The Market Reaction to *ROCE* and *ROCE* Components

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November 2005

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Abstract

This study examines investor reaction to return on common equity (*ROCE*) and its components around the announcement of quarterly earnings. It is an issue that the accounting literature has not examined, notwithstanding the importance of ratio analysis in general and the DuPont decomposition in particular. We consider the importance of each of the *ROCE* components relative to the others and show, using portfolio formation, that the influence of each component on size-adjusted returns depends on the level of *ROCE* as a whole and the level of the other components. We find that a higher level of *NPM* leads to a more positive market reaction then that for asset turnover (*ATO*) or financial leverage (*LEV*). Also, high (low) *NPM* yields positive (negative) size-adjusted returns, regardless of the level of the other components. Further, an increase in *ATO* does not lead to an increase in size-adjusted returns when *NPM* or *ROCE* are low (and negative), as improved efficiency may exacerbate shareholder losses. Consistent with trade-off theory between tax savings and costs of financial distress, we find that the relation between *LEV* and size-adjusted returns is an inverted-U shape, and the market reaction to an increase in *LEV* is more positive when *NPM* is relatively high. Using regression analysis, we show that unexpected *NPM* is significant in explaining size-adjusted returns around earnings announcements incrementally to unexpected earnings and unexpected revenues surprises. Using a 50-day window around quarterly earnings announcements, we show that *ROCE* and its components explain size-adjusted returns incrementally to earnings and revenues surprises. Our results are important to financial statement users who use traditional ratio decomposition.

Key words: Return on Equity, DuPont Decomposition, Market Reaction, Ratio Analysis

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1. Introduction

Numerous studies, beginning with Ball and Brown (1968) and Beaver (1968), have examined the information content of accounting earnings, earnings components and other financial statement line items. These studies find that stock returns react to information on earnings, revenues and other financial disclosures.[1] The enormous interest in the market reaction to earnings and the association between stock returns and earnings is driven by the implications this has for equity valuation, fundamental analysis, forecasting, debt rating, standard setting and security regulation. It is quite surprising, however, that classic financial ratios, such as profit margin, asset turnover and financial leverage, which play a significant role in financial analysis, are rarely mentioned in market-based empirical accounting research.

Financial ratios are perhaps the most common tool in financial statement analysis. They are used for summarizing financial data, analyzing current performance and financial position and comparing performance and financial position across companies and over time. Investors, lenders, rating agencies and regulators use them to analyze company performance, strategy and risks. Consequently, most financial statement analysis textbooks contain a detailed chapter on analyzing financial ratios,[2] often advocating their use for identifying trends, assessing risks, estimating the probability of default, analytical auditing, imposing debt restrictions (covenants), comparison with industry norms and company budgets, and equity valuation.

Several studies have recently looked at the role of financial ratios in equity valuation. Most notably, Nissim and Penman (2001) have endeavored to develop a structural approach to financial statement analysis by relating certain financial ratios to equity values. They base

their analysis on the residual earnings valuation model and identify financial ratios that are linked to market values of equity, such as return on net operating assets (*RNOA*) and leverage. Then, they document the behavior of these ratios over the last three decades and observe their persistence over time.

Fairfield and Yohn (2001) find that decomposing the change in return on assets into change in asset turnover and change in profit margin assists in forecasting the change in return on assets. In this context, Penman and Zhang (2004) investigate the relation between future stock returns and *RNOA* and its components – profit margin and net operating asset turnover. They find that the changes in profit margin and asset turnover forecast stock returns only one year ahead, and *RNOA* assists in forecasting stock returns two years ahead. Soliman (2004) contributes to this line of research by showing that a decomposition of *RNOA* into profit margin and asset turnover assists in predicting *RNOA*. He also shows that profit margin and asset turnover revert to industry averages.[3]

This study extends the work initiated by Nissim and Penman (2001), Fairfield and Yohn (2001), and Soliman (2004) by focusing on the market reaction to key financial ratios. In particular, we measure the market reaction around the announcement of quarterly earnings and examine whether this reaction is associated with return on common equity (*ROCE*) and its DuPont components after controlling for earnings and revenues surprises. We focus on the traditional DuPont model, in which *ROCE* is decomposed into net profit margin (*NPM*), total asset turnover (*ATO*) and financial leverage (*LEV*): $ROCE = NPM \times ATO \times LEV$.

The DuPont decomposition is interesting and popular because it captures the three main activities of a company – net profitability, efficiency in investing and financing. As Nissim and Penman (2001) point out, the ratios identified by the DuPont decomposition are tied together in a structured way that explains how they "sum up" as building blocks of net income. The DuPont decomposition also establishes the tradeoff between *NPM*, *ATO* and

LEV. For example, the same *ROCE* can be achieved with low *NPM* and high *ATO* or with high *NPM* and low *ATO*.

In spite the importance of ratio analysis in general and of the DuPont decomposition in particular, previous research has not examined immediate market reaction to *ROCE* and its components, though several studies have examined the association between stock returns and earnings and balance sheet components. For instance, Lipe (1986) examines the association between stock returns and components of earnings. Wilson (1987) decomposes earnings into accrual and fund components and examines whether these components explain stock returns incrementally to earnings. Ou and Penman (1989) estimate the association between the probability of an earnings increase and a large set of financial ratios. Lev and Thiagarajan (1993) identify a set of financial indicators used by financial analysts and show that they have incremental explanatory power beyond that of earnings in explaining annual stock returns. Ohlson and Penman (1992) decompose earnings and shareholders' equity into components and estimate the association between these components and stock returns over long windows ranging from one to five years. Though these studies, as well as many others, also use some form of financial ratios to explain stock returns, the main difference in our study is that we focus on *ROCE* and the structured and popular DuPont decomposition to better understand the market reaction to quarterly earnings.

Investigating market reaction around quarterly earnings announcement dates is potentially useful in identifying ratios that are important to investors, used in practice and are relevant for equity valuation. Thus, our main contribution is in investigating whether the market reaction to quarterly earnings announcements depends on the mix of *ROCE* components, as prescribed by the DuPont decomposition, in a predictable manner, and not just on unexpected earnings and unexpected revenues.[4]

For positive net income, an increase in one of the *ROCE* components, holding the other constant, leads to an increase in *ROCE*. In contrast, when net income is negative, an increase in asset turnover or leverage decreases *ROCE*. While theoretically all three components have equal weight in the computation of *ROCE*, the market reaction to *ROCE* may depend on the mix of *ROCE* components in a predictable manner. We therefore examine whether the stock market reacts to the components of *ROCE* in the same manner, or whether one of the *ROCE* components is a dominant factor. We also examine the market reaction to opposite/ conflicting signals, as for instance when *NPM* is low and *ATO* is high or vise versa. Thus, our main interest is in the hierarchy of the *ROCE* components in terms of market reaction.

Since prior studies document market reaction to earnings surprise and revenues surprise and show that the explanatory power of earnings in determining stock returns is higher, we investigate the incremental influence of *ROCE* and its components beyond that of earnings and revenue surprises. We are particularly interested in whether the market reacts to the ratio of net income to revenues (i.e., *NPM*) after controlling for net income and revenues as main explanatory variables.

Hence, we formulate the following research questions:

(i) What is the role of *ROCE* and *ROCE* components in explaining stock returns around quarterly earnings announcements? Do *ROCE* and *ROCE* components have an incremental effect on stock returns after controlling for earnings and revenues surprises?

(ii) Does the market react differently to *ROCE* components? Is there a dominant component or does the market reacts to each component in a similar fashion? Moreover, does the market reaction to one component depend on the value of another component?

Answering these questions will extend our understanding of the role financial ratios play in financial statement analysis, and may assist internal and external financial statement users in analyzing firm performance.

We address these questions using a large sample of quarterly earnings announcements made by 11,268 companies over 1972-2004. We employ two empirical methodologies: First, we form portfolios based on levels of *ROCE* and its components. Second, we use Fama-Macbeth quarterly regressions to extend our portfolio results to multivariate dimensions.

To form portfolios, all the observations in each quarter are ranked according to their *ROCE* and *ROCE* components and assigned to quintiles. We then examine the differences in market reaction to each quintile. We also investigate the interaction between *ROCE* components and *ROCE* by observing the differences in market reaction between quintiles of each component, holding the quintile of *ROCE* constant. In order to examine the interaction between *ROCE* components we form variable-size portfolios of companies that are both in quintile i of one component (e.g., *NPM*) and quintile j of another component (e.g., *ATO*).

We compute ratios in three ways. First, we compute ratios using *raw* financial data. We also conduct our analysis using *unexpected ROCE* and *ROCE* components that are computed in a manner similar to the computation of Standardized Unexpected Earnings (*SUE*). Finally, we repeat our analysis using *industry-adjusted ROCE* and *ROCE* components where industry-adjusted ratios are measured as raw ratios divided by industry means. We measure market reaction using size-adjusted stock returns (SAR) around quarterly earnings announcement. Size-adjusted returns are measured as raw stock returns minus the return on the size portfolio that contains the firm/quarter. We conduct our analysis using a short return window (days -2 through +1) and a long (days -2 through +47) around earnings announcements where day zero denotes the quarterly earnings announcement date. The long window ensures availability of all *ROCE* components. We report most of the results using

raw and unexpected ratios over a long return window. However, the results are very similar across methods of ratio computations and window length. We anticipate that unexpected earnings and revenues are correlated with *ROCE* and its components (particularly, *NPM* and *ATO*). Therefore, we calculate and control for standardized unexpected earnings (*SUE*) and standardized unexpected revenues (*SURG*), employing a similar methodology to that used in prior studies.

As expected, we find that stock returns around quarterly earnings announcements increase with *ROCE*. Also, the market reaction to *NPM* and *ATO* increases monotonically with *NPM* and *ATO*. However, the reaction to *NPM* is stronger than that to *ATO*. This result suggests that the market prefers an improvement in *NPM* than an improvement in *ATO*. Furthermore, we find that the market reaction to *LEV* has an inverted-U shape, consistent with the *trade-off theory* between the benefit from a tax-shield and the expected cost of financial distress (Modigliani and Miller 1963, Scott 1976).[5]

An examination of the market reaction to *ROCE* components holding the level of *ROCE* constant reveals that when *ROCE* is relatively low, increasing *ATO* does not change market reaction, because higher *ATO* may exacerbate losses to shareholders. In contrast, when *ROCE* is relatively high, higher *ATO* is rewarded by the market.

An investigation of the interaction between *ROCE* components yields several interesting results:

(i) Moving from the lower to the upper quintile of *NPM* leads to a more positive market reaction regardless of the level (quintile) of the other components, implying that *NPM* is a dominant component of *ROCE*. Interestingly, the increase in SAR is higher for high *ATO* since higher profitability ratios translate into higher profits; and for high *LEV*, since higher *NPM* reduces the probability of default and the expected cost of financial distress.

(ii) Regarding *ATO*, when *NPM* is low (and negative) higher *ATO* does not change SAR since an increase in *ATO* is not associated with higher profits to shareholders. Higher *ATO* leads to more positive SAR regardless of the level of *LEV*.

(iii) We find that market reaction to an increase in *LEV* is more positive when *NPM* is relatively high, as the probability of default is lower.

(iv) We also examine the market reaction to extreme quintiles of *ROCE* components. Consistent with our previous results, we find that *NPM* is the dominant component of *ROCE*. When *NPM* is in its lowest quintile (highest quintile), mean SAR is negative (positive) regardless of the level of either *ATO* or *LEV*.

Regression analysis that employs a short return window around earnings announcements suggests that *NPM* has incremental explanatory power beyond earnings and revenues surprises. This result is important because it demonstrates how a ratio captures the non-linear link between two primary variables such as earnings and revenues. Using a long window, we find that *ROCE*, *NPM* and *ATO* have incremental explanatory power beyond unexpected earnings and revenues, suggesting that the market reacts differently to *ROCE* depending on the mix of components.

Overall, this study shows that the market reacts to *ROCE* according to the mix of its components. We also show that the influence of one component on stock returns depends on the value of *ROCE* and the other components. Our results highlight the hierarchy between *ROCE* components in terms of market reaction – *NPM* being most preferred by the market followed by *ATO* and then by *LEV*. Obtaining these results after controlling for earnings and revenue surprises adds credibility to them. These results may assist financial statement users in interpreting the market reaction to financial ratios.

The study proceeds as follows. In section 2, we review the theory and develop testable predictions. Section 3 discusses the sample selection, data sources and variable definitions.

Section 4 contains the empirical results. Finally, section 5 provides some concluding remarks and suggestions for future research.

2. Theoretical Background

Return on common equity (*ROCE*) is constructed from two summary measures: net profits available to common shareholders divided by common shareholders equity. Net profits are usually generated by three basic activities – operating, investing and financing. Thus, to identify the source of net profitability, financial statement users normally decompose *ROCE* into three components – net profit margin (*NPM*), total asset turnover (*ATO*) and financial leverage (*LEV*) – $ROCE = NPM \times ATO \times LEV$ - aimed at capturing these three basic activities. This is the DuPont decomposition, perhaps the most popular analysis regularly conducted by financial statement users.

The link between fundamental values of equity and *ROCE* has long been established in the empirical and theoretical accounting literature. The residual income valuation model links equity values to book values of equity plus the present value of expected residual income. Similarly, market-to-book ratios (market values of equity divided by book values of equity) are linked to expected future abnormal *ROCE,* measured as the difference between *ROCE* and the cost of equity capital (Edwards and Bell 1964, Freeman et al. 1982, Ohlson 1995, Nissim and Penman 2001).

NPM, measured as net income minus preferred stock dividends, divided by net sales, provides information about the sensitivity of net income to product price and cost structure changes. Although companies should strive to maximize the net profit margin, neither high nor low profit margins alone necessarily translate into high *ROCE* and positive stock returns. *ROCE* depends also on the amount of investment employed by the company in generating profits. In particular, low profit margin does not necessarily indicate bad performance as

firms with low *NPM* may have required a relatively small investment. *ATO*, measured as net sales divided by total asset, captures efficiency in using the firm's total investment in assets. This ratio varies by industry, where some industries are characterized by relatively high *ATO*s, while others are characterized by relatively low *ATO*s.

LEV, measured as total assets divided by common shareholders' equity, captures the firm's ability to leverage up its operations. *LEV* is positively correlated with expected financial distress cost and financial risk. Hence, higher *LEV* increases the return required by shareholders (Modigliani and Miller (1958, 1963), proposition 2). Nissim and Penman (2001) find that, except for companies with high *ATO* and high *LEV*, respectively, both ratios are quite stable over time.

Prior research suggests that higher *ROCE* should yield higher abnormal stock returns around earnings announcements. Higher *ROCE* components increase *ROCE* (assuming positive net income and positive equity) so one would also expect higher *ROCE* components (*NPM*, *ATO* and *LEV*) to yield higher abnormal stock returns as well. However, it is possible that the market reacts differently to each component. In particular, the market may react more positively to an increase in one component than another or even react negatively to an increase in a component, as might be the case with *LEV*.

Based on prior studies, we expect the market reaction to be stronger for increases in *NPM* than to *ATO* or *LEV*. As Bruns (1992) states, *NPM* provides information about the sensitivity of net income to product price and cost structure changes. Managers are usually able to react more swiftly to volume (demand) shocks by adjusting variable costs. As net income contains a large component of variable costs, *NPM* may not change dramatically as a result of changes in sales volume. Consequently, changes in *NPM* may be perceived as more permanent. *ATO* and *LEV*, on the other hand, depend on the amount of resources invested in the production of sales. As Anderson et al. (2003) point out, managers usually refrain from

committing more resources or cutting resources in response to economic shocks that are perceived to be temporary because of a significant adjustment cost. Thus, changes in *ATO* or *LEV* are more likely to be perceived by the market as temporary. In addition, *ATO* and *LEV* contain large components of fixed costs. Since *NPM* reflects the entire cost structure, including variable and fix costs, it contains more valuable information to investors about the firm cost structure and its ability to handle changes in demand (sales).

Moreover, prior studies have shown that the market reacts more strongly to net profits than to any other financial variable. For example, Ertimur et al. (2003) and Jegadeesh and Livnat (2004) show that the reaction to net profit is significantly stronger than that to revenues. Consequently, the reaction to *NPM* is expected to be stronger than that to *ATO* or *LEV* because this ratio includes more information on net profit than the other two ratios. Consistent with this argument, financial analysts have long considered *NPM* as a critical variable that constrains the increase in *ROCE* and thus the perceived growth in expected dividends (Babcock 1970, Reilly 1997). Following these arguments, we expect the market reaction to *NPM* to be stronger than to *ATO* or *LEV*.

Regarding financial leverage, we expect to find a nonlinear relation between *LEV* and stock returns. Scott (1976) and Modigliani and Miller (1963) argue that a trade-off between tax shield from borrowing and expected costs of financial distress may result in an optimal leverage ratio. When *LEV* is relatively small the probability of default is low, hence the expected cost of financial distress is small. An increase in *LEV* in that range is likely to yield a more positive market reaction as firm value increases with additional borrowing. At some point the marginal cost of borrowing equals the marginal utility from tax shield and beyond that point the marginal cost of borrowing exceeds the marginal utility of tax shield (financial distress costs increase faster than tax shield). At that point, higher *LEV* decreases firm value. Also, Jensen (1986) argues that managers might use free cash flows to invest in negative net

present value projects (i.e., over invest). Lehn and Poulsen (1989, p.774) argue that since the penalty for defaulting on debt is greater than the penalty for reducing dividends, "debt more effectively compels management to pay free cash flow to the firm's security holders." Hence, an increase in leverage may reduce agency costs due to committing free cash flows to debt servicing. Other factors that might influence capital structure include personal taxes (Miller 1977) and asymmetric information.

We also expect that the market reaction to a change in one component is influenced by the level of other components. Specifically, the correlation structure between *ROCE* components may have a predictable effect on stock prices. First, when *NPM* is relatively low, we expect to find that an increase in *ATO* will not lead to higher stock returns. The explanation is that *ATO* measures sales generated by each dollar of assets, hence when *NPM* is relatively low (and even negative), an increase in *ATO* may inflate negative abnormal earnings and shareholder's losses. Second, we expect to find that when *ATO* is relatively high, market reaction to changes in *NPM* is stronger than when it is low. This hypothesis is driven by the fact that when *ATO* is high an increase in profitability rate translates into higher cash flows. Third, when *NPM* is relatively low, the probability for default is higher and financial risk is more sensitive to debt level. Hence, the market reaction to an increase in *LEV* is expected to be more negative.

In addition, previous studies refer to the relation between earnings, revenues and stock returns and find that both earnings and revenues have influence over stock returns, as market reaction to earnings is stronger than the reaction to revenues (Ertimur et al. 2003, Jegadeesh and Livnat 2004, and Kama 2005). We add to that literature by investigating the reaction to *ROCE* and its components after controlling for earnings and revenues surprises. In particular, as earnings surprise is, on average, a dominating factor over revenue surprise, we expect to

find that *NPM* (or, unexpected *NPM*) is associated with stock returns around earnings announcements incrementally to earnings and revenues surprises.

3. Sample and Variables

The initial sample includes all public companies covered by Compustat and CRSP databases during 1972-2004. We deleted observations with missing data needed to calculate abnormal stock returns around earnings announcements, *ROCE*, *NPM*, *ATO* and *LEV*. We also excluded financial institutions and public utilities (4-digit SIC codes 6000-6999 and 4900-4999) because the structure of their financial statements is incompatible with those of other companies. To obtain the final sample and to limit the effect of extreme observations, we ranked the sample according to each of the *ROCE* components and size-adjusted returns and deleted the extreme one percent of observations in each of these variables. In addition, we deleted observation with *NPM* lower than -1 (i.e., negative 100%).

Table 1 lists the number of observations by quarter and median *ROCE* per quarter. The main sample includes 318,102 quarter-firm observations for 11,268 different firms. In addition to the main sample, Table 1 presents details on a reduced sample that includes all observations with data sufficient to calculate unexpected *ROCE* and its components. This reduced sample includes 185,382 quarter-firm observations for 6,859 different firms.

(Table 1 about here)

The market reaction to earnings is measured using size-adjusted stock returns around the announcement of quarterly earnings. Size-adjusted returns are calculated as raw returns minus the return on the portfolio of all companies in the same size decile.[6] We use two return windows: a short window (SW) and a long window (LW). The short window contains the four days starting from day -2 through day +1, where day 0 represents the earnings announcement date, as stated in Compustat. The long window contains the 50 days starting

from day -2 through day +47, where day 0 is the earnings announcement date. We use the short window to examine the immediate reaction of the market to the release of earnings and revenues. The long window is used because leverage (*LEV*) and asset turnover (*ATO*) are not revealed to the market prior to the release of the entire quarterly report or the filing of the 10-Q. Since form 10-Q is filed within 45 days after quarter end, a 50-day window ensures the availability of *ROCE* components.

Net profit margin (*NPM*) is calculated as earnings per share (EPS) divided by sales per share (SPS), where EPS is calculated as basic earnings per share, excluding extraordinary items. Asset turnover (*ATO*) is calculated as net revenues divided by total assets. Leverage (*LEV*) is calculated as total assets divided by common shareholders' equity. *ROCE* is calculated as *NPM* multiplied by *ATO* and *LEV*; hence, *ROCE* is calculated as earnings excluding extraordinary items, divided by common shareholders' equity.[7]

In order to examine whether our results hold in the presence of earnings surprise as an additional profit variable and revenues surprise as an additional efficiency variable, we follow the methodology of Jegadeesh and Livnat (2004) by calculating standardized unexpected earnings (SUE) as the standardized difference between EPS and the expected EPS: $SUE_{i,t} = \frac{EPS_{i,t} - E(EPS_{i,t})}{S_{i,t}}$, where $EPS_{i,t}$ is EPS for firm i in quarter t, E($EPS_{i,t}$) is the expected EPS for firm i in quarter t, and $S_{i,t}$ is the standard error of $\left[EPS_{i,t} - E(EPS_{i,t})\right]$. E($EPS_{i,t}$) is calculated as the EPS in the same quarter of the previous year, plus an average drift: $E(EPS_{i,t}) = EPS_{i,t-4} + D_{i,t}$, where $D_{i,t}$ is the average drift of EPS over 8 quarters measured as $D_{i,t} = \frac{1}{8}\sum_{j=1}^{8}(EPS_{i,t-j} - EPS_{i,t-j-4})$. $S_{i,t}$, the standard error of the unexpected part

of the EPS, is calculated as: $S_{i,t} = \frac{1}{7}\sqrt{\sum_{j=1}^{8}(EPS_{i,t-j} - E(EPS)_{i,t-j})^2}$. Standardized unexpected revenues (SURG) are calculated using a similar procedure.

To examine the market reaction to the unexpected part of *ROCE* and its components we use this methodology to calculate standardized unexpected *ROCE* (U*ROCE*) and standardized unexpected *ROCE* components (U*NPM*, *UATO*, and U*LEV*). Industry-adjusted ratios are computed by dividing *ROCE* and *ROCE* components by industry means of *ROCE* and *ROCE* components, obtained each quarter, from raw figures.[8]

Table 2 contains descriptive statistics for the main variables. Panel A contains statistics for the full sample and Panel B presents statistics for the reduced sample. The return variables are long and short window size-adjusted returns (SAR). The main financial variables contain *ROCE*, *NPM*, *ATO* and *LEV*. We also report statistics for two additional risk measures: market-to-book ratios (M/B), measured as market value of common equity divided by book value of equity, and firm size (*LMV*), measured as the log normal of market value of common equity. In addition to these variables, Panel B presents statistics for unexpected *ROCE*, unexpected components, *SUE* and *SURG*.

Generally, statistics are similar across samples. Mean SAR is zero for the short and the long window, as expected. Mean (median) quarterly *ROCE* is 0.01 (0.03), indicating that the distribution of *ROCE* is slightly skewed to the left. As for the *ROCE* components, the distribution of *NPM* is close to the distribution of *ROCE*.

The distribution of market-to-book ratios is skewed to the right as the mean (2.57) is larger than the median (1.70) in the full sample. As for firm size, companies are, on average, smaller in the full sample than in the reduced sample, because the reduced sample contains more observations from recent years for which firms are, on average, larger.

(Table 2 about here)

Figure 1 presents the median of annualized *ROCE* and *NPM* in each year of the sample period (1972-2004). *ROCE* and *NPM* behave in a very similar manner over time. Both medians have been decreasing almost steadily from 1979 to 2001 with temporary increases in the late 1980s and the mid-1990s and an increase starting 2002.

(Figure 1 about here)

Figure 2 presents the percentage of companies with negative earnings per share in each year. This percentage increases almost steadily over time. In fact, the decrease in median *ROCE* and *NPM* over time is negatively associated with the percentage of loss-reporting companies (Hayn, 1995).

(Figure 2 about here)

Figure 3 presents the median of *ATO* and *LEV* in each year of the sample period. Median *ATO* has also been decreasing over time, explaining some of the decline in *ROCE*. *LEV* on the other hand has varied considerably over the sample period. In particular, leverage seems to follow a cyclical pattern with temporary increases during recession periods (1980, 1990).

(Figure 3 about here)

Table 3 presents Spearman and Pearson correlations for *ROCE* and its components. We compute cross-sectional correlations in each quarter and then average these quarterly correlations over time. The left section presents correlations for the full sample and the right section presents correlations for the reduced sample where *ROCE* and components are in *unexpected* form. Generally, correlations are similar between samples. The correlation between *ROCE* and *NPM* is positive and very high, indicating that the level of *ROCE* is governed primarily by the firm's ability to generate net profits out of sales. Also, the correlation between *ROCE* and *ATO* is positive, although smaller than the correlation between *ROCE* and *NPM*.

As for the correlation structure of the *ROCE* components, for the full sample, the correlation between *NPM* and *ATO* is rather weak (Pearson = 0.03; Spearman = -0.10). However, for the unexpected figures, the correlation between *NPM* and *ATO* is stronger (Pearson = 0.22; Spearman = 0.24). The correlation between *NPM* and *LEV* is negative, presumably because higher *LEV* implies higher interest rates, which reduces *NPM*.

(Table 3 about here)

In Table 4, we take a closer look at *ROCE* and at the association between *ROCE* and *NPM*. In each quarter, we rank companies according to their *ROCE* and assign them into quintile portfolios. We compute mean and median of *ROCE* for each of the *ROCE* quintiles. In addition, for each quarter we divide each *ROCE* quintile into five portfolios according to the level of *NPM* and compute mean and median for *NPM*1, the lowest quintile, and for *NPM*5, the upper quintile. Results in Table 4 appear in two panels: Panel A provides descriptive statistics when *ROCE* and *NPM* are assigned to quintiles according to *raw figures*. Panel B provides descriptive statistics when *ROCE* and *NPM* are assigned to quintiles according to *unexpected figures*.

Focusing on Panel A (raw figures), we observe that *ROCE* in the lowest quintile is, on average, negative. Also, conditional on *ROCE* being on the lowest quintile, *NPM* is mostly negative, as evidenced by mean *NPM*1 and mean *NPM*5. The finding that *NPM* is negative for most of the companies in the lowest quintile has an important implication for our market reaction tests. In particular, an increase in *ATO* conditional on companies being in the lowest *NPM* quintile may result in negative market reaction as higher *ATO* exacerbates losses.

In Panel B (unexpected figures), we observe that mean (median) *raw ROCE* in the lowest quintile of *UROCE* is -0.01 (0.02). Also, conditional on U*ROCE* being on the lowest quintile, *raw NPM* is not necessarily negative, as reflected by positive mean and median for

*UNPM*5. This result has implications for our work because the association between *NPM* and the other *ROCE* components depends on whether *NPM* is positive or negative.

(Table 4 about here)

4. Empirical Results

4.1 Market reaction to ROCE and ROCE components – Portfolio analysis

Table 5 analyzes the market reaction to *ROCE* and its components using portfolio analysis. We form quintile portfolios based on measures of *ROCE* and its components and compute average size-adjusted returns (SAR) for each portfolio.

Panel A presents SAR for unconditional quintile portfolios formed each quarter based on unexpected *ROCE* (*UROCE*) and unexpected components of *ROCE* (*UNPM*, *UATO* and *ULEV*). In the interest of saving space, we report results for unexpected ratios over a long return window. However, the results and the statistical inferences are very similar for raw and industry-adjusted ratios and for a short return window.

Higher *UROCE* translates to higher SAR and the relation is monotonic. For example, mean SAR for companies in the lowest quintile of *UROCE* is -2.06% whereas mean SAR for the upper quintile is 2.72%, a difference of 4.78% (significant at the 0.01 level). Similarly, we find a monotonic relation between U*NPM* and SAR with a difference between the upper and the lower portfolios is 4.39% (significant at the 0.01 level). *UATO* also exhibits a monotonic relation with SAR, but the difference between the upper and the lower quintiles is much smaller – only 2.73% (significant at the 0.01 level). We also find that SAR is lower for high *ULEV* than for low *ULEV* (difference of 0.45%, significant at the 0.01 level).

The results in Panel A establish a hierarchy of *ROCE* components in terms of market reaction. The market reaction is stronger for *UNPM* than for *UATO* (significant at the 0.01 level, not tabulated), which in turn is stronger than that of U*LEV* (also significant at the 0.01

level, not tabulated). Moreover, the market reaction is stronger for *UROCE* than for *UNPM* and the difference (4.78% minus 4.39%) is significant at the 0.02 level. This result suggests that *ROCE* contains relevant information not contained in *UNPM*.

Panel B of Table 5 presents differences in SAR between the upper and lower quintiles of each unexpected component, conditional on the level of *raw ROCE*, for the long window returns. The first result that emerges is that higher unexpected *NPM* or *ATO* are rewarded by the market regardless of the *ROCE* quintile. This is not the case for unexpected leverage.

Moreover, for each quintile of *ROCE*, we observe a similar order in terms of market reaction as in Panel A. That is, for each *ROCE* quintile, the market reaction to an increase in unexpected *NPM*, represented here by the difference in SAR between U*NPM*5 and U*NPM*1, is stronger than the corresponding reaction to increase in unexpected *ATO* (significant at the 0.01 level in the upper four quintiles). This result suggests that the market prefers improvements in *NPM* than in *ATO*. Furthermore, for each *ROCE* quintile, the market reaction to an increase in unexpected *ATO* is stronger than that for an increase in unexpected *LEV* (significant at the 0.01 level for all quintiles).

Panel C of Table 5 presents differences in SAR between the upper and lower quintiles of each raw component, conditional on the level of *raw ROCE*, for the long window returns. First, the difference between *NPM*5 and *NPM*1 is positive and significantly different from zero only in the first two quintiles of *ROCE*. When *ROCE* is larger, higher *NPM* is not rewarded by the market. This result reflects the high correlation between *ROCE* and *NPM* as higher *ROCE* are caused primarily because of higher *NPM*.[9]

Conditioning *ATO* on the level of *raw ROCE*, we find that for the lowest quintiles of *ROCE*, the differences in SAR between the upper and the lower quintiles of *ATO* are not positive.[10] This result suggests that when net profitability is low, hence more likely to be below the cost of equity capital, higher *ATO* means higher sales but not higher abnormal

earnings to shareholders. However, for the upper quintiles of *ROCE*, higher *ATO* is more likely to translate into higher SAR. This is consistent with the argument that when profitability is likely to be larger than the cost of equity capital, higher *ATO* generates higher abnormal earnings to shareholders.[11]

Conditioning financial leverage on the level of raw *ROCE*, we observe significant differences only in the extreme quintiles. The average difference between high and low leverage (*LEV*5 – *LEV*1) is -0.52% when *ROCE* is in the lowest quintile. This market reaction is consistent with higher financial distress costs and inability to utilize tax shields when profitability is low. However, when *ROCE* is high, the average difference between high and low leverage is also negative (-0.58%, significant at the 0.01 level). This could be explained by firms increasing *ROCE* by assuming more leverage, reducing *NPM* because of higher interest expenses, where in fact high *ROCE* is less likely to persist. We find empirical support for this argument (not tabulated). Conditional on being in the upper *ROCE* quintile, companies with the highest leverage ratio (mean ratio 5.80) also have higher *ROCE* (mean ratio 0.12) but lower *NPM* (mean ratio 0.07). On the other hand, companies in the same *ROCE* quintile with low leverage (mean ratio 1.31) have lower *ROCE* (mean ratio 0.07) but higher *NPM* (mean ratio 0.15). This result demonstrates once again investors' preference of *NPM* over other *ROCE* components.

Overall, the results in Table 5 show that for the full sample, higher *ROCE*, *NPM* and *ATO* yield higher SAR. However, when profitability is relatively low, higher *ATO* does not yield higher SAR. Also, the market reaction to changes in *NPM* is stronger than the reaction to *ATO* or *LEV*, suggesting the *NPM* is a dominating component of *ROCE* in terms of market reaction.

(Table 5 about here)

Figure 4 focuses on the market reaction to quintiles of raw financial leverage. We observe a non-linear inverted-U shape relation between *LEV* and SAR. In particular, the difference between the first and the third quintiles of *LEV* is 0.26% (significant at the 0.01 level) whereas the difference between the third and the fifth quintiles is –0.69% (significant at the 0.01 level). This relation, which also holds using industry-adjusted figures (not tabulated), is consistent with the trade-off between tax shield and expected costs of financial distress (Scott 1976, Modigliani and Miller 1963).

(Figure 4 about here)

4.2 Interaction between ROCE components– Portfolio analysis

Next we focus on the interaction between *ROCE* components and its effect on stock prices. In Table 6, we form variable-sized portfolios of firm/quarters that are both in quintile i of one component and quintile j of a second component. We present results for several combinations of *ROCE* components. This way, we examine whether the market's reaction to each *ROCE* component depends on the value of another component. We report results for long return windows to ensure availability of all components to investors.

Panel A of Table 6 provides results for the interaction of *NPM* and *ATO*. We divide the sample into quintiles according to raw figures. When companies are in the lower quintile of *NPM* and also in the lower quintile of *ATO* (*NPM*1, *ATO*1), mean SAR is -2.63%. In contrast, when companies are in the upper quintile of *NPM* and in the upper quintile of *ATO* (*NPM*5, *ATO*5) mean SAR is 3.54%, a difference of 6.17% (significantly different from zero at the 0.01 level).

Furthermore, when *NPM* is in the upper quintile and *ATO* is in the lower quintile, mean SAR is 0.98%, compared with a negative mean SAR of -2.66% when *ATO* is in the upper quintile and *NPM* is in the lower quintile. This result suggests that the market prefers higher

NPM than higher *ATO*. Consistent with this finding, the differences in SAR between the upper and the lower quintiles of *NPM* is positive (significant at the 0.01 level) *regardless* of the level of *ATO*. However, higher *ATO* does not necessarily translate into positive SAR. Conditional on the lower quintile of *NPM*, the differences in SAR between the upper and the lower quintiles of *ATO* is -0.03% (not reliably different from zero at the 0.05 level). In contrast, conditional on the upper quintile of *NPM*, the differences in SAR between the upper and the lower quintiles of *ATO* is 2.56% (significant at the 0.01 level). This interesting finding follows from the fact that in the lower quintile of *NPM*, mean and median *NPM* are negative; hence, an increase in *ATO* may exacerbate shareholders' losses. Figure 5 further illustrates the dominance of *NPM* over *ATO* as the market reacts more positively to larger *NPM* than to larger *ATO*.

(Figure 5 about here)

This Panel also shows that when division into quintiles of *NPM* is done according to *raw* or *unexpected figures*, the market prefer an increase in *NPM* when *raw ATO* is in its highest quintile (SAR of 6.20% and 5.57% for *raw* and *unexpected NPM*, respectively) than when *raw ATO* is in its lowest quintile (SAR of only 3.61% and 3.17% for *raw* and *unexpected NPM*, respectively) because higher NPM translates into higher profits. Finally, when division into quintiles of *ATO* is done according to *unexpected figures*, market reaction to an increase in *unexpected ATO* is positive regardless the level of *NPM* (SAR of 2.55% and 2.60% for *NPM*1 and *NPM*5, respectively). This result is in contrast to the market reaction to an increase in *raw ATO*. One possible explanation is the low correlation between *unexpected* and *raw ATO* (Spearman = 0.04, not tabulated); hence, high *unexpected ATO* does not necessarily mean high *raw ATO*.

When *NPM* and *ATO* are assigned into quintiles according to *unexpected figures* (not tabulated), an increase in *unexpected ATO* and an increase in *unexpected NPM* are both

rewarded by the market regardless of the level of the other component. However, when *unexpected NPM* is in its highest (lowest) level SAR is still positive (negative) regardless the value of *unexpected ATO* (significant at least at the 0.05 level). In addition, the market still rewards an increase in *unexpected NPM* more than an increase in *unexpected ATO*, reflecting the dominance of this component in equity valuation.

Panels B focuses on the interaction between *NPM* and *LEV*. When the level of *NPM* is high (*NPM*5), SAR is positive (significantly larger than zero at the 0.01 level) regardless of the level of *LEV*. Similarly, when *NPM* is low (*NPM*1), SAR is negative (significantly less than zero at the 0.01 level) regardless of the level of *LEV*. Moreover, the effect of an increase in *NPM* from *NPM*1 to *NPM*5 is larger when *LEV* is high (4.96%) than when *LEV* is low (4.23%). The reason is that when *LEV* is in its highest quintile, the probability of default and the expected cost of financial distress are relatively high; hence, higher *NPM* works to reduce the probability of default. This result does not hold when division into quintiles of *NPM* is done according to *unexpected figures*, as Spearman correlation between *raw NPM* and *unexpected NPM* is relatively low (0.17, not tabulated).[12] Also, the differences in SAR between the upper and the lower quintiles of *LEV* are larger when *NPM* is high. The reason for this is that higher *NPM* implies less probability of default, hence lower expected cost of financial distress from increasing the level of debt.

We repeated the analysis in Panel B using *unexpected LEV* instead of *raw LEV*, obtaining similar results to those reported in Panel B. These results are therefore not tabulated.[13] Overall, results in this Panel, which are also presented graphically in Figure 6, re-emphasize the dominance of *NPM* over the other components in terms of market reaction.

(Figure 6 about here)

Panel C examines the interaction between *ATO* and *LEV*. When *ATO* is in the upper quintile (*ATO*5), SAR is positive regardless of the level of *LEV*. When *ATO* is in the lower

quintile (*ATO*1), SAR is negative (at the 0.01 level) regardless of the value of *LEV*. Also, the differences in SAR between the upper and the lower quintiles of *ATO* are positive and significant at the 0.01 level, unconditional on the level of *LEV*. The results in this panel suggest that the market reacts more to changes in *ATO* than to changes in *LEV*. Similar results are obtained (not tabulated) where instead of raw *ATO* and *LEV*, we form portfolios based on unexpected *ATO* and *LEV*.

To summarize the findings in Table 6:

(i) The market reacts more strongly to *NPM* than to *ATO* or *LEV*. Also, an increase in *NPM* leads to an increase in SAR regardless of the level of *ATO* or *LEV*. Moreover, when *NPM* is low (high), mean SAR is negative (positive) regardless of the level of either *ATO* or *LEV*. These results imply that the market regards improvements in *NPM* more positively than improvements in the other components. However, the increase in SAR is higher for high *ATO* and high *LEV*.

(ii) Higher raw *ATO* does not lead to increase in SAR when *NPM* is low (and negative), suggesting that an increase in *ATO* when *NPM* is low may exacerbate shareholders' losses.

(iii) The market reacts more strongly to higher levels of *ATO* than to higher levels of *LEV* and higher *ATO* leads to higher SAR regardless of the level of *LEV*, implying that *ATO* dominates *LEV* in terms of market reaction.

(iv) The reaction to an increase in *LEV* is more positive when *NPM* is high because high *NPM* implies lower probability for default.

(Table 6 about here)

4.3 The interaction between unexpected earnings, unexpected revenues, ROCE and ROCE components

NPM has been traditionally used by financial statements users as a measure of net profitability and the sensitivity of net income to input and output price changes. The unique feature of *NPM* is that it combines together net income and sales revenues in measuring the firm's ability to respond to economic shocks. Researchers, on the other hand, have used both standardized unexpected earnings (SUE) and standardized unexpected revenues (SURG) as two separate explanatory variables for stock returns (e.g., Jegadeesh and Livnat, 2004, Ertimur et al. 2003). Both variables were found to have incremental information in explaining stock returns. The question being raised here is: Does *NPM* (i.e., ratio of net income to sales) provide information incrementally to its numerator and denominator?

We use regression analysis to examine the incremental information of *NPM* over unexpected earnings and unexpected sales, after controlling for *ROCE*. We estimate quarterly regressions and compute coefficients and *t*-statistics as in Fama and MacBeth (1973). The dependent variable in Equation (1) is size-adjusted return over four-day window around quarterly earnings announcements. Independent variables are unexpected *ROCE* (*UROCE*) and *ROCE*, unexpected *NPM* (*UNPM*) and *NPM*, standardized unexpected earnings (*SUE*) and standardized unexpected revenues (*SURG*).

$$\begin{aligned} SAR_{it} = \alpha_0 + \alpha_1 UROCE_{it} + \alpha_2 ROCE_{it} + \alpha_3 UNPM_{it} + \alpha_4 NPM_{it} + \\ \alpha_5 SUE_{it} + \alpha_6 SURG_{it} + \varepsilon_{it} \end{aligned} \quad (1)$$

Table 7 presents three specifications of Equation (1). The first specification includes *unexpected ROCE* and *unexpected NPM* in addition to *SUE* and *SURG*. The coefficients on all variables are positive, as expected. Consistent with Ertimur et al. (2003) and Jegadeesh

and Livnat (2004) the coefficient on *SUE* is larger than that on *SURG*. Also, the coefficient on *UNPM* is significantly larger than zero, whereas the coefficient on *UROCE* is not reliably different from zero. This result suggests that unexpected *NPM* provides information to investors incrementally to unexpected earnings and unexpected sales.

In the second specification we replace *unexpected ROCE* and *unexpected NPM* with *raw ROCE* and *raw NPM*, respectively. Here we find that *raw ROCE* has incremental information where *raw NPM* is only marginally significant. The last specification contains all six variables. We find that the coefficients on *raw ROCE* and *unexpected NPM* are positive (and significantly different from zero at the 0.01 level) after controlling for *SUE* and *SURG*. In addition, the coefficient on unexpected *ROCE* is negative due to the high correlation with *NPM*.

The surprising aspect of the results in Table 7 is that two net profitability ratios, net income over book value of equity and the unexpected net profit margin, have incremental explanatory power for stock returns over unexpected net income and unexpected revenues around the announcement of quarterly earnings. This result suggests that a ratio that links together the numerator and the denominator contains information in addition to that contained in its numerator and denominator. The economic significance of this result is that in addition to increases in net income and revenues, the market rewards a more efficient firm that is able to convert a larger share of revenues into net income.[14]

(Table 7 about here)

We extend the analysis in Table 7 by including all *ROCE* components as explanatory variables for size-adjusted returns. Since information on *ATO* and *LEV* is usually not known to the market before filing of quarterly statements, we use a long return window. Also, given our prior results on the inverted-U shape relation between leverage and stock returns, we allow the coefficients on high and low leverage to be different from each other by including

dummy variables – H and L – that obtain values of "1" if leverage is above or below median in a particular quarter, respectively, and zero otherwise. Equation (2) includes *raw* and *unexpected* figures of *ROCE* and its components.

$$\begin{aligned} SAR_{it} = {} & \beta_0 + \beta_1 UROCE_{it} + \beta_2 ROCE_{it} + \beta_3 UNPM_{it} + \beta_4 NPM_{it} + \beta_5 UATO_{it} + \beta_6 ATO_{it} \\ & + \beta_7 L_{it} \times ULEV_{it} + \beta_8 H_{it} \times ULEV_{it} + \beta_9 L_{it} \times LEV_{it} + \beta_{10} H_{it} \times LEV_{it} \\ & + \beta_{11} SUE_{it} + \beta_{12} SURG_{it} + \eta_{it} \end{aligned} \tag{2}$$

Results in Table 8 suggest that *ROCE* and each of the components, when included as explanatory variables, provide information which is incremental to unexpected earnings and unexpected revenues. In the case of *ROCE*, *NPM* and *ATO*, the coefficients are positive, whereas in the case of *LEV*, the coefficients are largely negative. Also, in the case of leverage, the coefficient is significantly smaller from zero only for high leverage as the probability of default is higher.

Specification 10 in Table 8 contains *unexpected ROCE* and its components in addition to unexpected earnings and unexpected revenues. The coefficient on U*NPM* is positive and significant at the 0.01 level. Also, the coefficient on high unexpected leverage is negative, as expected, and significant at the 0.01 level.

The last specification in Table 8 contains *ROCE* and its components in raw and unexpected forms. We find that raw *ROCE* is positive and significant at the 0.01 level, whereas unexpected *ROCE* is not positive due to the high correlation between *ROCE* and *NPM*. We also find that raw *NPM* and unexpected *NPM* are positive and significant at the 0.01 level. Moreover, the coefficients on raw *ATO* and unexpected *ATO* are positive, as expected, and significant at the 0.01 level. This result highlights the importance of asset turnover as an efficiency measure in valuation after controlling for unexpected earnings, unexpected revenues, raw *ROCE* and *NPM*. In addition, the coefficients on *LEV* and

unexpected *LEV* are not reliably different from zero suggesting that leverage has no incremental information beyond *ROCE*, *NPM* and *ATO*.

The conclusion from Table 10 is that, after controlling for earnings and revenues surprises, *ROCE* and its components have significant incremental effect in explaining size-adjusted returns. Particularly, the market reacts to net profit margin, which captures the non-linear link between net income and revenues and to raw and unexpected *ATO*, which capture the company's ability to use its assets more efficiently.[15]

(Table 8 about here)

5. Concluding Remarks and Further Research

This study focuses on the market reaction to return on common equity (*ROCE*) and its 'DuPont' components - net profit margin (*NPM*), total asset turnover (*ATO*) and financial leverage (*LEV*). Our aim is to understand the relative importance of each component for equity investors and the interdependence of each component with the other components and with earnings and revenues surprises. We argue that the market assigns hierarchy to *ROCE* components and reacts more strongly to changes in *NPM* than to changes in *ATO* or *LEV*. We provide empirical evidence that consistently supports our arguments.

We use two research methodologies – portfolio analysis and Fama-Macbeth quarterly regressions. In the portfolio analysis, we form portfolios every quarter based on the levels of *ROCE* and its components and measure the market reaction in terms of size-adjusted returns. We show that *NPM* is the dominant component among the three *ROCE* components followed by *ATO* and *LEV*. In particular, the market reaction to high (low) *NPM* is positive (negative) regardless of the levels of *ATO* or *LEV*. However, an increase in *NPM* is rewarded more strongly by the market when *ATO* is relatively high as higher *NPM* translates into higher

profit, and when *LEV* is relatively high as *NPM* is important in reducing the likelihood of default.

We find that an increase in *ATO* is not rewarded by the market when *ROCE* and/or *NPM* are relatively low, as when *NPM* and *ROCE* are under the required rate of return, growth in sales may inflate shareholder losses. Consistent with the *trade-off theory* between benefit from tax-shield and expected cost of financial distress, the relation between *LEV* and market reaction is nonlinear and has an inverted U shape.

Our regression analysis shows that the levels of *ROCE* and unexpected *NPM* have significant explanatory power for stock returns beyond that of earnings and revenues surprises in the four-day period surrounding the quarterly earnings announcements. This result highlights the importance of *ROCE* and *NPM* in capturing the interaction between earnings and book value of equity and between earnings and revenues that is not captured by linear valuation models.

We also use a 50-day return window to estimate the relation between stock returns and *ROCE* and its components after controlling for earnings and revenue surprises. We find that the levels of *ROCE*, *NPM* and *ATO* explain stock returns in addition to earnings and revenues surprises.

Overall, our study provides useful information to those who use ratio analysis in financial analysis. We document how investors react to *ROCE* according to the mix of its components. Our results point out the importance of each of the *ROCE* components relative to the others and show that the influence of each component on market reaction depends on the value of the *ROCE* and the other components.

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Endnotes

[1] The following survey studies capture a significant portion of the relevant literature: Lev and Ohlson (1982), Lev (1989), Kothari (2001), Holthausen and Watts (2001) and Dechow and Schrand (2004).

[2] See for example, Cottle, Murray and Block (1988), Penman (2001), Stickney (1996), Palepu, Healy and Bernard (2000) and White, Sondhi and Fried (1998).

[3] Fairfield et al. (2005) argue that industry analysis have only marginal incremental information over firm-specific figures for forecasting *RNOA*, *ROCE* and growth in NOA. However, they argue that industry analysis assist in predicting future sales growth.

[4] Studies that focus on the market reaction to unexpected earnings and unexpected revenues include Ertimur et al. (2003), Jegadeesh and Livnat (2004) and Kama (2005).

[5] However, bankruptcy costs and tax shield are not the only factors that influence the relations between capital structure and firm value. Other factors may include personal taxes, agency costs and asymmetric information. The combination of all factors may lead to the conclusion that the net present value of financial side effects (NPVF) is negligible.

[6] Our results are not sensitive to using market-adjusted returns (raw returns minus the return on the value-weighted NYSE Index) instead of size-adjusted returns.

[7] In quarterly Compustat items: EPS $= data19 / data17$, SPS $= data2/(data15 * data17)$, ATO $= data2 / data44$, and $LEV = data\,44 / data\,59$. All per share figures are adjusted for stock splits and stock dividends.

[8] To obtain industry averages of *ROCE* and *ROCE* components in each quarter, we divided our sample into 35 industry groups. First, we divided the sample into industries according to 2-digit SIC codes. Then, we grouped together industries such that each industry group contained at least 2,000 firm-quarter observations (except for SIC code 01-09 group that contains less than 2,000 observations). We also used Professor K. French's 12-industry classification http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html) with similar results. Bhojraj et al. (2003) discuss the effects of industry classification on capital markets research.

[9] Spearman correlation between *UNPM* and *ROCE* is 0.19 (not tabulated) while Spearman correlation between *NPM* and *ROCE* is 0.81.

[10] Recall (Table 4, Panel A) that in the lowest quintiles, *ROCE* is mostly not positive. Therefore, higher *ATO* means exacerbated losses.

[11] This result is not found in panel B (with unexpected *ATO*) as an increase in *UATO* does not necessarily mean an increase in *ATO* (Spearman correlation between *ATO* and *UATO* is 0.04, not tabulated)

[12] The consequences of the low correlation between *raw NPM* and *unexpected NPM* are detailed in Table 4, Panel B.

[13] The Spearman correlation between *raw LEV* and *unexpected LEV* is 0.03.

[14] To confirm our regression results, we form portfolios based on quintiles of *SUE* and *NPM*. First we divide the sample into five equal-size *SUE* quintiles. Then, we divide each *SUE* quintile into five equal-size quintiles, according to the level of *NPM* (*NPM* is measured in *raw* and *unexpected* forms). We then compute the difference in SAR between the highest and the lowest quintiles of *NPM* (*NPM5-NPM1*). The results (not tabulated) suggest that NPM has an incremental influence on SAR over SUE. Similar results are obtained for long window returns.

[15] Our results are not sensitive to the way we measure *SUE* and *SURG*. We repeated all our tests using a share price deflated versions of *SUE* and *SURG* as in Ertimur et al. (2003). In particular, we measure *SUE* (*SURG)* as earnings (revenues) per share minus earnings (revenues) per share in the same quarter last year minus an average drift over the last 8 quarters and divided by share price 3 days prior to quarterly earnings announcements. The coefficients on *ROCE* and its components are consistently larger and more significant but the statistical inferences remain the same.

Notation

ROCE – Return on Common Equity – Quarterly net income per share divided by common shareholders' equity per share.

NPM – Net Profit Margin – net income per share divided by sales per share.

ATO – Total Asset Turnover – sales divided by total assets.

LEV – Financial Leverage – total assets divided by common shareholders' equity.

U – Unexpected variable (U*ROCE*, U*NPM*, U*ATO*, and U*LEV*), measured as the difference between the current variable and the expected variable, and divided by standard deviation of the drift (average changes over the last 8 quarters). The expected variable is equal to the variable at the same quarter last year plus a drift.

SUE – Standardized Unexpected Earnings – earning per share, minus earnings in the same quarter last year minus an average drift and divided by standard deviation of earnings drift in the last 8 quarters.

SURG – Standardized Unexpected Sales – sales per share minus sales in the same quarter last year minus an average drift, and divided by the standard deviation of sales drift in the last 8 quarters.

SAR – Size-Adjusted Returns – raw returns minus the return on the equally weighted return on the portfolio of all companies in the same size decile.

SW – Short return window – 4-day return window that contains days -2 through +1, where 0 is the earnings announcement date, as stated in Compustat.

LW – Long return window – 50-day return window that contains days -2 through +47, where 0 is the earnings announcement date, as stated in Compustat.

Table 1
Sample and Median *ROCE* per Quarter*

Year	Q1	Q2	Q3	Q4	Annualized	Reduced
	Median Quarterly *ROCE*				*ROCE*	*ROCE*
	Number of Observations per Quarter				Observations	Observations
1972				3.1%	12.3%	
				1,424	1,424	
1973				3.3%	13.3%	
				1,615	1,615	
1974				3.0%	12.1%	
				1,636	1,636	
1975	2.1%	2.7%	2.9%	3.2%	10.9%	
	653	773	855	1,605	3,886	
1976	2.7%	3.4%	3.2%	3.3%	12.5%	
	1,259	1,244	1,405	1,616	5,524	
1977	2.8%	3.4%	3.3%	3.6%	13.1%	14.7%
	1,523	1,514	1,512	1,582	6,131	677
1978	3.0%	3.7%	3.6%	4.1%	14.5%	14.5%
	1,483	1,492	1,485	1,526	5,986	3,176
1979	3.4%	3.9%	3.8%	4.0%	15.2%	15.1%
	1,457	1,460	1,439	1,517	5,873	4,412
1980	3.3%	3.4%	3.4%	3.7%	13.9%	13.7%
	1,425	1,436	1,411	1,490	5,762	4,638
1981	3.0%	3.5%	3.4%	3.5%	13.4%	13.2%
	1,317	1,302	1,301	1,460	5,380	4,258
1982	2.5%	2.7%	2.5%	2.7%	10.4%	10.4%
	1,471	1,560	1,730	1,948	6,709	4,403
1983	2.1%	2.7%	2.9%	3.1%	10.7%	10.7%
	2,015	2,119	2,210	2,446	8,790	4,285
1984	2.6%	3.1%	3.2%	3.1%	12.0%	12.3%
	2,342	2,367	2,399	2,565	9,673	4,181
1985	2.3%	2.7%	2.5%	2.5%	10.0%	10.5%
	2,389	2,403	2,390	2,558	9,740	4,303
1986	2.0%	2.5%	2.3%	2.5%	9.2%	9.5%
	2,405	2,486	2,527	2,650	10,068	5,345
1987	2.3%	2.6%	2.7%	2.6%	10.2%	10.2%
	2,582	2,643	2,701	2,739	10,665	6,057
1988	2.5%	2.9%	2.9%	3.1%	11.4%	11.3%
	2,634	2,645	2,632	2,672	10,583	6,282
1989	2.5%	2.8%	2.6%	2.5%	10.5%	10.6%
	2,596	2,654	2,622	2,640	10,512	6,568
1990	2.2%	2.6%	2.4%	2.5%	9.7%	10.0%
	2,590	2,608	2,579	2,582	10,359	6,923
1991	1.8%	2.2%	2.2%	2.1%	8.3%	8.5%
	2,583	2,626	2,657	2,754	10,620	7,280
1992	1.9%	2.3%	2.4%	2.4%	9.0%	9.0%
	2,758	2,857	2,885	2,974	11,474	7,536
1993	2.0%	2.5%	2.6%	2.5%	9.7%	9.7%
	3,025	3,149	3,263	3,388	12,825	7,812
1994	2.2%	2.7%	2.9%	3.0%	10.8%	11.1%
	3,408	3,490	3,474	3,549	13,921	8,151

1995	2.4%	2.8%	2.7%	2.8%	10.7%	11.4%
	3,575	3,589	3,617	3,790	14,571	8,463
1996	2.3%	2.7%	2.7%	2.7%	10.4%	11.4%
	3,826	3,852	3,877	4,073	15,628	8,790
1997	2.2%	2.7%	2.7%	2.7%	8.1%	11.4%
	4,018	4,076	4,096	4,155	16,345	9,329
1998	2.1%	2.5%	2.4%	2.3%	9.2%	10.5%
	4,123	4,058	3,854	3,817	15,852	9,275
1999	1.8%	2.3%	2.4%	2.1%	8.6%	10.2%
	3,773	3,739	3,562	3,682	14,756	9,155
2000	1.8%	2.1%	2.1%	1.6%	7.5%	9.5%
	3,668	3,677	3,469	3,414	14,228	9,257
2001	1.2%	1.2%	1.1%	0.7%	4.2%	6.1%
	3,331	3,319	3,221	3,237	13,108	9,011
2002	1.0%	1.5%	1.6%	1.5%	5.7%	6.9%
	3,266	3,205	3,145	3,100	12,716	9,190
2003	1.2%	1.7%	1.8%	2.1%	6.8%	7.5%
	3,124	3,110	3,156	3,166	12,556	9,488
2004	1.8%	2.2%	2.4%	2.4%	8.9%	9.4%
	3,161	3,039	2,558	428	9,186	7,137
Mean annualized *ROCE*					10.4%	10.7%
Median annualized *ROCE*					10.4%	10.5%
Number of observations					318,102	185,382
Number of different companies					11,268	6,859

*Notes:

1. The Table presents number of observations per quarter and median quarterly Return on Common Equity (*ROCE*) for the two samples used in this study (full and reduced). The Table also presents annualized *ROCE* for both samples.

2. Full Sample: The initial sample includes all observations with complete return and financial data on the Compustat and CRSP databases, excluding financial institutions (1-digit SIC = 6) and public utilities (2-digit SIC = 49). We delete the extreme one percent of the observations in the components of *ROCE* and returns.

3. Reduced Sample: For the purpose of calculating unexpected *ROCE* and *ROCE* components. Initial sample includes all observations with data sufficient to calculate unexpected *ROCE* and its components. We delete the extreme observations in raw and unexpected components of *ROCE* and returns.

Table 2
Descriptive Statistics

Panel A: Full Sample (N = 318,102)

Variable	Mean	Std Dev	5th Pctl	25th Pctl	Median	75th Pctl	95th Pctl
SAR (LW)	0.00	0.17	-0.26	-0.10	-0.01	0.09	0.30
SAR (SW)	0.00	0.08	-0.12	-0.04	0.00	0.04	0.14
ROCE	0.01	0.11	-0.11	0.00	0.03	0.04	0.09
NPM	0.01	0.15	-0.26	0.00	0.04	0.07	0.17
ATO	0.34	0.20	0.08	0.21	0.31	0.43	0.72
LEV	2.44	1.71	1.17	1.48	1.96	2.71	5.34
M/B	2.57	3.70	0.51	1.03	1.70	2.88	7.05
LMV	4.82	2.00	1.86	3.35	4.64	6.14	8.38

Panel B – Reduced Sample (N = 185,382)

Variable	Mean	Std Dev	5th Pctl	25th Pctl	Median	75th Pctl	95th Pctl
SAR (LW)	0.00	0.16	-0.24	-0.09	-0.01	0.08	0.28
SAR (SW)	0.00	0.07	-0.11	-0.03	0.00	0.04	0.13
ROCE	0.02	0.07	-0.07	0.01	0.03	0.04	0.08
NPM	0.03	0.11	-0.14	0.01	0.04	0.07	0.16
ATO	0.34	0.19	0.09	0.22	0.31	0.43	0.70
LEV	2.43	1.57	1.19	1.53	2.00	2.72	5.08
M/B	2.24	2.49	0.53	1.02	1.61	2.61	5.83
LMV	5.17	2.07	2.06	3.63	5.02	6.58	8.78
UROCE	-0.24	3.56	-6.32	-1.90	-0.09	1.69	5.45
UNPM	-0.31	3.60	-6.51	-1.94	-0.11	1.61	5.42
UATO	0.04	3.41	-5.74	-2.17	0.16	2.30	5.53
ULEV	0.42	3.86	-5.53	-2.23	0.33	2.77	6.70
SUE	-0.17	3.70	-6.63	-1.81	0.01	1.79	5.77
SURG	0.26	3.71	-5.94	-2.22	0.34	2.68	6.35

Notes:

1. The Table presents descriptive statistics for the full sample (Panel A) and the reduced sample (Panel B).
2. Variable Definitions:
   - SAR – Size-Adjusted Returns – raw returns minus the return on the equally weighted return on the portfolio of all companies in the same size decile.
   - SW (short return window) – 4 day return window that contains days -2 through +1, where 0 is the earnings announcement date, as stated in Compustat.
   - LW (long return window) – 50 day return window that contains days -2 through +47, where 0 is the earnings announcement date, as stated in Compustat.
   - *ROCE* – Return on Common Equity – **Quarterly** net income per share divided by common shareholders' equity per share.
   - *NPM* – Net Profit Margin – net income per share divided by sales per share.
   - *ATO* – Total Asset Turnover – sales divided by total assets.
   - *LEV* – Financial Leverage – total assets divided by common shareholders' equity.

- M/B – Market to Book ratio – market value of common equity divided by book value of common equity.
- *LMV* – Log normal of Market Value of common equity – size variable.
- U – Unexpected. U before *ROCE*, *NPM*, *ATO* and *LEV* denotes unexpected variables, measured as current variable minus the variable at the same quarter last year and minus an average drift over the last 8 quarters and divided by standard deviation of the drift.
- *SUE* – Standardized Unexpected Earnings – earning per share minus expected earnings per share and divided by standard deviation of earnings drift in the last 8 quarters.
- *SURG* – Standardized Unexpected Sales – sales per share, minus expected sales per share, and divided by the standard deviation of sales drift in the last 8 quarters.

Table 3
Correlation Matrix

Full Sample N = 318,102					Reduced Sample N = 185,382				
	NPM	**ATO**	**LEV**	**ROCE**		**UNPM**	**UATO**	**ULEV**	**UROCE**
NPM		0.03	-0.15	0.62	**UNPM**		0.22	-0.14	0.85
ATO	-0.10		-0.01	0.11	**UATO**	0.24		-0.10	0.34
LEV	-0.27	0.05		-0.20	**ULEV**	-0.14	-0.09		-0.05
ROCE	0.81	0.26	-0.02		**UROCE**	0.86	0.38	-0.00	

Notes:

1. The Table presents Pearson (above diagonal) and Spearman (below diagonal) correlations for the full sample and the reduced sample. Correlations are computed for each quarter during the sample period and then averaged over time.

2. Variable Definitions:
   - *ROCE* – Return on Common Equity – net income per share divided by common shareholders' equity per share.
   - *NPM* – Net Profit Margin – net income per share divided by sales per share.
   - *ATO* – Total Asset Turnover – sales divided by total assets.
   - *LEV* – Financial Leverage – total assets divided by common shareholders' equity.
   - U – Unexpected. U before *ROCE*, *NPM*, *ATO* and *LEV* denotes unexpected variables, measured as current variable minus the variable at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.

Table 4
The Association of *ROCE* with Net Profit Margin*

Panel A – Raw figures

		Quarterly *ROCE*	NPM Conditional on Quintile Portfolios of *ROCE* and *NPM*		
ROCE Portfolio	**Average sample size per cell**	**Mean Median**	**Average sample size per cell**	**NPM1 Mean Median**	**NPM5 Mean Median**
All	**318,102**	0.01	**63,620**	-0.19	0.14
		0.03		-0.10	0.12
1	**63,620**	-0.10	**12,724**	-0.51	-0.02
		-0.05		-0.52	-0.01
2	**63,620**	0.01	**12,724**	-0.04	0.06
		0.01		0.00	0.05
3	**63,620**	0.02	**12,724**	0.02	0.12
		0.02		0.02	0.10
4	**63,620**	0.04	**12,724**	0.03	0.15
		0.04		0.03	0.14
5	**63,620**	0.08	**12,724**	0.04	0.21
		0.07		0.04	0.19

Panel B – Unexpected figures (reduced sample)

		Quarterly ROCE	NPM Conditional on Quintile Portfolios of Unexpected *ROCE* and Unexpected *NPM*		
Unexpected ROCE Portfolio	**Average sample size per cell**	**Mean Median**	**Average sample size per cell**	**UNPM1 Mean Median**	**UNPM5 Mean Median**
All	**185,382**	0.02	**37,076**	-0.02	0.05
		0.03		0.02	0.04
1	**37,076**	-0.01	**7,415**	-0.08	0.03
		0.02		-0.01	0.05
2	**37,076**	0.02	**7,415**	0.00	0.05
		0.02		0.03	0.06
3	**37,076**	0.02	**7,415**	0.03	0.04
		0.03		0.04	0.05
4	**37,076**	0.03	**7,415**	0.05	0.04
		0.03		0.05	0.04
5	**37,076**	0.03	**7,415**	0.06	0.05
		0.03		0.06	0.04

*Note: The table presents descriptive statistics for *ROCE* quintile portfolios. Panel A presents portfolios formed based on raw *ROCE* and Panel B presents portfolios formed based on unexpected *ROCE*. The left section of the table presents descriptive statistics for *ROCE* quintiles. The right section presents mean and median net profit margin (*NPM*) for *ROCE* and *NPM* portfolios. All observations are ranked by *ROCE* in each quarter to form *ROCE* quintiles. Then, each *ROCE* quintile is ranked by *NPM* to form *NPM* quintiles. Each cell contains the mean (median) *NPM* for each of the 25 equal-size portfolios.

Table 5

Market Reaction to ROCE and to ROCE Components – Portfolio Analysis

Panel A – Mean SAR for quintile portfolios of Unexpected *ROCE* and Unexpected *ROCE* components (*UNPM, UATO,* and *ULEV*).

Quintile Portfolio	UROCE	UNPM	UATO	ULEV
1	-2.06%**	-1.96%**	-0.87%**	0.60%**
2	-0.54**	-0.41**	-0.15	0.44**
3	0.52**	0.63**	0.40**	0.63**
4	1.55**	1.49**	0.93**	0.36**
5	2.72**	2.43**	1.86**	0.15
Quintile 5 – Quintile 1	4.78**	4.39**	2.73**	-0.45**

Panel B – Mean SAR for Unexpected *ROCE* Components conditional on the level of Raw *ROCE*

ROCE Portfolio	UNPM5 - UNPM1	UATO5 - UATO1	ULEV5 - ULEV1
All	4.39%**	2.73%**	-0.45%**
1	2.70**	2.55**	-0.38
2	3.37**	2.26**	-0.04
3	4.09**	2.56**	0.22
4	3.34**	2.70**	0.19
5	3.92**	3.05**	0.34

Panel C – Mean SAR for Raw *ROCE* components conditional on the level of Raw *ROCE*

ROCE Portfolio	NPM5 – NPM1	ATO5 - ATO1	LEV5 - LEV1
All	4.61%**	1.64%**	-0.43%**
1	1.20**	-0.45	-0.52*
2	0.88**	-0.70**	-0.27
3	-0.01	0.26	0.02
4	0.09	0.41*	-0.14
5	-0.33	1.38**	-0.58**

Notes:

1. The table presents average size-adjusted returns (SAR) for 50-day (-2, +47) window portfolios around earnings announcements formed each quarter based on two measures of *ROCE* and *ROCE* components – *raw figures* and *unexpected figures*.
2. Variable Definitions:
   - *ROCE* – Return on Common Equity – net income per share divided by common shareholders' equity per share.
   - *NPM* – Net Profit Margin – net income per share divided by sales per share.
   - *ATO* – Total Asset Turnover – sales divided by total assets.
   - *LEV* – Financial Leverage – total assets divided by common shareholders' equity.
   - U – Unexpected. U before *ROCE*, *NPM*, *ATO* and *LEV* denotes unexpected variables, measured as current variable minus the variable at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.
3. *, ** – significantly different from zero at the 0.05 and at the 0.01 level, respectively.

Table 6
Interaction between ROCE Components – Long Window Analysis

Panel A – Mean SAR for variable-size portfolios that contain the observations that are in the extreme quintiles of both *NPM* and *ATO*

	NPM 1	NPM 5	NPM5 – NPM1	UNPM5 – UNPM1
ATO 1	-2.63%**	0.98%**	3.61%**	3.17%**
ATO 5	-2.66%**	3.54%**	6.20%**	5.57%**
ATO5 – ATO1	-0.03%	2.56**		
UATO5 – UATO1	2.55%**	2.60%**		

Panel B – Mean SAR for portfolios that contain the observations that are in extreme quintiles of both *NPM* and *LEV*.

	NPM 1	NPM 5	NPM5 – NPM1	UNPM5-UNPM1
LEV 1	-2.47%**	1.76%**	4.23%**	4.39%**
LEV 5	-3.05%**	1.91%**	4.96%**	4.26%**
LEV5 – LEV1	-0.58%**	0.15		
ULEV5 – ULEV1	-0.43%	-0.01%		

Panel C – Mean SAR for portfolios that contain the observations that are in extreme quintiles of both *ATO* and *LEV*.

	LEV 1	LEV 5	LEV5 – LEV1	ULEV1 –ULEV5
ATO 1	-1.06%**	-0.55%**	0.51%**	-0.80%**
ATO 5	1.03%**	0.24%	-0.79%**	-0.39%
ATO5 – ATO1	2.09%**	0.79%**		
UATO5-UATO1	3.05%**	2.11%**		

Notes:

1. The Table presents size-adjusted returns for 50-day window (-2, +47) around quarterly earnings announcements. For each quarter, we rank all companies according to their *ROCE* components (*NPM*, *ATO*, and *LEV*) and assign them into quintiles. In Panel A we report size-adjusted returns for portfolios whose *NPM* and *ATO* are in one of the extreme quintiles (quintile 1 or 5). Panel B repeats the analysis for *NPM* and *LEV*, and Panel C repeats the analysis for *ATO* and *LEV*.

2. Variable Definitions:
   - *ROCE* – Return on Common Equity – net income per share divided by common shareholders' equity per share.
   - *NPM* – Net Profit Margin – net income per share divided by sales per share
   - *ATO* – Total Asset Turnover – sales divided by total assets.
   - *LEV* – Financial Leverage – total assets divided by common shareholders' equity.
   - U – Unexpected. U before *ROCE*, *NPM*, *ATO* and *LEV* denotes unexpected variables, measured as current variable minus the variable at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.

3. *, ** - Significantly different from zero at the 0.05 and 0.01 level, respectively.

Table 7
Market Reaction to *ROCE, NPM, SUE and SURG*
Regression Analysis - Short Window

Spec.		UROCE	ROCE	UNPM	NPM	SUE	SURG	Adj-R^2 N
1	**Coeff.**	0.09		0.66		2.59	1.36	0.05
	t-stat.	0.72		6.03		20.26	19.14	185,382
2	**Coeff.**		81.25		6.17	2.92	1.16	0.06
	t-stat.		11.28		1.80	34.22	16.76	185,382
3	**Coeff.**	-0.33	82.80	0.66	4.26	2.66	1.28	0.06
	t-stat.	-2.84	11.70	5.81	1.21	22.66	17.98	185,382

Notes:

1. This table presents mean coefficients and *t*-statistics for quarterly Fama-MacBeth regression for equation (1):

$$SAR_{i,t} = \alpha_0 + \alpha_1 UROCE_{i,t} + \alpha_2 ROCE_{i,t} + \alpha_3 UNPM_{i,t} + \alpha_4 NPM_{i,t} + \alpha_5 SUE_{i,t} + \alpha_6 SURG_{i,t} + \varepsilon_{i,t}$$

2. Dependent variable (SAR) – Size-Adjusted Returns, measured as raw returns minus the return on the equally weighted return on the portfolio of all companies in the same size decile. We use a short 4-day return window that contains days -2 through +1, where 0 is the earnings announcement date, as stated in Compustat.

3. Independent Variables:
   - *ROCE* – Return on Common Equity – net income per share divided by common shareholders' equity per share.
   - *NPM* – Net Profit Margin – net income per share divided by sales per share.
   - U – Unexpected. U before *ROCE* and *NPM* denotes unexpected variables, measured as current variable minus the variable at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.
   - *SUE* – Standardized Unexpected Earnings – earning per share, minus earnings per share at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.
   - *SURG* – Standardized Unexpected Revenues – sales per share, minus sales per share at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.

4. Coefficient estimates are multiplied by 1,000

Table 8
Market Reaction to *SUE, SURG, ROCE* and its components - Long Window

Spec		UROCE	ROCE	UNPM	NPM	UATO	ATO	ULEV Low	ULEV High	LEV Low	LEV High	SUE	SURG	Adj-R^2 N
1	**Coef.**											4.56	2.12	0.02
	t-stat.											25.08	14.37	185,382
2	**Coef.**	0.47										4.20	2.10	0.02
	t-stat.	1.88										16.90	14.07	185,382
3	**Coef.**	-0.33	177.83									4.34	1.96	0.03
	t-stat.	-1.40	13.32									18.39	13.20	185,382
4	**Coef.**			0.84								3.84	2.26	0.02
	t-stat.			3.87								16.34	14.96	185,382
5	**Coef.**			0.26	90.52							3.96	2.08	0.03
	t-stat.			1.28	10.33							17.38	13.75	185,382
6	**Coef.**					0.41						4.50	1.95	0.02
	t-stat.					2.68						25.10	12.23	185,382
7	**Coef.**					0.40	18.37					4.46	1.88	0.03
	t-stat.					2.65	4.55					25.11	11.68	185,382
8	**Coef.**							-0.36	-0.78			4.47	2.29	0.02
	t-stat.							-1.53	-4.19			24.69	14.99	185,382
9	**Coef.**							-0.38	-0.71	0.09	-0.80	4.45	2.29	0.03
	t-stat.							-1.63	-3.81	0.09	-1.68	24.89	14.94	185,382
10	**Coef.**	0.02		0.66		0.15		-0.33	-0.74			3.89	2.33	0.03
	t-stat.	0.09		2.72		0.82		-1.34	-3.85			15.35	13.07	185,382
11	**Coef.**	-1.02	146.90	0.68	33.64	0.80	13.86	-0.08	0.16	1.68	0.62	4.14	1.65	0.04
	t-stat.	-3.17	9.71	2.93	3.18	4.66	3.48	-0.35	0.87	1.56	1.13	16.41	9.53	185,382

Notes:

1. The Table presents mean coefficients and *t*-statistics for quarterly Fama-MacBeth regressions (Equation 2):

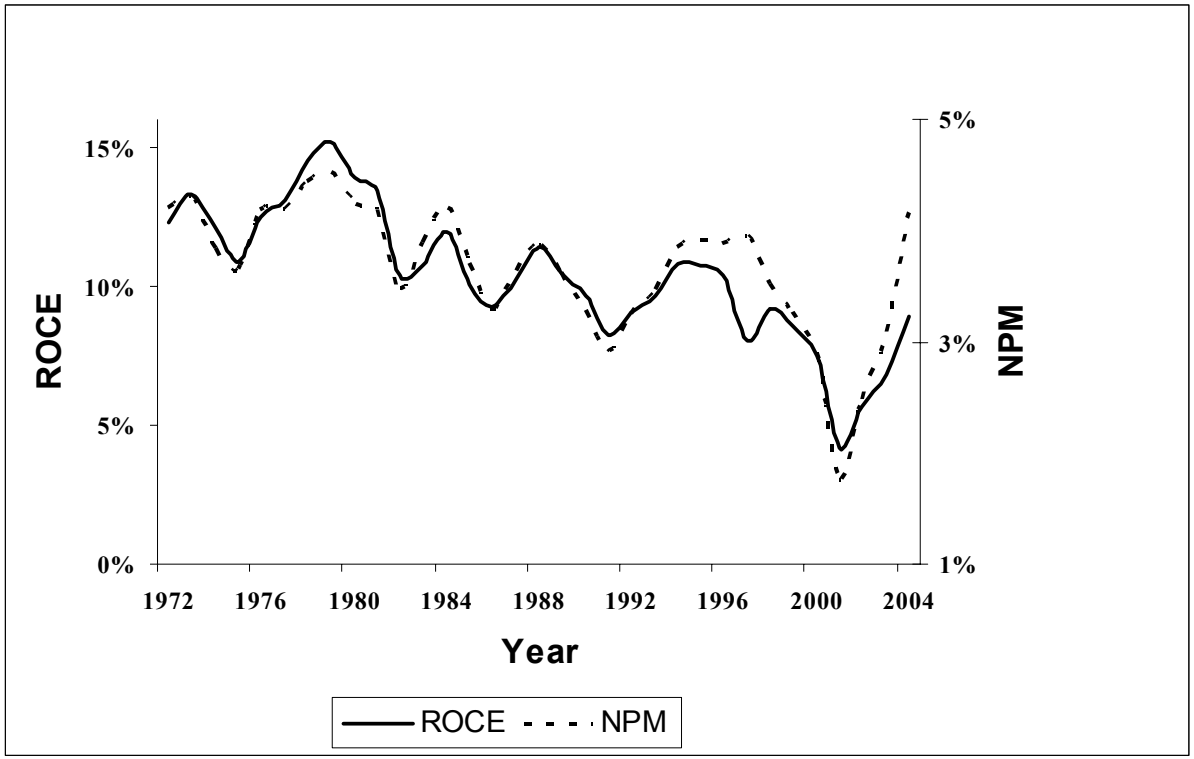
$$SAR_{it} = \beta_0 + \beta_1 UROCE_{tt} + \beta_2 ROCE_{tt} + \beta_3 UNPM_{it} + \beta_4 NPM_{it} + \beta_5 UATO_{it} + \beta_6 ATO_{it}$$
$$+ \beta_7 L_{it} \times ULEV_{it} + \beta_8 H_{it} \times ULEV_{it} + \beta_9 L_{it} \times LEV_{it} + \beta_{10} H_{it} \times LEV_{it} + \beta_{11} SUE_{it} + \beta_{12} SURG_{it} + \eta_{it}$$

2. Dependent variable (SAR) – Size-Adjusted Returns, measured as raw returns minus the return on the equally weighted return on the portfolio of all companies in the same size decile. We use a 50-day return window that contains days -2 through +47, where 0 is the earnings announcement date, as stated in Compustat.

3. Independent Variables:
   - *ROCE* – Return on Common Equity – net income per share divided by common shareholders' equity per share.
   - *NPM* – Net Profit Margin – net income per share divided by sales per share.
   - *ATO* – Total Asset Turnover – sales divided by total assets.
   - *LEV* – Financial Leverage – Total assets divided by total common equity.
   - U – Unexpected. U Before *ROCE*, *NPM*, *ATO* and *LEV* denotes unexpected variables, measured as current variable minus the variable at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.
   - H_{it} – Dummy variable that obtains the value of "1" if leverage of firm i in quarter t is above quarterly median.
   - L_{it} – Dummy variable that obtains the value of "1" if leverage of firm i in quarter t is below quarterly median.
   - *SUE* – Standardized Unexpected Earnings – earning per share, minus earnings per share at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.
   - *SURG* – Standardized Unexpected Revenues – sales per share, minus sales per share at the same quarter last year and minus an average drift over the last 8 quarters, and divided by standard deviation of the drift.

4. Coefficient estimates are multiplied by 1,000.

Figure 1*
Median Annualized *ROCE* and *NPM* over 1972-2004



*Note: Median annualized Return on Common Equity (*ROCE*) and median quarterly net profit margin for the sample period. *ROCE* is measured as net income per share divided by common shareholders' equity per share. Net Profit Margin (*NPM*) is measured as quarterly income per share divided by quarterly sales per share.

Figure 2
Percentage of Companies with Negative Earnings per Share in Each Year

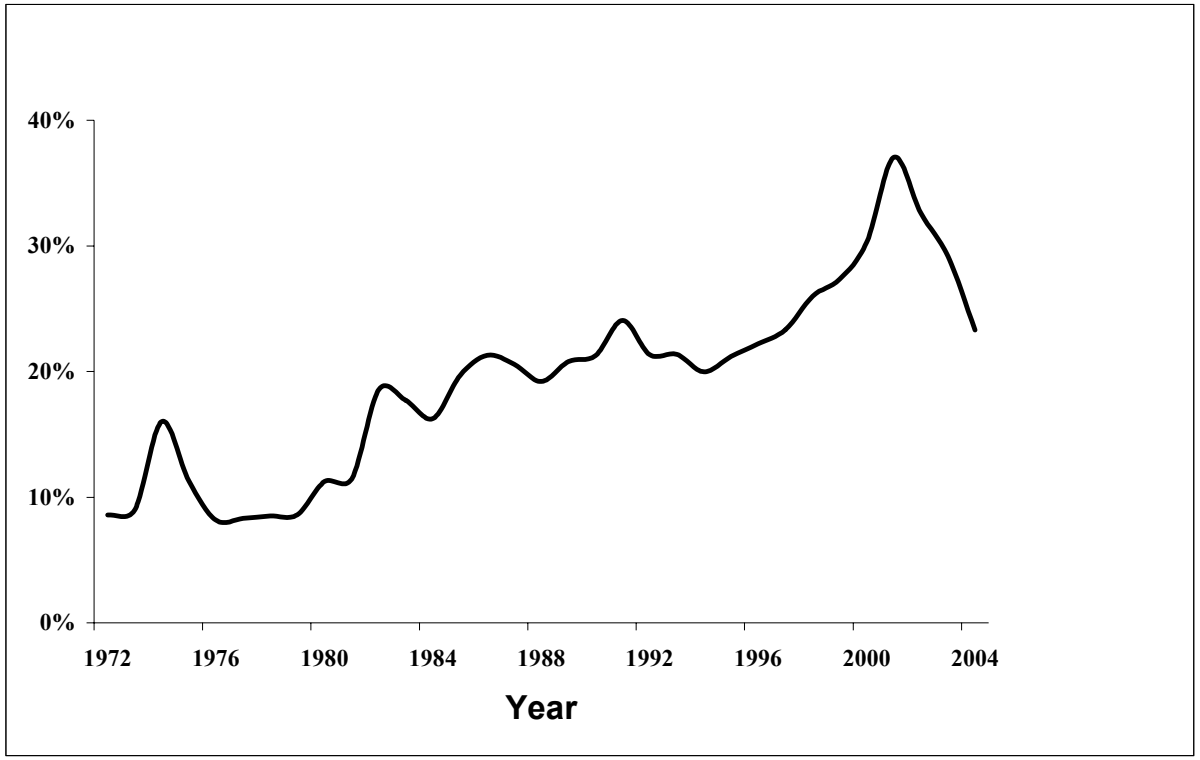
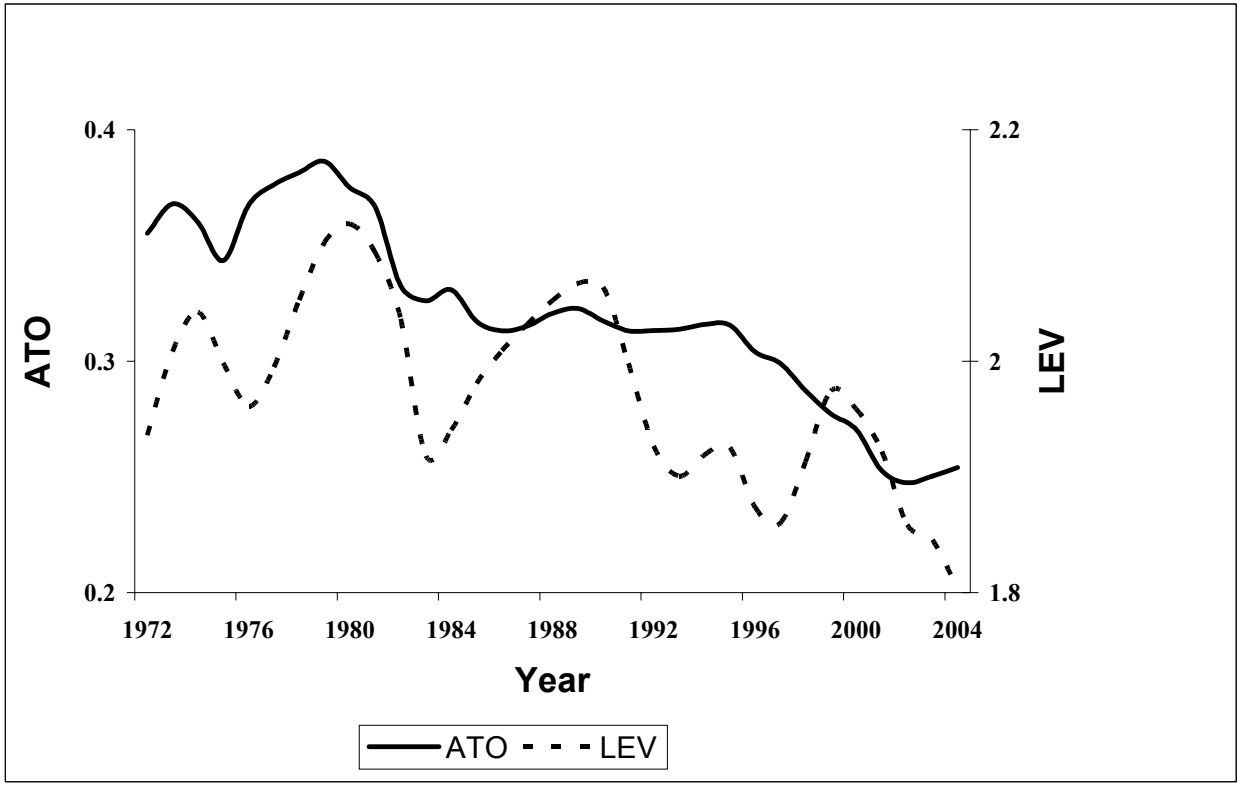


Figure 3*
Median *ATO* and *LEV* over 1972-2004

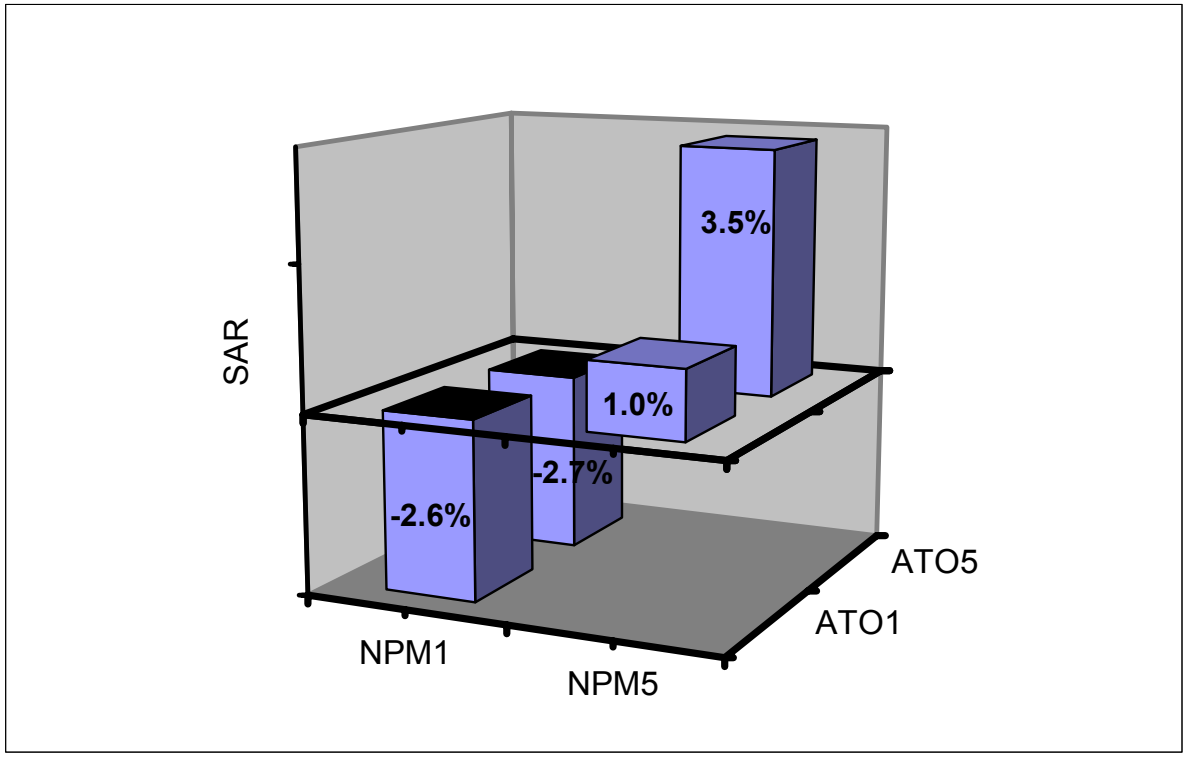


*Note: Median total asset turnover (*ATO*) and median financial leverage (*LEV*) over the sample period. *ATO* is measured as *quarterly* sales divided by total assets at the end of the quarter. *LEV* is measured as total assets divided by common shareholders' equity at quarter end.

Figure 4*
Mean SAR for LEV Quintiles (Raw Data)

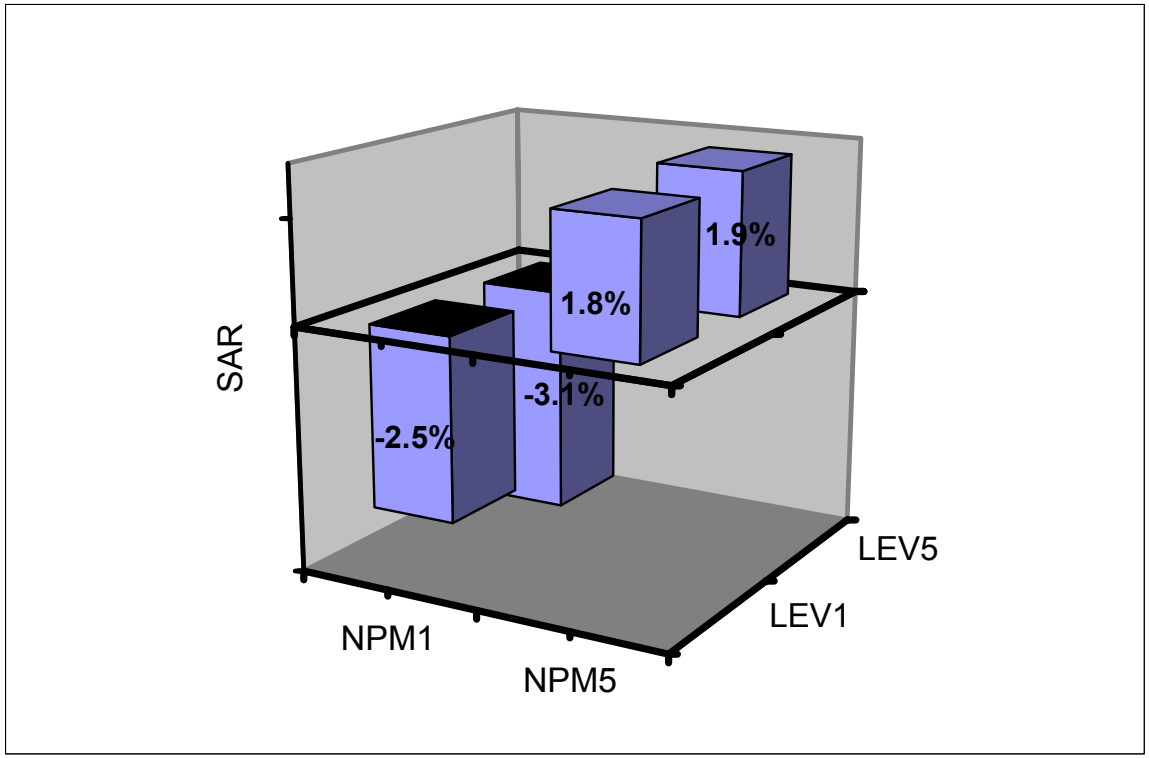
*Note: The graph presents market reaction to quintiles formed based on financial leverage. *LEV* is measured as total assets divided by common shareholders' equity at quarter end. Market reaction is measured as Size-Adjusted Returns (SAR) – raw returns minus the return on the equally weighted return on the portfolio of all companies in the same size decile – over a 50-day return window that contains days -2 through +47, where 0 is the earnings announcement date, as stated in Compustat.

Figure 5*
Interaction between *NPM* and *ATO* (Raw Data)



*Note: The market reaction to combination of net profit margin (*NPM*) and total asset turnover (*ATO*). *NPM* is measured as quarterly net income per share divided by quarterly sales per share. *ATO* is measured as quarterly sales divided by total assets at quarter-end. Market reaction is measured as Size-Adjusted Returns (SAR) – raw returns minus the return on the equally weighted return on the portfolio of all companies in the same size decile - over a 50-day return window that contains days -2 through +47, where 0 is the earnings announcement date, as stated in Compustat.

Figure 6*
Interaction between *NPM* and *LEV* (Raw Data)



Note: The market reaction to combination of net profit margin (*NPM*) and financial leverage (*LEV*). *NPM* is measured as quarterly net income per share divided by quarterly sales per share. *LEV* is measured as total assets divided by shareholders' equity at quarter-end. Market reaction is measured as Size-Adjusted Returns (SAR) – raw returns minus the return on the equally weighted return on the portfolio of all companies in the same size decile - over a 50-day return window that contains days -2 through +47, where 0 is the earnings announcement date, as stated in Compustat.