth stage (β = 0.064, p < 0.01). This suggests underpricing of ΔD&A/Sales for early-stage firms and overpricing of ΔD&A/Sales for growth firms. The latter result is consistent with the table 10 result that indicates that the market does not fully appreciate the information about future growth embedded in a change in depreciation and amortization. Change in receivables turnover is again significantly negative for introduction firms (β = -0.146, p < 0.05) but is significantly positive for growth (β = 0.046, p < 0.05) and mature firms (β = 0.042, p < 0.05). The latter result suggests that an increase in the velocity of sales represents good news that is not fully priced by the market. Change in inventory turnover (β = 1.612, p < 0.01) is significantly positive and change in PP&E turnover is significantly negative (β = -1.502, p < 0.10) for decline firms. The first result suggests that inventory movement is a positive sign for decline firms. The second result may be obtained because the decline firm is shedding assets. Overall, the mispricing results presented in Tables 10 and 11 suggest that investors do not fully process the information in the sub-components of the DuPont variables.

5. Conclusions

This study examines whether and how the components and sub-components of the DuPont model provide incremental information to return on net operating assets (RNOA) when analysis is conditioned on firm life cycle. It extends Soliman's (2008) study in two ways. (1) It investigates and compares the incremental effects of components of the DuPont model for firms in different life cycle stages. Previous empirical studies employ a cross-sectional approach using a large sample of heterogenous firms, meaning that they treat all of the accounting fundamentals as equivalent across firms. On the other hand, some studies focus exclusively on subsets of firms – value firms, growth firms, and firms with extreme stock returns (see Piotroski 2000; Mohanram 2005; and Beneish et al. 2001). If accounting information that is capturing firms' activities and accompanying profitability, competitiveness, and risk has different value-relevance as circumstances change over firms' life spans, this reasonably leads to the need for studies that examine the information properties of accounting fundamentals across life-cycle stages to interpret properly their implications for valuation purposes. (2) It examines the incremental effects of sub-components of the DuPont model. Profit margin is a mixture of results from such things as competitive pricing, brand identity and product differentiation ability. These results may be conveyed by sub-components of PM (e.g., COGS, SG&A, and R&D expenditures). ATO is an aggregation of efficiencies in using different types of assets (e.g., receivables, inventory, and PP&E turnover). Investigating incremental information provided by sub-components of PM and ATO gives additional insights on the role of accounting information across life-cycle stages.

We find that changes in asset turnover are most valuable for mature firms. We find that PM is valuable for all the life cycle stages except the decline stage, inconsistent with the prediction that profit margin is more valuable for growth firms than mature firms. We find that the value relevance of PM for growth and mature firms is derived from the sub-components of COGS, SG&A, and depreciation and amortization (D&A), but R&D information is more valuable for mature firms. We also find that the value relevance of ATO for mature firms is derived from receivables and PP&E turnover. Our results of one-year and two-year ahead returns show that PM is underpriced for growth firms, indicating that the market does not fully value some of the information provided by accounting. This appears to be due to a failure to appreciate the information about future growth in earnings available from changes in depreciation expense and changes in R&D spending by growth firms. Our mispricing results also suggest that there is information embedded in changes in the sub-components under some life-cycle conditions that is not picked up initially by market participants.

Overall, our study demonstrates the richness of conditioning DuPont analysis on life-cycle and the information value of examining the sub-components of RNOA for profit margin and asset turnover. The paper contributes to the literature on financial information analysis that illustrates the usefulness of contextual financial analysis. This paper also contributes to practice by providing evidence of the importance of valuation strategies that incorporate the life cycle concept in fundamental analysis to pick up common attributes for subsets of firms.

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Appendix. Variable definitions

Variables	**Descriptions**
Net Operating Assets$_t$ (NOA$_t$)	Operating Assets – Operating Liabilities ; Operating Assets = [Total assets (Compustat item "at") – Cash ("che") – Short-term investments ("ivao")] ; Operating Liabilities = Total assets – Total debt ("dltt" + "dlc") – Book value of total commen and preferred equity ("ceq" + "pstk") – Minority interest ("mib")
Profit Margin$_t$ (PM$_t$)	Operating Income$_t$ ("oiadp") / Sales$_t$ ("sale")
Asset Turnover$_t$ (ATO$_t$)	Sales$_t$ / Average NOA$_t$ ((NOA$_t$ + NOA$_{t-1}$)/2)
Return on Net Operating Assets$_t$ (RNOA$_t$)	$PM_t \times ATO_t$
ΔPM_t	$PM_t – PM_{t-1}$
ΔATO_t	$ATO_t – ATO_{t-1}$
$\Delta RNOA_t$	$RNOA_t – RNOA_{t-1}$
$\Delta RNOA_{t+1}$	$RNOA_{t+1} – RNOA_t$
Cost of Goods Sold$_t$ (COGS$_t$)	Cost of Goods Sold$_t$ ("cogs") / Sales$_t$
SG&A Expense$_t$ (SG&A$_t$)	SG&A Expense$_t$ ("xsga") / Sales$_t$
Depreciation and Amortization$_t$ (D&A$_t$)	Depreciation and Amortization$_t$ ("dp") / Sales$_t$
Research and Development$_t$ (R&D$_t$)	Research and Development Expense$_t$ ("xrd") / Sales$_t$
$\Delta COGS_t$	$COGS_t – COGS_{t-1}$
$\Delta SG\&A_t$	$SG\&A_t – SG\&A_{t-1}$
$\Delta D\&A_t$	$D\&A_t – D\&A_{t-1}$
$\Delta R\&D_t$	$R\&D_t – R\&D_{t-1}$
Receivables Turnover$_t$ (REC_T$_t$)	Sales$_t$ / Receivables$_t$ ("rect")
Inventory Turnover$_t$ (INV_T$_t$)	Sales$_t$ / Inventory$_t$ ("invt")
PP&E Turnover$_t$ (PPE_T$_t$)	Sales$_t$ / Net PP&E$_t$ ("ppent")
ΔREC_T_t	$REC\_T_t – REC\_T_{t-1}$
ΔINV_T_t	$INV\_T_t – INV\_T_{t-1}$
ΔPPE_T_t	$PPE\_T_t – PPE\_T_{t-1}$
R_t	Compounded 12-month buy-and-hold market-adjusted returns (raw returns minus the corresponding value-weighted returns including all distributions) with the cumulation period beginning in the first month of the firm's fiscal year and ending at the end of the fiscal year *t*
R_{t+1}	Compounded 12-month buy-and-hold market-adjusted returns with the cumulation period starting from the beginning of the fourth month of year *t* through the third month of year *t* + 1.

R_{t+2}	Compounded 24-month buy-and-hold market-adjusted returns with the cumulation period starting from the beginning of the fourth month of year *t* through the third month of year *t* + 2
EPS_t	EPS_t ("epspx") / Market value of equity per $share_{t-1}$ ("prcc_f")
ΔEPS_t	ΔEPS_t/ Market value of equity per $share_{t-1}$
RSST Controls	The three components of total accruals in Richardson et al. (2005)
ΔWC_t	WC_t – WC_{t-1}; WC = Current Operating Assets (COA) – Current Operating Liabilities (COL), COA = Current assets ("act") – Cash and short-term investments ("che"), and COL = Current liabilities ("lct") – Debt in current liabilities ("dlc")
ΔNCO_t	NCO_t – NCO_{t-1}; NOC = Noncurrent Operating Assets (NCOA) – Noncurrent Operating Liabilities (NCOL), NCOA = Total assets ("act") – Current assets ("act") – Investments and advances ("ivao"), and NCOL = Total liabilities ("lt") – Current liabilities ("lct") – Long-term debt ("dltt")
ΔFIN_t	FIN_t – FIN_{t-1}; FIN = Financial Assets (FINA) – Financial Liabilities (FINL), FINA = Short-term investments ("ivst") + Long-term investments ("ivao"), and FINL = Long-term debt ("dltt") + Debt in current liabilities ("dlc") + Preferred stock ("pstk")
AB Controls	Fundamental signals used by Abarbanell and Bushee (1997, 1998) that are not directly correlated with components and sub-components of DuPont variables
AB_CAPEX	ΔIndustry $Capex_t$ ("capx") – ΔFirm $Capex_t$
AB_AQ	0 for Unqualifed, 1 for Qualified and other ("auop")
AB_LF	($Sales_{t-1}$ / # of $Employees_{t-1}$ ("emp") – $Sales_t$ / # of $Employees_t$) / ($Sales_{t-1}$ / # of $Employees_{t-1}$)
Fama-French Risk Factors	Risk factors in Fama and French (1993)
BM_t	Book-to-Market Ratio = Book Value of $Equity_t$ ("ceq") / Market Value of $Equity_t$ ("csho" × "prcc_f")
MVE_t (Size)	Log (Market Value of $Equity_t$)
$BETA_t$ (β)	β for firm *i* for fiscal year *t* is estimated by a market model regression. The regression is run using weekly returns for a period of two years ending at the end of the fiscal year from which the data is obtained to compute each of the financial ratios.

Table 1 - Classification of firm life cycle[a]

	1 Introduction	2 Growth	3 Mature	4 Shake-Out	5 Shake-Out	6 Shake-Out	7 Decline	8 Decline
Predicted Sign								
Cash flows from operating activities	–	+	+	–	+	+	–	–
Cash flows from investing activities	–	–	–	–	+	+	+	+
Cash flows from financing activities	+	+	–	–	+	–	+	–

[a] Classification methodology is developed by Dickinson (2011, p. 1974) based on cash flow patterns from operating, investing, and financing activities.

Table 2 - Descriptive statistics

	Full Sample	Introduction	Growth	Mature	Decline	Shake-Out
N	38,425	2,402	15,560	18,173	409	1,881
NOA	1,762	194	1,370	2,401	375	1,137
RNOA	24.35%	16.39%	22.65%	26.91%	17.97%	25.28%
PM	10.50%	6.10%	10.80%	11.08%	4.98%	9.21%
ATO	2.76	3.10	2.50	2.88	3.73	3.22
COGS	61.25%	65.38%	60.32%	61.51%	62.75%	60.89%
SG&A	23.39%	25.75%	23.33%	22.75%	29.23%	25.79%
D&A	4.69%	2.62%	5.34%	4.54%	2.83%	3.94%
R&D	3.06%	3.15%	3.44%	2.59%	4.90%	3.99%
REC_T	16.51	10.72	16.69	17.68	10.86	12.24
INV_T	23.45	12.35	26.14	22.81	15.53	23.21
PPE_T	10.42	22.03	9.43	9.15	21.55	13.71
ΔRNOA	1.31%	6.65%	-0.40%	1.08%	19.53%	6.78%
ΔPM	0.87%	3.27%	0.69%	0.46%	6.91%	2.03%
ΔATO	-0.07	-0.27	-0.18	0.01	0.13	0.20
ΔCOGS	-0.37%	-0.85%	-0.32%	-0.28%	-2.03%	-0.80%
ΔSG&A	-0.45%	-2.19%	-0.43%	-0.11%	-3.95%	-0.87%
ΔD&A	0.02%	-0.20%	0.10%	-0.06%	-0.66%	-0.28%
ΔR&D	1.56%	-1.00%	1.85%	1.95%	-3.02%	-0.26%
ΔREC_T	-0.12	-0.14	-0.26	-0.05	0.60	0.29
ΔINV_T	0.43	0.11	0.32	0.43	2.31	1.26
ΔPPE_T	6.06	-11.04	6.87	8.57	-6.94	-0.21
R_t	9.58%	10.69%	7.97%	9.84%	26.63%	15.25%
R_{t+1}	2.24%	-8.38%	0.83%	4.46%	-3.89%	7.45%
R_{t+2}	5.42%	-12.06%	3.90%	8.40%	1.46%	12.37%
EPS	0.05	0.03	0.04	0.06	0.03	0.05
ΔEPS	0.03	0.07	0.02	0.03	0.19	0.08

All data presented are the means except for the total number of observations.

Table 3 - Pearson correlation matrix

Panel A - Levels of DuPont components and sub-components

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) RNOA	_													
(2) PM	0.494	_												
	(0.000)													
(3) ATO	0.547	-0.204	_											
	(0.000)	(0.000)												
(4) COGS	-0.304	-0.576	0.165	_										
	(0.000)	(0.000)	(0.000)											
(5) SG&A	0.150	0.039	0.031	-0.795	_									
	(0.000)	(0.000)	(0.000)	(0.000)										
(6) D&A	-0.184	0.290	-0.384	-0.347	-0.072	_								
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)									
(7) R&D	0.200	0.158	0.012	-0.530	0.567	0.025	_							
	(0.000)	(0.000)	(0.023)	0.000	0.000	0.000								
(8) REC_T	0.057	-0.094	0.195	0.094	-0.042	-0.069	-0.180	_						
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)							
(9) INV_T	0.063	0.122	0.036	-0.089	-0.043	0.235	-0.041	0.098	_					
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)						
(10) PPE_T	0.164	-0.136	0.425	0.091	0.071	-0.334	0.029	-0.054	-0.025	_				
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)					
(11) $\Delta RNOA_{t+1}$	1.000	0.494	0.547	-0.304	0.150	-0.184	0.200	0.057	0.063	0.164	_			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)				
(12) R_t	0.145	0.086	0.085	-0.049	0.022	-0.034	0.043	-0.001	0.003	0.056	0.145	_		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.816)	(0.549)	(0.000)	(0.000)			
(13) R_{t+1}	-0.003	-0.019	0.015	-0.004	0.018	-0.004	0.026	-0.007	-0.001	-0.004	-0.003	-0.013	_	
	(0.593)	(0.000)	(0.004)	(0.448)	(0.001)	(0.476)	(0.000)	(0.193)	(0.837)	(0.468)	(0.593)	(0.009)		
(14) R_{t+2}	-0.003	-0.023	0.015	-0.010	0.030	-0.007	0.031	-0.005	-0.002	0.000	-0.003	-0.034	0.695	_
	(0.516)	(0.000)	(0.004)	(0.049)	(0.000)	(0.164)	(0.000)	(0.307)	(0.741)	(0.998)	(0.516)	(0.000)	(0.000)	

Panel B - Changes of DuPont components and sub-components

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)
(1) ΔRNOA	_													
(2) ΔPM	0.644	_												
	(0.000)													
(3) ΔATO	0.611	0.195	_											
	(0.000)	(0.000)												
(4) ΔCOGS	-0.369	-0.634	-0.044	_										
	(0.000)	(0.000)	(0.000)											
(5) ΔSG&A	-0.496	-0.670	-0.197	-0.051	_									
	(0.000)	(0.000)	(0.000)	(0.000)										
(6) ΔD&A	-0.320	-0.473	-0.194	0.045	0.319	_								
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)									
(7) ΔR&D	-0.111	-0.130	0.018	0.001	0.177	0.108	_							
	(0.000)	(0.000)	(0.000)	(0.863)	(0.000)	(0.000)								
(8) ΔREC_T	0.100	0.080	0.124	-0.035	-0.072	-0.058	-0.008	_						
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.125)							
(9) ΔINV_T	0.140	0.163	0.123	-0.081	-0.123	-0.131	-0.012	0.068	_					
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.019)	(0.000)						
(10) ΔPPE_T	0.003	-0.016	0.052	0.007	0.017	-0.005	0.181	0.050	0.000	_				
	(0.606)	0.002	(0.000)	(0.159)	(0.001)	(0.336)	(0.000)	(0.000)	(0.957)					
(11) $\Delta RNOA_{t+1}$	-0.071	-0.061	0.053	0.037	0.060	0.002	0.120	0.018	-0.011	0.053	_			
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.663)	(0.000)	(0.001)	(0.031)	(0.000)				
(12) ΔR_t	0.291	0.327	0.139	-0.213	-0.226	-0.175	-0.079	0.052	0.072	-0.007	0.056	_		
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	0.199	(0.000)			
(13) ΔR_{t+1}	0.001	-0.008	0.021	0.002	0.012	0.003	-0.018	0.021	0.009	-0.004	0.249	-0.013	_	
	(0.849)	(0.100)	(0.000)	(0.736)	(0.018)	(0.618)	(0.001)	(0.000)	(0.087)	(0.478)	(0.000)	(0.009)		
(14) ΔR_{t+2}	-0.010	-0.024	0.014	0.007	0.026	0.014	-0.024	0.026	0.011	-0.005	0.183	-0.034	0.695	_
	(0.043)	(0.000)	(0.008)	(0.205)	(0.000)	(0.006)	(0.000)	(0.000)	(0.026)	(0.326)	(0.000)	(0.000)	(0.000)	

Numbers in parentheses are *p*-values.

Table 4 - DuPont components for future change in RNOA

Variables	(1) Full Sample	(2) Introduction	(3) Growth	(4) Mature	(5) Decline	(6) Shake-out
RNOA	-0.908***	-0.657***	-0.919***	-0.934***	-1.409***	-0.980***
	(0.025)	(0.089)	(0.033)	(0.035)	(0.349)	(0.080)
ΔPM	0.082	-0.219	0.148**	-0.097	0.345	-0.320
	(0.067)	(0.197)	(0.069)	(0.104)	(0.593)	(0.263)
ΔATO	0.004	0.001	0.008	0.007	-0.032***	-0.015
	(0.005)	(0.009)	(0.006)	(0.007)	(0.012)	(0.015)
Intercept	0.191***	0.0426**	0.156***	0.235***	0.130**	0.233***
	(0.008)	(0.019)	(0.009)	(0.011)	(0.059)	(0.025)
RSST Controls	Included	Included	Included	Included	Included	Included
AB Controls	Included	Included	Included	Included	Included	Included
Wald Chi^2	2459.46	157.39	1192.50	1417.95	214.40	295.32
N	24,158	787	9,182	13,012	92	1,058

Results are based on Arellano-Bond dynamic panel-data estimation. Because dynamic panel-data estimation uses the lagged variable as instruments, the sample size is reduced to 24,158.
Robust standard errors are reported in parentheses.
The Wald test is asymptotically robust to general heteroskedasticity.
*, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 5 - DuPont components for contemporaneous returns

Variables	(1) Full Sample	(2) Introduction	(3) Growth	(4) Mature	(5) Decline	(6) Shake-out
EPS	1.232***	1.893***	1.183***	1.522***	1.525*	0.810***
	(0.064)	(0.356)	(0.114)	(0.112)	(0.903)	(0.262)
ΔEPS	0.382***	0.363*	0.357***	0.310***	0.0119	0.410***
	(0.035)	(0.186)	(0.070)	(0.060)	(0.275)	(0.142)
RNOA	0.208***	1.060**	0.235***	0.133***	2.075**	0.129
	(0.036)	(0.434)	(0.066)	(0.047)	(0.966)	(0.165)
ΔRNOA	0.204***	0.058	0.314***	0.220***	-0.492	0.0125
	(0.035)	(0.196)	(0.059)	(0.052)	(0.614)	(0.138)
PM	-0.246**	-1.846	-0.271	-0.526***	-8.214	0.682
	(0.100)	(1.138)	(0.177)	(0.143)	(5.201)	(0.640)
ATO	-0.002	-0.013	0.004	-0.004	-0.027	0.012
	(0.004)	(0.035)	(0.007)	(0.005)	(0.040)	(0.019)
ΔPM	1.789***	1.207**	1.721***	1.943***	2.299	1.364***
	(0.108)	(0.608)	(0.163)	(0.182)	(1.846)	(0.458)
ΔATO	0.0168***	-0.010	0.000	0.030***	0.119**	0.020
	(0.005)	(0.026)	(0.009)	(0.008)	(0.058)	(0.024)
Intercept	0.122***	0.421**	0.206***	0.0728***	0.326	-0.219
	(0.020)	(0.171)	(0.036)	(0.028)	(0.299)	(0.134)
Adj. R^2	24.1%	21.7%	21.6%	26.9%	41.7%	26.6%
N	38,425	2,402	15,560	18,173	409	1,881

Results are based on panel analysis with firm and year fixed effects.
Robust standard errors adjusted for clustering on firm are reported in parentheses.
*, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 6 - Ranks of DuPont components for one-year-ahead returns

Variables	(1) Full Sample	(2) Introduction	(3) Growth	(4) Mature	(5) Decline	(6) Shake-out
EPS	0.005	-0.039	0.014	-0.012	0.213	-0.138*
	(0.014)	(0.074)	(0.026)	(0.021)	(0.214)	(0.075)
ΔEPS	-0.034***	0.069	-0.058**	-0.023	-0.380*	-0.050
	(0.013)	(0.078)	(0.023)	(0.018)	(0.203)	(0.065)
RNOA	0.047	-0.045	0.039	0.0984**	0.276	-0.076
	(0.029)	(0.172)	(0.050)	(0.044)	(0.406)	(0.143)
ΔRNOA	-0.020	-0.037	-0.051	0.002	0.384	-0.036
	(0.021)	(0.115)	(0.038)	(0.030)	(0.421)	(0.099)
PM	-0.026	-0.100	-0.004	-0.126***	-0.393	0.171
	(0.029)	(0.173)	(0.049)	(0.046)	(0.425)	(0.162)
ATO	0.074***	0.301**	0.091*	0.037	0.056	-0.013
	(0.028)	(0.150)	(0.050)	(0.042)	(0.398)	(0.123)
ΔPM	0.025	0.035	0.052*	-0.003	-0.372	-0.092
	(0.017)	(0.105)	(0.028)	(0.024)	(0.361)	(0.083)
ΔATO	0.027**	0.009	0.011	0.026	0.375***	0.047
	(0.013)	(0.060)	(0.024)	(0.019)	(0.141)	(0.068)
Intercept	0.574***	0.269*	0.605***	0.584***	-0.300	0.775***
	(0.033)	(0.147)	(0.056)	(0.057)	(0.360)	(0.272)
FF Risk Factors	Included	Included	Included	Included	Included	Included
Adj. R^2	13.5%	21.3%	14.7%	13.1%	36.0%	19.5%
N	38,425	2,402	15,560	18,173	409	1,881

The decile ranks of the continuous independent variables are used. The ranks are created by sorting all the continuous variables into ten equal-sized groups numbered 0 to 9 each year and then dividing the number by 9.
Results are based on panel analysis with firm and year fixed effects.
Robust standard errors adjusted for clustering on firm are reported in parentheses.
*, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 7 - Ranks of DuPont components for two-year-ahead returns

Variables	(1) Full Sample	(2) Introduction	(3) Growth	(4) Mature	(5) Decline	(6) Shake-out
EPS	0.001	-0.130	-0.015	0.011	0.388	-0.261***
	(0.021)	(0.092)	(0.037)	(0.032)	(0.341)	(0.094)
ΔEPS	-0.046***	-0.038	-0.018	-0.065***	0.021	-0.047
	(0.017)	(0.092)	(0.031)	(0.024)	(0.301)	(0.071)
RNOA	0.116***	0.227	0.154**	0.138**	-0.689	0.005
	(0.044)	(0.205)	(0.072)	(0.068)	(0.536)	(0.178)
ΔRNOA	-0.032	-0.272*	-0.117**	0.004	1.878**	0.078
	(0.029)	(0.141)	(0.052)	(0.041)	(0.736)	(0.145)
PM	-0.064	-0.454**	-0.068	-0.222***	1.235*	-0.026
	(0.045)	(0.208)	(0.070)	(0.070)	(0.662)	(0.224)
ATO	0.063	0.274	0.080	0.002	-0.494	-0.147
	(0.044)	(0.191)	(0.075)	(0.062)	(0.683)	(0.181)
ΔPM	0.024	0.237*	0.054	0.018	-1.561***	-0.070
	(0.024)	(0.121)	(0.042)	(0.032)	(0.580)	(0.117)
ΔATO	0.027	0.035	0.016	0.031	0.184	0.001
	(0.018)	(0.072)	(0.032)	(0.027)	(0.301)	(0.089)
Intercept	1.144***	0.862***	1.176***	1.176***	0.468	1.549***
	(0.053)	(0.207)	(0.082)	(0.084)	(0.676)	(0.303)
FF Risk Factors	Included	Included	Included	Included	Included	Included
Adj. R^2	19.7%	24.6%	21.3%	20.4%	36.6%	24.0%
N	37,133	2,376	15,105	17,419	400	1,833

The decile ranks of the continuous independent variables are used. The ranks are created by sorting all the continuous variables into ten equal-sized groups numbered 0 to 9 each year and then dividing the number by 9.
Results are based on panel analysis with firm and year fixed effects.
Robust standard errors adjusted for clustering on firm are reported in parentheses.
The sample is reduced to 37,133 (years 1991-2015) for the test of two-year-ahead returns (R_{t+2}) because the calculation of R_{t+2} requires two-year-ahead return data.
*, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 8 - Sub-components for future change in RNOA

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Full Sample	Introduction	Growth	Mature	Decline	Shake-out
RNOA	-0.909***	-0.659***	-0.921***	-0.932***	-1.339***	-0.987***
	(0.025)	(0.090)	(0.033)	(0.035)	(0.442)	(0.080)
ΔCOGS	0.070	0.242	-0.057	0.188**	-0.349	0.081
	(0.051)	(0.176)	(0.065)	(0.087)	(0.669)	(0.167)
ΔSG&A	0.093	0.165	-0.110	0.268**	-1.204	0.380
	(0.073)	(0.231)	(0.090)	(0.120)	(0.924)	(0.266)
ΔD&A	-0.205**	0.868	-0.080	-0.459***	-0.445	-0.144
	(0.104)	(0.676)	(0.139)	(0.177)	(1.519)	(0.441)
ΔR&D	-0.047	-0.612	-0.241**	0.397**	-0.694	0.266
	(0.093)	(0.588)	(0.111)	(0.193)	(2.794)	(0.436)
ΔReceivables Turnover	-0.001*	0.000	0.000	-0.001*	-0.008**	-0.001*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.004)	(0.001)
ΔInventory Turnover	0.000	0.001	0.000	0.000	0.001	-0.002
	(0.000)	(0.001)	(0.000)	(0.000)	(0.003)	(0.001)
ΔPP&E Turnover	0.001**	0.001	0.000	0.000	-0.001	0.001
	(0.000)	(0.000)	(0.000)	(0.000)	(0.002)	(0.001)
Intercept	0.189***	0.0534***	0.158***	0.223***	0.092	0.236***
	(0.008)	(0.020)	(0.010)	(0.012)	(0.077)	(0.024)
RSST Controls	Included	Included	Included	Included	Included	Included
AB Controls	Included	Included	Included	Included	Included	Included
Wald Chi^2	2517.48	156.83	1228.60	1477.15	152.11	280.18
N	24,158	787	9,182	13,012	92	1,058

Results are based on Arellano-Bond dynamic panel-data estimation. Because dynamic panel-data estimation uses the lagged variable as instruments, the sample size is reduced to 24,158.
Robust standard errors are reported in parentheses.
The Wald test is asymptotically robust to general heteroskedasticity.
*, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 9 - Sub-components for contemporaneous returns

Variables	(1) Full Sample	(2) Introduction	(3) Growth	(4) Mature	(5) Decline	(6) Shake-out
EPS	1.210***	1.845***	1.170***	1.486***	1.068	0.824***
	(0.064)	(0.359)	(0.114)	(0.111)	(0.777)	(0.265)
ΔEPS	0.378***	0.375**	0.346***	0.316***	0.189	0.371**
	(0.035)	(0.186)	(0.070)	(0.059)	(0.289)	(0.144)
ΔRNOA	0.174***	0.967***	0.239***	0.104***	1.066	0.178
	(0.025)	(0.301)	(0.046)	(0.031)	(0.839)	(0.130)
RNOA	0.244***	0.0198	0.268***	0.314***	0.220	0.108
	(0.026)	(0.173)	(0.044)	(0.036)	(0.462)	(0.073)
COGS	0.250***	1.453	0.380**	0.449***	7.522	-0.762
	(0.090)	(0.938)	(0.166)	(0.121)	(5.117)	(0.694)
SG&A	0.166	1.473	0.150	0.547***	4.775	-0.695
	(0.110)	(1.220)	(0.211)	(0.150)	(5.276)	(0.774)
D&A	-0.652**	2.274	-0.0537	-0.619	-0.408	0.846
	(0.309)	(4.191)	(0.476)	(0.537)	(10.440)	(2.174)
R&D	0.322	1.280	0.260	0.829*	0.751	1.556
	(0.246)	(1.653)	(0.368)	(0.477)	(7.831)	(1.720)
Receivables Turnover	-0.003***	-0.001	-0.002	-0.007***	0.015*	-0.001
	(0.001)	(0.003)	(0.002)	(0.002)	(0.009)	(0.004)
Inventory Turnover	-0.000	0.002	-0.000	-0.000	-0.005	-0.001
	(0.000)	(0.003)	(0.000)	(0.000)	(0.006)	(0.001)
PP&E Turnover	0.004***	0.003	0.003**	0.007***	0.001	0.005
	(0.001)	(0.002)	(0.002)	(0.002)	(0.004)	(0.004)
ΔCOGS	-1.764***	-0.957	-1.816***	-1.720***	1.539	-1.090*
	(0.123)	(0.719)	(0.192)	(0.189)	(1.798)	(0.562)
ΔSG&A	-1.951***	-1.876**	-2.242***	-2.038***	-2.006	-1.496**
	(0.150)	(0.765)	(0.241)	(0.244)	(1.648)	(0.681)
ΔD&A	-2.287***	-2.071	-2.029***	-2.555***	5.386	-2.156
	(0.318)	(3.128)	(0.484)	(0.525)	(5.142)	(1.707)
ΔR&D	0.785***	1.219	0.0593	1.152**	-1.050	1.490
	(0.221)	(1.288)	(0.299)	(0.462)	(3.675)	(1.324)
ΔReceivables Turnover	0.001	-0.000	-0.000	0.001*	0.005	-0.007*
	(0.000)	(0.004)	(0.001)	(0.001)	(0.005)	(0.003)
ΔInventory Turnover	0.000	-0.006	0.000	0.000	-0.0028	0.003
	(0.000)	(0.004)	(0.001)	(0.000)	(0.014)	(0.002)
ΔPP&E Turnover	0.004***	0.001	0.003*	0.007***	0.005	0.003
	(0.001)	(0.002)	(0.001)	(0.002)	(0.004)	(0.003)
Intercept	-0.091	-1.217	-0.090	-0.394***	-6.397	0.383
	(0.084)	(0.935)	(0.154)	(0.114)	(4.722)	(0.608)
Adj. R^2	24.4%	22.0%	22.1%	27.2%	44.8%	27.0%
N	38,425	2,402	15,560	18,173	409	1,881

Results are based on panel analysis with firm fixed and year effects.
Robust standard errors adjusted for clustering on firm are reported in parentheses.
*, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 10 - Ranks of sub-components for one-year-ahead returns

Variables	(1) Full Sample	(2) Introduction	(3) Growth	(4) Mature	(5) Decline	(6) Shake-out
EPS	-0.001	-0.049	0.006	-0.022	0.187	-0.105
	(0.014)	(0.076)	(0.025)	(0.021)	(0.238)	(0.075)
ΔEPS	-0.026**	0.067	-0.045**	-0.014	-0.449**	-0.066
	(0.013)	(0.078)	(0.023)	(0.019)	(0.196)	(0.065)
ΔRNOA	0.061***	-0.061	0.069*	0.039	-0.080	0.067
	(0.020)	(0.106)	(0.036)	(0.031)	(0.447)	(0.104)
ΔRNOA	0.031**	0.002	0.002	0.046**	0.173	0.013
	(0.015)	(0.089)	(0.027)	(0.021)	(0.281)	(0.069)
COGS	0.025	0.030	-0.016	0.012	1.397	-0.026
	(0.040)	(0.280)	(0.071)	(0.058)	(1.239)	(0.259)
SG&A	-0.005	-0.112	-0.015	0.007	0.400	-0.297
	(0.041)	(0.267)	(0.073)	(0.057)	(1.062)	(0.301)
D&A	-0.007	0.354*	-0.117**	0.004	1.942***	0.171
	(0.030)	(0.202)	(0.054)	(0.044)	(0.683)	(0.181)
R&D	0.032	-0.110	0.065	0.044	-0.340	-0.313
	(0.032)	(0.138)	(0.054)	(0.042)	(0.511)	(0.215)
Receivables Turnover	-0.034	-0.003	-0.0904*	0.013	0.343	0.059
	(0.028)	(0.149)	(0.050)	(0.041)	(0.441)	(0.169)
Inventory Turnover	0.013	0.189	-0.047	0.017	-0.001	-0.102
	(0.027)	(0.160)	(0.051)	(0.042)	(0.615)	(0.190)
PP&E Turnover	0.013	0.492**	-0.017	0.005	1.235*	-0.496**
	(0.036)	(0.221)	(0.065)	(0.055)	(0.639)	(0.225)
ΔCOGS	0.004	-0.010	-0.025	0.043***	-0.158	0.062
	(0.011)	(0.071)	(0.019)	(0.016)	(0.224)	(0.059)
ΔSG&A	0.009	-0.021	-0.008	0.018	0.242	0.121**
	(0.011)	(0.067)	(0.019)	(0.016)	(0.220)	(0.057)
ΔD&A	0.023**	0.009	0.039**	0.022	-0.249	-0.009
	(0.010)	(0.067)	(0.017)	(0.015)	(0.264)	(0.067)
ΔR&D	0.024	-0.325	0.094*	0.027	-0.658	0.049
	(0.034)	(0.229)	(0.056)	(0.052)	(0.790)	(0.225)
ΔReceivables Turnover	-0.003	-0.118**	0.004	-0.006	-0.248	0.005
	(0.009)	(0.057)	(0.015)	(0.012)	(0.175)	(0.059)
ΔInventory Turnover	0.013	-0.002	0.010	0.023*	0.437	0.010
	(0.009)	(0.069)	(0.016)	(0.012)	(0.302)	(0.065)
ΔPP&E Turnover	-0.008	0.190	-0.012	-0.060	-0.143	-0.097
	(0.034)	(0.173)	(0.065)	(0.050)	(0.418)	(0.208)
Intercept	0.568***	0.148	0.733***	0.514***	-2.756	1.177**
	(0.065)	(0.370)	(0.116)	(0.098)	(1.691)	(0.465)
FF Risk Factors	Included	Included	Included	Included	Included	Included
Adj. R^2	13.5%	21.7%	14.8%	13.0%	41.1%	20.5%
N	38,425	2,402	15,560	18,173	409	1,881

The decile ranks of the continuous independent variables are used. The ranks are created by sorting all the continuous variables into ten equal-sized groups numbered 0 to 9 each year and then dividing the number by 9.
Results are based on panel analysis with firm and year fixed effects.
Robust standard errors adjusted for clustering on firm are reported in parentheses.
*, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.

Table 11 - Ranks of sub-components for two-year-ahead returns

Variables	(1) Full Sample	(2) Introduction	(3) Growth	(4) Mature	(5) Decline	(6) Shake-out
EPS	-0.007	-0.172*	-0.027	-0.006	0.579	-0.247***
	(0.021)	(0.095)	(0.036)	(0.031)	(0.378)	(0.094)
ΔEPS	-0.037**	-0.029	0.002	-0.055**	-0.141	-0.054
	(0.017)	(0.092)	(0.031)	(0.024)	(0.305)	(0.075)
ΔRNOA	0.111***	0.045	0.164***	0.006	-0.566	-0.001
	(0.030)	(0.129)	(0.051)	(0.046)	(0.486)	(0.129)
RNOA	0.019	-0.127	-0.042	0.038	0.286	0.061
	(0.021)	(0.112)	(0.037)	(0.029)	(0.421)	(0.083)
COGS	0.068	0.479*	0.023	0.034	2.421	0.018
	(0.064)	(0.289)	(0.101)	(0.091)	(1.646)	(0.334)
SG&A	0.027	-0.044	0.099	0.004	0.805	-0.329
	(0.064)	(0.318)	(0.106)	(0.089)	(2.169)	(0.352)
D&A	-0.034	0.287	-0.126	-0.002	0.295	-0.047
	(0.048)	(0.206)	(0.081)	(0.069)	(0.958)	(0.246)
R&D	0.019	-0.199	0.112	-0.008	0.448	-0.265
	(0.049)	(0.177)	(0.074)	(0.065)	(0.918)	(0.276)
Receivables Turnover	-0.019	-0.025	-0.050	0.016	1.113	0.197
	(0.043)	(0.184)	(0.072)	(0.064)	(0.747)	(0.207)
Inventory Turnover	-0.018	0.000	-0.056	-0.037	-1.188	-0.183
	(0.047)	(0.223)	(0.083)	(0.067)	(0.780)	(0.233)
PP&E Turnover	-0.059	0.247	-0.112	0.005	0.544	-0.699**
	(0.056)	(0.243)	(0.094)	(0.082)	(0.975)	(0.300)
ΔCOGS	-0.004	-0.104	-0.008	0.013	-0.215	-0.027
	(0.016)	(0.075)	(0.027)	(0.023)	(0.287)	(0.076)
ΔSG&A	0.014	-0.011	0.013	0.004	0.226	0.004
	(0.015)	(0.074)	(0.027)	(0.022)	(0.284)	(0.072)
ΔD&A	0.041***	-0.166*	0.064***	0.026	0.270	0.114
	(0.014)	(0.093)	(0.023)	(0.020)	(0.296)	(0.077)
ΔR&D	0.009	-0.152	0.113	-0.056	0.450	0.176
	(0.053)	(0.288)	(0.085)	(0.083)	(1.325)	(0.341)
ΔReceivables Turnover	0.035***	-0.146**	0.046**	0.042**	-0.390	-0.051
	(0.013)	(0.070)	(0.021)	(0.018)	(0.350)	(0.067)
ΔInventory Turnover	0.018	0.083	0.014	0.018	1.612***	0.044
	(0.014)	(0.085)	(0.022)	(0.019)	(0.508)	(0.084)
ΔPP&E Turnover	-0.120**	0.129	-0.130	-0.106	-1.052*	-0.089
	(0.050)	(0.218)	(0.089)	(0.079)	(0.593)	(0.231)
Intercept	1.187***	0.870**	1.207***	1.216***	-2.395	2.002***
	(0.099)	(0.427)	(0.165)	(0.145)	(2.350)	(0.520)
FF Risk Factors	Included	Included	Included	Included	Included	Included
Adj. R^2	19.9%	24.7%	21.6%	20.5%	43.3%	26.2%
N	37,133	2,376	15,105	17,419	400	1,833

The decile ranks of the continuous independent variables are used. The ranks are created by sorting all the continuous variables into ten equal-sized groups numbered 0 to 9 each year and then dividing the number by 9.
Results are based on panel analysis with firm and year fixed effects. Robust standard errors are reported in parentheses.
The sample is reduced to 37,133 (years 1991-2015) for the test of two-year-ahead returns (R_{t+2}) because the calculation of R_{t+2} requires two-year-ahead return data.
*, **, and *** indicate significance at the 10 percent, 5 percent, and 1 percent levels (two-tailed), respectively.