Using residual income to refine the relationship between earnings growth and stock returns

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Abstract We use the concept of residual income (RI) to decompose earnings growth into a growth in RI component, growth in invested capital component and other components. We use this decomposition to explain the cross-section of returns. Our approach refines the returns-earnings relationship with a significant increase in explanatory power vis-à-vis a regression of returns on levels and changes in earnings. Further, markets appear to value growth in RI more than growth in invested capital. However, markets undervalue growth in RI and overvalue growth in invested capital, as future returns are positively associated with growth in RI and negatively associated with growth in invested capital. A trading rule based on these findings generates significant hedge returns that persist after controlling for known risk factors. The results show that RI, a measure long recommended by accountants, allows investors to separate out and evaluate different sources of earnings growth.

Keywords Earnings growth, residual income, growth in residual income, growth in invested capital

JEL Codes M40, M41, M44

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1. Introduction

Earnings and earnings growth have long been viewed both in theory and empirically as fundamental determinants of stock returns (Easton & Harris 1991; Ali & Zarowin 1992; Easton, Harris and Ohlson 1992; Ohlson & Juettner-Nauroth 2005). In this paper, we use the concept of residual income to decompose earnings growth into growth in residual income, growth in invested capital, and other components. Using this decomposition, we ask the following research questions. First, are we better able to explain cross sectional variation in returns using this decomposition? Second, do growth in residual income and the other components of earnings growth have different associations with returns? Third, does the market fully appreciate the implications of growth in residual income and the other components of earnings growth, or do these components predict future stock returns?

Residual income (RI) seems a natural point of departure to refine the empirical relationship between earnings growth and stock returns. Accounting scholars have long criticized accounting earnings as an incomplete measure of firm profitability from the shareholders' perspective since accounting earnings do not reflect the opportunity cost of the capital employed (Solomons 1965, Dearden 1972, Morse and Zimmerman 1997, Horngren, Datar and Foster 2006). They present residual income as better proxy for economic profits as it includes a charge for capital employed. Anthony (1973) notes that firms often consider the cost of capital for internal decision making, arguing that "In management accounting it is quite usual to take into account the cost of equity capital; indeed, unless it did so, a company's management would have difficulty in planning effectively and maintaining control." He supports the use of residual income to analyze firm profitability by arguing that "the financial community would be better able to judge the company's results if the reports it analyzed recognized these costs."

Subsequent research in both managerial and financial accounting has analyzed the usefulness of residual income. Rogerson (1997), Reichelstein (1997) and Dutta and Reichelstein (2002) show theoretically that contracts based on RI with appropriate accrual accounting can achieve goal congruence between owners and managers. Empirically, Wallace (1997) and Balachandran (2006) show that firms' investment decisions are likely to better aligned with shareholder interests after the implementation of RI-based compensation contracts. Theory work in financial accounting has used residual income to develop structural models to value firms (Ohlson 1995; Feltham and Ohlson 1995). These residual income based valuation models have been empirically used to estimate the intrinsic value of the firm (Frankel & Lee 1997) and estimate implied cost of capital (Gebhardt, Lee and Swaminathan 2001).

Given the vital important accorded to residual income by prior literature, we seek to use it as a basis to refine the relationship between returns and earnings. In our refinement, we decompose earnings growth into earnings growth from growth in residual income, earnings growth from growth in invested capital and other components. We incorporate this decomposition of earnings growth into the standard Easton and Harris (1991) specification that expresses stock returns as a function of the level of earnings and growth in earnings.

We first find that the RI-based decomposition explains more of the cross-sectional variation in stock returns than does the Easton and Harris (1991) specification. Further, while both growth in residual income and growth in invested capital are positively associated with returns, the relationship is stronger for growth in residual income. These results highlight the incremental value of using the residual income based decomposition. Further, they suggest that the markets view earnings growth arising from growth in residual income as more valuable.

We next analyze the relationship between the components of earnings growth and future returns. We find that growth in residual income is positively associated with future returns, while the growth in invested capital is negatively associated with future returns. This suggests that the markets do not contemporaneously impound the information in the components of earnings growth appropriately, underreacting to growth in residual income and overreacting to growth in invested capital. A trading strategy that goes long in firms with the most growth in residual income and least growth in invested capital and short in firms with the least growth in residual income and most growth in invested capital generates significant abnormal returns that are robust to controls for risk factors and other documented anomalies.

Finally, we seek to understand why growth in residual income is viewed as valuable by the stock markets by examining the persistence of earnings growth. We analyze the relationship between future earnings growth and current earnings growth, conditioning on the proportion of current earnings growth that arises from growth in residual income. We find that earnings growth is likely to be far more persistent when the proportion of growth coming from growth in residual income is greater.

To ensure the robustness of our results, we run a battery of sensitivity tests. First, we rerun all the analyses with alternative measures of cost of capital. Second, we examine alternate specifications where we use historical return on invested capital instead of cost of capital to separate out growth in residual income and growth in invested capital, as well as specifications that remove the structure imposed by our decomposition. Third, we control for the effect of accounting conservatism (Rajan, Reichelstein and Soliman 2007), which can overstate growth in residual income for slow-growing conservative firms and understate growth in residual income for fast-growing conservative firms. All sensitivity tests are conducted for both current returns tests as well as future returns tests. In all cases, the basic results are unaltered. We continue to find strong support for our finding that markets undervalue growth in residual income and overvalue growth in invested capital.

The results validate the use of a residual income based decomposition of earnings growth to refine the relationship between earnings and returns. This has implications for prior research which finds that residual income has only a minimally incremental association with stock returns in addition to earnings (Biddle, Bowen and Wallace 1997; Chen and Dodd, 1997). We show that the utility of residual income lies not as a competing metric to accounting earnings, but rather as an effective conditioning variable that separates out different components of earnings growth.

The remainder of this paper is organized as follows. Section 2 develops our empirical specification and research design. Section 3 describes our sample selection and provides descriptive statistics. Section 4 presents the results of the paper. Section 5 concludes.

2. Research design

2.1 The relationship between returns and earnings

We start with the specification developed in Easton and Harris (1991), which combines two valuation perspectives that view firm value or stock price as a function of either book values or accounting earnings. Hence, change in price (returns) can be viewed as a function of change in book values (earnings) and change in earnings. This is also the first-differenced form of models in Ohlson (1995) and Feltham and Ohlson (1995) that express price as a function of book values and earnings. Easton and Harris (1991) express the relationship between returns and earnings as.

$$RETM_t = \alpha_0 + \alpha_1 NI_t + \alpha_2 \Delta NI_t + \varepsilon. \quad (1)$$

where $RETM_t$ is a measure of market-adjusted returns.

While the Easton and Harris (1991) framework relies on earnings growth, it does not distinguish between the different sources of earning growth. It assumes that all earnings growth is equally valuable to shareholders. However, in reality, earnings growth from certain sources may be more valuable than earnings growth from other sources. In the following sub-section, we motivate why decomposing earnings growth on the basis of residual income might help in separating out different components earnings growth which might differ in their inherent value.

2.2 Why use residual income to refine the relationship between returns and earnings?

Accountants have long cautioned that earnings growth should be interpreted with care because the income statement does not reflect the full cost of capital invested in the firm. This can cause income to grow even for firms that invest in negative NPV projects. For instance, a firm might grow net income by investing in projects that generate enough profits to cover the cost of debt, but not the cost of capital. Similarly, a firm might hoard excess cash on its balance sheet and earn interest from this excess cash, which may increase net income, but generates returns much lower than the opportunity cost of shareholder funds. The basic model used to analyze the relationship between returns and earnings does not have the ability to distinguish between firms that increase accounting earnings as well as shareholder value and firms that may be increasing accounting earnings but potentially destroying shareholder value.

Residual income is a natural starting point to refine the relationship between earnings and stock returns. If returns to shareholders are a function of growth in the economic profitability of the firm, then incorporating a superior measure of economic profitability can potentially improve the ability to explain stock returns. Residual income starts with accounting income and incorporates a charge for the opportunity cost of the capital employed, thereby correcting an inherent incompleteness in accounting earnings. Hence, since the 1960's, accounting scholars have viewed residual income as a more appropriate indicator of firm profitability (Solomons 1965, Dearden 1972, Morse and Zimmerman 1997, Horngren, Datar and Foster 2006). Rogerson (1997) shows theoretically that it is appropriate to "impute interest costs at the firm's cost of capital when using income as a performance measure for management." He concludes that "the current wave of enthusiasm for residual income and EVA measures seems justified."

Rogerson (1997) however argues that for an asset which is equally productive throughout its lifetime, the total expenses associated with the usage of the asset in a given period ought to be constant. However, the imputed interest (capital charge in residual income) is higher initially when book values are high, while depreciation is typically either straight line or accelerated. The higher initial capital charge means that residual income is often understated in the early stages of an asset's life. Baldenius, Fuhrmann and Reichelstein (1999) however show that while the level of residual income may be biased downwards initially, changes in residual income preserve the valuation relationship between residual income and the net present value of a firm, independent of the depreciation method. This has implications for our RI based refinement of the Easton and Harris (1991) model as it suggests that we ought to focus on decomposing the change in net income into change in residual income and other components, rather than decomposing the level of net income into residual income and other components.

2.3 Using residual income to decompose earnings growth

The prior research has typically defined residual income (RI) as net operating profit after tax (NOPAT) for the period less a charge for invested capital at the beginning of the period which is typically represented as a weighted average cost of capital (wacc) times the capital invested (IC). As net operating profit or NOPAT is the sum of net income and after-tax interest, we can express residual income (henceforth RI) as

$$RI_t = NI_t + Int_t{*}(1-t) - wacc_t{*}IC_{t-1}. \quad (2)$$

where NI is GAAP Net income for the period, Int_t is interest expense and t is the tax rate. Correspondingly RI in the prior period is

$$RI_{t-1} = NI_{t-1} + Int_{t-1}{*}(1-t) - wacc_{t-1}{*}IC_{t-2}. \quad (3)$$

Combining (2) and (3), we can express change in RI as

$$\Delta RI_t = \Delta NI_t + \Delta Int_t{*}(1-t) - wacc_t{*}IC_{t-1} + wacc_{t-1}{*}IC_{t-2}. \quad (4)$$

where Δ refers to the change in a variable.

Add and subtract $wacc_t{*}IC_{t-2}$ to the above expression

$$\Delta RI_t = \Delta NI_t + \Delta Int_t{*}(1-t) - wacc_t{*}IC_{t-1} + wacc_t{*}IC_{t-2} - wacc_t{*}IC_{t-2} + wacc_{t-1}{*}IC_{t-2}. \quad (5)$$

Reorganizing the above expression and solve for ΔNI_t

$$\Delta NI_t = \Delta RI_t + \Delta IC_{t-1}{*}\ wacc_t - \Delta Int_t{*}(1-t) + IC_{t-2}{*}\ \Delta wacc_t. \quad (6)$$

This decomposition is potentially helpful because empirically it explicitly considers earning growth in terms of a growth in RI component that incorporates the cost of capital and other components. Consider the terms in equation 6.

- ΔRI_t: Earnings growth from growth in RI. It is change in net income which exceeds the incremental cost of capital invested. This growth in RI component is increasing only when earnings changes are greater than the incremental cost of capital invested. Even if earnings growth is positive, the growth in residual income component could be negative if the earnings growth does not exceed the incremental capital charge.
- $\Delta IC_{t-1}{*}\ wacc_t$: Earnings growth from growth in invested capital. It equals the change in invested capital multiplied by the weighted average cost of capital. It represents earnings growth one would expect if the firm earned the cost of capital on new investment.

- ΔInt_t*(1-t): Earnings growth from change in interest expense, after-tax. This could either be because of increased debt or increased cost of debt. As NI is after interest and tax, increase in interest expense lowers growth in NI, all else being equal.
- IC_{t-2}* $\Delta wacc_t$: Earnings growth from change in cost of capital. Cost of capital could change due to changes in risk, and capital structure among other factors.

The RI-based decomposition above has the advantage of dividing earnings growth into additive components, allowing one to compare the relative coefficients among the different components and make assessments about differential valuation. Harris and Nissim (2006) also analyze the valuation of earnings growth derived from different sources. Their tests do not use a formal decomposition but instead use change in return on invested capital ($\Delta ROIC_t$) as a proxy for growth from increased profitability and growth in beginning invested capital (ΔIC_{t-1}) as a proxy for growth from investment.

2.4 Using the Decomposition in the Returns-Earnings Specification

We begin with the Easton and Harris (1991) specification which expresses returns as a function of both the level of profitability (NI) and growth in profitability (ΔNI). As $\Delta NI_t = NI_t - NI_{t-1}$, this equation can be restated as

$$RETM_t = \alpha_0 + \beta_1 NI_{t-1} + \beta_2 \Delta NI_t + \varepsilon. \qquad (7)$$

This allows for easier interpretation of the coefficients, as NI_{t-1} refers to past information and ΔNI_t refers to contemporaneous information. We substitute for the components of ΔNI_t from equation 6 to give the following specification.

$$RETM_t = \alpha_0 + \gamma_1 {*} NI_{t-1} + \gamma_2 \Delta RI_t + \gamma_3(\Delta IC_{t-1} {*} wacc_t) + \gamma_4(\Delta Int_t {*} (1-t)) + \gamma_5(IC_{t-2} {*}\ \Delta wacc_t) + \varepsilon. \ (8)$$

Consistent with our interpretation of the terms in equation 6, we interpret the coefficients from this regression as measures of how the stock market responds to earnings growth from different components. For our decomposition to add value, it is necessary that the explanatory power of the regression for equation 8 exceeds that of the regression for equation 7.

We also examine the relationship between the components of change in net income and future returns by replacing contemporaneous returns with one-year-ahead market adjusted returns as the dependent variable. Our specification is hence

$$RETM_{t+1} = \alpha_0 + \delta_1 * NI_{t-1} + \delta_2 \Delta RI_t + \delta_3(\Delta IC_{t-1} * wacc_t) + \delta_4(\Delta Int_t*(1-t)) + \delta_5 (IC_{t-2} * \Delta wacc_t) + \varepsilon. \quad (9)$$

We interpret the coefficients from this regression as measures of how the stock market reinterprets its initial reaction to the components of earnings growth. For example, if any of the coefficients are positive, it implies that the market's initial reaction was an underreaction, leading to a drift in the future. However, if the coefficients are negative, it implies that the initial market response was an overreaction, leading to a future reversal.

2.5 Alternate specifications for the RI-based decomposition

To ensure that our results are not driven by any particular research design choice, we conduct several sensitivity tests that are described below.

2.5.1 Alternate definitions of RI

The computation of RI, the focal point of our decomposition, is crucial to our analysis. In practice, RI is measured using a variety of different methodologies. The primary source of variation is the measurement of cost of capital. Different measures of cost of capital will lead to different estimates for RI. [1] In addition, RI can be estimated as a levered measure ($NI_t - r_e * BV_{t-1}$)

[1] The impact of errors in the estimation of the cost of capital is likely mitigated in our analysis, as our decomposition includes the change in residual income and not the level of residual income. This is similar to the insight in Baldenius, Fuhrmann and Reichelstein (1999) discussed earlier.

instead of an unlevered measure ($NOPAT_t$ – wacc*IC_{t-1}). We rerun the analyses with RI computed using alternate estimates for cost of capital as well as using the levered definition.

2.5.2 Alternate breakdown using different multipliers and no multipliers

Our approach towards using RI to refine the returns-earnings relationship has the desirable property of being an additive decomposition, where we separate out earnings growth into components. However, it also makes certain assumptions, which may or may not be empirically valid. We now relax these assumptions, to ensure the robustness of key results.

Our RI based decomposition yields a term labeled earnings growth from growth in invested capital (ΔIC_{t-1}*$wacc_t$). This represents earnings growth one would expect if the firm earned the cost of capital on new investment. If in reality incremental investment generates returns differing from cost of capital, then this component will be measured with error. Further, any measurement error in this component, will also affect other components in the decomposition, as the total of all components equals actual earnings growth.

We use two approaches to examine the empirical effect of such error. First we examine an alternate specification in which we multiply change in invested capital by the firm's lagged return on invested capital instead of wacc. Our expression for earnings growth from growth in invested capital is redefined as ($ROIC_{t-1}$*ΔIC_{t-1}). This assumes that the new investments will earn what the firm's existing assets have most recently earned. To ensure the consistency of the decomposition, we redefine the ΔRI term (i.e. we subtract ΔIC_{t-1}* $ROIC_{t-1}$ and add ΔIC_{t-1}* $wacc_t$ to ΔRI_t and re-label it ΔRI_ADJ_t). Second, we use a specification in which we remove any multiplier and simply use ΔIC_{t-1} in the regression. This specification has the advantage of no longer making any assumption about the rate of return that investments earn, but no longer preserves the decomposition of earnings growth into additive components.

2.5.3 Controlling for conservatism and growth

The level of and growth in RI is affected by accounting conservatism, which can bias net assets and consequently invested capital downwards. This can affect any interpretation attached to earnings growth from growth in RI. Rajan, Reichelstein, and Soliman (2007) show both analytically and empirically that RI is influenced by the interplay of the level of unconditional accounting conservatism and growth. For conservative firms with low or steady growth, while there is unlikely to be any bias in NOPAT, RI and growth in RI can get overstated because of understated invested capital. Conversely, a fast-growing firm with conservative accounting will see both the level and the change in RI understated, as NOPAT is relatively more understated than invested capital is. To control for the above effects, we will rerun the analyses including controls for the interaction of growth and conservatism.

3. Sample selection and descriptive statistics

3.1 Sample selection

We conduct our tests using a sample over the 30-year period from 1975 through 2004, as going back further would limit the number of observations per year and make it difficult to construct hedge portfolios. We rely entirely on publicly available information from two databases, the Compustat annual file and CRSP monthly returns file.

Table 1 outlines our sample selection procedure. We start from the Compustat annual file, with all firm-years from 1975 through 2004 with valid information needed to compute RI, specifically; net income before extraordinary items (Compustat Annual #18), total assets (Compustat Annual #6), stock price and shares outstanding at fiscal-year-end (Compustat Annual #24 and #25, respectively) needed to compute market capitalization, and total invested capital (Compustat Annual #37). To ensure that our hedge strategies are not affected by timing differences in the availability of fiscal year-end data, we restrict ourselves to December fiscal year-end firms, effectively exchanging slightly more than a third of our sample for better integrity in our results. Our sample nevertheless remains large and, well spread out over industries and time, as later descriptive statistics will attest.

To compute current and lagged RI, we assure the availability of lagged information for earnings and lagged and twice-lagged information for invested capital. Further, we ensure that both contemporaneous and one-year-ahead information is available, and that we have enough returns (at least 24 past months) to compute cost of equity and wacc, for all the firms in our sample. Finally, we eliminate financial services firms (2-digit SIC code between 60 and 69) as the notion of invested capital is very different for financial services firms. We also eliminate utilities (2-digit SIC code 49) because firms in regulated industries are likely to have guaranteed rates of return on invested capital. Our final sample consists of 52,190 firm-years representing 6645 distinct firms, which averages to approximately 1,740 firms per year.

3.2 Computation of RI and returns

We base our computation of RI on Balachandran (2006). Net operating profits after tax (NOPAT) is income before extraordinary items (Compustat Annual #18) plus interest expense (Compustat Annual #15), adjusted for taxes. The tax rate is set to the prevailing statutory tax rate for each year, or zero for firms with net operating loss carry-forwards (NOLs).[2] RI is defined as NOPAT minus the charge for capital, which is weighted average cost of capital (wacc) times lagged invested capital (Compustat Annual #37).[3]

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[2] Our results are not affected if we use the effective tax rate, defined as Income Tax Expense (Compustat Annual #16) divided by Income before Extraordinary Items and Tax (Compustat Annual #18 + Compustat Annual #16).

[3] wacc is calculated by (i) estimating a CAPM cost of equity using 60 past monthly returns, (ii) inferring after-tax cost of debt from interest expense, total interest bearing debt, and the tax rate, and (iii) using market value of equity and book value of total debt for their relative weights. We estimate β using at least 24 months and upto 60 months of

Contemporaneous annual returns ($RETM_t$) for a given firm are calculated by compounding CRSP monthly returns beginning four months after the beginning of the fiscal year and ending 12 months thereafter. We do this to allow enough time to ensure that annual financials are available. One-year-ahead returns ($RETM_{t+1}$) are similarly calculated by starting the compounding period four months after the end of the fiscal year. We adjust the returns by subtracting the compounded return on the value-weighted index over the same period.

3.3 Descriptive statistics

Panel A of Table 2 presents descriptive statistics for the sample firms. The large differences between the means and medians of our size variables (sales, assets, total invested capital, book and market value of equity) indicate skewness due to the presence of large firms. The considerable variation in the book-to-market ratio suggests the presence of both value (high BM) and growth (low BM) stocks in the sample. Interestingly, although the median net income and NOPAT are positive, the median RI is barely negative, indicating that fewer than half the firms in the sample cover their cost of capital.

Panel B of Table 2 presents the industry distribution. Our sample displays an industry distribution that is almost identical to the Compustat population (excluding Financial Services and Utilities) over the 1975-2004 period. Also, untabulated results indicate that the number of observations per year varies from a low of 1187 in 1980 to a high of 2,607 in 1998. No single year represents less than 2% or more than 5% of the sample, indicating a lack of time clustering.

Table 3 presents the descriptive statistics and correlations for the variables used in our analysis. The variables of interest are earnings growth (ΔNI) and it components: growth in RI (ΔRI), growth in invested capital (ΔIC_{t-1}*$wacc_t$), change in after-tax interest expense (Δ INTt*(1-

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lagged returns. β below 0.4 are set to 0.4, while β above 3 are set to 3. If β cannot be estimated, we use the contemporaneous median β for firms with the same 2-digit SIC code.

t)), and change in risk ($IC_{t-2}*\Delta wacc_t$). All these variables are scaled by beginning market value of equity and winsorized at the 1% and 99% level using annual distributions.[4] $RETM_t$ and $RETM_{t+1}$ are respectively the contemporaneous and one-year-ahead annual buy-and-hold excess returns, computed by subtracting value-weighted market return compounded over the same time period. Returns are compounded starting 4 months after the corresponding prior fiscal year end.

Panel A presents the means of all variables. By construction, the mean ΔNI (1.96%) equals ΔRI (1.91%) plus $\Delta IC_{t-1}*wacc_t$ (0.24%), minus $\Delta INT_t*(1-t)$ (0.17%) plus $IC_{t-2}*\Delta wacc_t$ (-0.03%). The means of both contemporaneous and one-year-ahead returns are significantly greater than zero, as these are equally weighted means while the market index is value-weighted. Mean excess returns are close to zero if we use the equally weighted index.

Panel B presents means of annual cross-sectional correlations. Not surprisingly, ΔNI and ΔRI are highly correlated (0.963 Pearson, 0.898 Spearman). Interestingly, the correlation between ΔNI and $\Delta IC_{t-1}*wacc_t$ is negative, indicating that large changes in income are seldom associated with growth because of investment. Both ΔNI and ΔRI show strong correlation with current returns ($RETM_0$), with ΔNI showing a marginally stronger correlation. Finally, ΔNI and ΔRI correlate positively, while $\Delta IC_{t-1}*wacc_t$ correlates negatively with future returns ($RETM_1$).

4. Results

4.1 Components of earnings growth and contemporaneous returns

4.1.1 Baseline result

We begin our analysis by analyzing the basic Easton and Harris (1991) specification (equation 7) by regressing contemporaneous market-adjusted stock returns ($RETM_t$) on lagged

[4] Deleting instead of winsorizing outliers yields similar results.

earnings (NI_{t-1}) and changes in earnings (ΔNI_t). We then analyze the regressions that substitute for ΔNI_t with the components of earnings growth. We conduct statistical tests using pooled regressions, with and without fixed effects, as well as annual regressions. Parameters for the annual regressions are time series averages from annual regressions using the Fama and Macbeth (1973) methodology as modified by Litzenberger and Ramaswamy (1979), who weight parameter estimates by their precision. The results are presented in Table 4.

Panel A presents results for the basic Easton and Harris specification. The results are similar across all four specifications. The coefficient on the change in net income varies between 0.7265 for the pooled regression without fixed effects to 0.7766 for the annual regression. The adjusted R^2 for the pooled regression without fixed effects is 6.09%, increasing to 13.10% with industry and time fixed effects. The average adjusted R^2 for the annual regressions is 9.91%.

Panel B presents the regressions using our decomposition of earnings growth (equation 8). The coefficient γ_2 on Δ RI_t is 0.6750 (0.6826) for the pooled regression without (with) fixed effects, which increases to 0.7200 for the annual regression. The coefficient γ_3 on $\Delta IC_{t-1}*wacc_t$ is also significant in all specifications; 0.1955 (0.3960) for the pooled regressions without (with) fixed effects, and 0.4987 for the annual regression. Hence, the market also appears to value earnings growth from growth in RI as well as earnings growth from growth in invested capital; however it does not place the same weight on each component. In addition the coefficient γ_4 on $\Delta Int_t*(1-t)$ is significantly negative, while the coefficient γ_5 on $IC_{t-2}*\Delta wacc_t$ is significantly positive, consistent with the breakdown in equation 6.

The decomposition allows different weights for each components of earnings growth. If these weights had been restricted to be the same for each component, we would essentially be running the original Easton and Harris specification. The value of the RI-based decomposition is seen in the enhanced ability to explain the cross-section of returns. For the pooled regression without fixed effects, the adjusted R^2 increases from 6.09% for the baseline model to 6.43% for the RI-based decomposition. Similar increases are seen for the other specifications as well. The Vuong (1989) test indicates that the increase in explanatory power between the models is strongly significant.[5] In addition, the decomposition validates the importance of earnings growth from growth in RI, as the coefficient on ΔRI_t is significantly greater than the coefficient on $\Delta IC_{t-1}*wacc_t$ in all specifications.

4.1.2 Alternative definitions of RI and alternative multipliers

To test the robustness of the results, we run several sensitivity tests. We start with alternate definitions for RI. The results are presented in Panel C of Table 4.[6]

First, we use a constant wacc of 12% for all firm-years, which implies that the term pertaining to change in wacc drops out of the regression. The coefficients on ΔRI_t and $\Delta IC_{t-1}*$ $wacc_t$ are similar, though adjusted R^2 drops to 6.16%. Second, we use a wacc that is constant across all firms at a given point in time, but varies across time. We set the wacc to equal the risk-free rate plus 6%. Here too, the results are almost identical, though the coefficient on the change in risk ($IC_{t-2}*\ \Delta wacc_t$) switches signs (which is not surprising since the cost of capital is now no longer firm specific). Third, we compute the cost of equity for each firm using a factor model, controlling for the Fama-French (1993) factors for size (SMB) and book-to-market (HML) in addition to the market factor[7]. Again, the results for ΔRI_t and $\Delta IC_{t-1}*\ wacc_t$ are very similar. The

[5] The p-value for the Vuong test for the difference in adjusted R^2 is 0.0000 for the pooled regressions, both with and without fixed effects. For the annual regressions, the p-value is less than 0.10 in 25 out of 30 years.

[6] For brevity, we only present the results for sensitivity tests using pooled regressions without fixed effects. The results are very similar across the other 2 specifications – pooled with fixed effects and annual.

[7] We run multi-factor estimation regressions to estimate firm specific factor loadings with respect to the market (Rm-Rf), Size (SMB) and Book-to-market (HML). To estimate the cost of equity, we assume the following risk premium for each of these factors based on historical realized premium: Rm-Rf (6%), SMB (2%), HML (4%).

adjusted R^2 is the highest of all the specifications used, indicating the additional power of more refined estimation of cost of capital. Finally, we use a levered definition of RI, where RI is redefined as net income minus the cost of equity times lagged book value of equity (i.e. $RI_t = NI_t - re^*BV_{t-1}$). The change in interest term is now a part of the change in RI, while the invested capital is based on book-value of equity. The coefficient on ΔRI is similar, but the coefficient on $\Delta IC_{t-1}{}^* \ wacc_t$ is now insignificant.

Next, we modify the model used to decompose the change in net income. Instead of multiplying the investment term by wacc, we multiply it by the lagged return on invested capital ($ROIC_{t-1}$)[8]. To ensure that our decomposition is consistent, we also redefine change in RI (i.e. we subtract $\Delta IC_{t-1}{}^* \ ROIC_{t-1}$ and add $\Delta IC_{t-1}{}^* \ wacc_t$ to ΔRI_t and re-label it ΔRI_ADJ_t). The results are presented in the first few columns of Panel D of Table 4. The results are very similar to the results using our baseline model. This suggests that the assumption that incremental investment earns the cost of capital is not critical to our decomposition.

We also consider a model with no multipliers which includes the following variables - NI_{t-1}, ΔRI_t, ΔIC_{t-1}, ΔINT_t and $\Delta wacc_t$. This is similar to the approach in Harris and Nissim (2006) who do not decompose earnings growth but rather regress returns on growth in profitability ($\Delta ROIC_t$) and growth in invested capital (ΔIC_{t-1}). This regression has a lower adjusted R^2 at 6.08%. This indicates that the structure imposed by our breakdown of earning growth is potentially valuable. The coefficient on ΔRI_t continues to stay significant; however the coefficient on ΔIC_{t-1} is now insignificant.[9]

[8] If lagged ROIC is negative, we continue to use wacc as the multiplier

[9] Finally, we re-estimate our regressions using fiscal year returns (instead of returns compounded from four months after prior fiscal year), as well as sixteen month returns (from beginning of prior year to four months after current fiscal year) to control for the fact that firms often make forecasts and preannouncements in the first quarter. The results are virtually identical and are not tabulated.

4.2 Components of earnings growth and future returns

The regressions in the prior section use contemporaneous returns as the dependent variable and the components of earnings growth as independent variables. This assesses how the stock markets value the components of earnings growth contemporaneously. However, prior research has shown that markets' contemporaneous reaction is often incorrect, as markets underreact to certain information (e.g. the post-earnings announcement drift demonstrated by Bernard and Thomas 1989) or over-react to other information (e.g. naive extrapolation of accruals as shown by Sloan 1996). We hence analyze the relationship between the components of earnings growth and future returns.

4.2.1 Baseline result

As before, we begin with the basic Easton and Harris (1991) specification by regressing one-year-ahead market-adjusted stock returns ($RETM_{t+1}$) on lagged earnings (NI_{t-1}) and changes in earnings (ΔNI_t). We then run regressions that substitute for ΔNI_t with the components of earnings growth. The results are presented in Table 5. Panel A presents the results for specification without decomposition of earnings growth. Consistent with the well documented earnings drift, the coefficient on change in earnings (ΔNI_t) is significantly positive.

Panel B of Table 5 presents the results for the regression of one-year-ahead returns on the components of earnings growth (equation 9). The coefficient δ_2 on ΔRI is significant and positive in all specifications. This indicates that the market only partially impounds the information in earnings growth from growth in RI, i.e. there is a drift with respect to change in RI. In contrast, the coefficient δ_3 on ΔIC_{t-1}* $wacc_t$ is significant and negative in all specifications. This indicates that the market subsequently reverses its initial favorable assessment of earnings growth from growth in invested capital.

The positive relationship between future returns and earnings growth from growth in RI provide strong support for the contention in Anthony (1973) that growth in RI is a crucial metric of financial performance. The negative relationship between future returns and earnings growth from growth in invested capital, on the other hand, corroborates prior research that documents negative returns in the aftermath of investments such as mergers and acquisitions (Roll 1986, Harding & Yale 2002, Bower 2001) and capital expenditure (Titman Wei and Xie 2004).

Finally, the adjusted R^2 for all the regressions using the decomposition are significantly greater than the corresponding regression using only the change in earnings.[10] Thus, the RI based decomposition of earnings growth explains a larger cross section of current as well as future returns.

4.2.2 Alternative definitions of RI and alternative multipliers

We also examine the relationship between one-year-ahead returns and the components of earnings growth using alternate definitions of RI. As before, we redefine RI in using three different specifications for wacc (constant wacc, cross-sectionally constant but time–varying wacc, factor model wacc) and also use a levered definition of RI. The results are presented in Panel C of Table 5. The coefficient on ΔRI_t continues to be significant and positive for all specifications. The coefficient on ΔIC_{t-1}* $wacc_t$ is a little smaller for the three alternative definitions of wacc but continues to be significant. Hence, the positive drift with respect to ΔRI_t and reversal with respect to ΔIC_{t-1}* $wacc_t$ continues to hold in all specifications.

Finally, we also consider the impact of alternative multipliers in Panel D of Table 4. When we multiply investment growth by $ROIC_{t-1}$ instead of $wacc_t$ and redefine ΔRI_ADJ_t accordingly, the results are essentially the same. This is also true for the regression without

[10] The p-value for the Vuong test for difference in adjusted R^2 is 0.0000 for pooled regression both with and without fixed effects. For annual regressions, the p-value is < 0.10 in 23 out of 30 years, both with and without fixed effects.

multipliers – using ΔRI_t, ΔIC_{t-1}, ΔINT_t and $\Delta wacc_t$. Hence, the basic result that the market systematically underreacts to earnings growth from growth in RI and overreacts earnings growth from growth in invested capital is unaltered.

4.3 The confounding effect of conservatism and growth

Rajan, Reichelstein and Soliman (2007) show that the growth in RI can be overstated for slow-growing conservative firms and understated for fast-growing conservative firms. This can cloud any interpretation that one attaches to growth in RI as generating value for shareholders. As a sensitivity test, we rerun the tests for both current as well as future returns with controls for the interplay of accounting conservatism and growth.

We measure conservatism using the C-SCORE measure of Penman and Zhang (2002), who define C-SCORE as the sum of capitalized R&D, capitalized advertising expense and the LIFO reserve scaled by net operating assets.[11] We define a dummy variable CONS, which equals 1 if a firm's C-SCORE is greater than the contemporaneous industry median (on the basis of 2-digit SIC code) and 0 otherwise. We also define a dummy variable called SLOW (FAST) which equals 1 if the firm's recent annualized growth rate in invested capital is less (greater) than its wacc, and 0 otherwise.[12] In our analysis, we interact ΔRI_t with CONS*FAST and CONS*SLOW to control for the interplay of growth and conservatism.

Table 6 presents the results for the model with the above interactions. The first set of columns present the regression for contemporaneous returns. Fast-growing conservative firms

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[11] Consistent with Penman and Zhang (2002), we capitalize R&D (Compustat # 46) over a five-year amortization period and advertising expense (Compustat # 45) over a two-year amortization period, using the sum-of-years-digits method. If the data for R&D or advertising are missing, we set them to zero. Instead of net operating assets, we use total assets (Compustat #6) as our deflator, as the information to calculate net operating assets is either unavailable or net operating assets are negative for almost 20% of all firms.

[12] The growth rate in invested capital is measured over a five year horizon. If five years of data are not available, a firm is classified as neither fast or slow (i.e. both FAST and SLOW are set to zero).

have a significantly greater coefficient on ΔRI_t, as the coefficient on ΔRI_t*CONS*FAST is a highly significant 0.2153. This is consistent with the markets capitalizing growth in RI at a higher rate for fast growing conservative firms, where such growth is likely understated. The incremental coefficient on ΔRI_t*CONS*SLOW is however insignificant, indicating that slow-growing conservative firms are not penalized relative to non-conservative firms. Interestingly, the adjusted R^2 of this regression at 6.50% is marginally higher than the 6.43% adjusted R^2 of the regression analyzed earlier without controlling for conservatism.

The next set of columns present the regression for one-year-ahead returns. Slow-growing conservative firms have a significantly smaller coefficient as the coefficient on ΔRI_t*CONS*SLOW is a significant -0.0632. These firms are less likely to be rewarded for the success of their investments in the future, as the positive RI growth stems potentially not from positive NPV projects but from the mechanical effect of conservatism and slow growth. Hence, controlling for the effect of growth and conservatism impacts the magnitudes of the coefficients for firms based on their level of conservatism and growth profiles, but does not impact our basic result of a positive drift with respect to ΔRI_t and a reversal with respect to ΔIC_{t-1}* $wacc_t$.

4.4 Trading strategy based on the decomposition of earnings growth

The results thus far suggest that the market does not contemporaneously understand the implications of earnings growth arising from different components. We now test whether we can combine the market's underreaction to ΔRI_t and overreaction to ΔIC_{t-1}*$wacc_t$ to create a trading rule that generates significant hedge returns.

4.4.1 Returns to trading rules based on decomposition of earnings growth

We measure one-year-ahead returns for firms in the same manner as for our regression analysis as buy-and-hold returns for a one year period starting four months after fiscal year end.

In each year, we divide the sample of firms into deciles on the basis of either earnings growth (ΔNI_t) or the two main components of earnings growth that we have focused on, namely ΔRI_t and $\Delta IC_{t-1}*wacc_t$. We then examine the patterns in returns for each of these deciles. The results are presented in Panel A of Table 7.

As a reference, we first create a hedge strategy based on ΔNI_t. A strategy of going long in the decile with the greatest increase in net income and short in the decile with the greatest decline in net income generates an average annual excess return of 4.9%. Further, in 19 out of the 30 years, the strategy returns positive excess returns. When we create a hedge strategy based on going long on firms with the largest ΔRI_t and short on the firms with lowest ΔRI_t, the average annual excess return increases to 5.3%, and the strategy generates positive excess returns in 23 out of the 30 years. [13] We next create hedge portfolios by going *short* in firms with the greatest $\Delta IC_{t-1}*wacc_t$ and long in firms with the lowest $\Delta IC_{t-1}*wacc_t$. This performs even better than the ΔRI_t strategy generating average excess returns of 6.7% that are positive in 21 out of 30 years.

Given the strong inverse correlation between ΔRI_t and $\Delta IC_{t-1}*wacc_t$, it is unclear whether the hedge returns based ΔRI_t are subsumed by the hedge returns based on $\Delta IC_{t-1}*wacc_t$. To test this, we create a composite variable combining both these components. We convert both ΔRI_t and $\Delta IC_{t-1}*wacc_t$ into ranks annually, with ranks for $\Delta IC_{t-1}*wacc_t$ in inverse order. We add these ranks to create a composite measure, RI_GROW. RI_GROW combines a preference for earnings growth from growth in RI with the avoidance of earnings growth from growth in invested capital. A hedge strategy based on RI_GROW generates average annual excess returns of 9.8%, with positive returns in 26 out of 30 years. This represents a significant improvement

[13] Results using alternative residual income definitions are similar; in fact results for a levered definition of residual income based on Net Income instead of NOPAT are marginally stronger. Results are not tabulated for brevity.

over the 5.3% generated based on ΔRI_t as well as the 6.7% generated based on ΔIC_{t-1}*$wacc_t$. We interpret the success of this strategy as reflecting the market's eventual realization that it had undervalued ΔRI_t and overvalued ΔIC_{t-1}*$wacc_t$.

4.4.2 Controlling for risk factors: calendar time portfolio regressions

To ensure our results are not driven by omitted risk, we control for additional risk factors using the Fama and French (1993) 3-factor and 4-factor models. We create calendar time portfolios of firms based on the decile of RI_GROW and regress the twelve monthly returns to these portfolios in the year after portfolio formation on the market factor (R_m-R_f), size factor (SMB), book-to-market factor (HML), and, for the 4-factor model, momentum (UMD).[14] The regression is run in time series by pooling the twelve future months for the thirty years. The intercept (alpha) represents the future monthly excess return for each decile.

Panel B of Table 7 presents the results from the 3-factor model regression. Firms in the lowest RI_GROW decile earn a significant negative return of -0.37%, while firms in the highest RI_GROW decile earn a significant positive return of 0.67%. The alphas increase monotonically from the lowest to the highest decile. The difference between the alphas of the extreme RI_GROW portfolios is 1.04%, equivalent to an annualized difference of 13.2%. Panel C of Table 7 presents the results of the 4-factor model. Although the lowest decile firms no longer show a significantly negative alpha, the difference in alphas between extreme portfolios is still significant at 0.92%, equivalent to an annualized difference of 11.6%.

To put our results in perspective, Titman, Wei and Xie (2004) report spreads of 0.20% to 0.28% between extreme quintiles of firms based on capital expenditures. Correspondingly, if we

[14] Although there is debate about whether momentum is, indeed, a risk factor, we include it in our tests to ensure that the results are incremental to a momentum effect. This can also be viewed as a control for the post-earnings-announcement drift, which as Chordia and Shivakumar (2006) show, is strongly related to price momentum.

run our tests using quintiles (alphas to deciles 9&10 minus alphas to deciles 1&2), we find alpha spreads of 0.7%-0.8%. Hence, our composite measure derived from the RI based decomposition generates excess returns that are almost three times as large.

4.4.3 Controlling for other documented anomalies

Finally, we test if the results are robust to controlling for previously documented anomalies. Zhang (2007) shows that many commonly documented anomalies in accounting research are related to the market's misperception about the implications of current growth for future growth. We control for three well documented anomalies – accruals (Sloan 1996), capital expenditures (Titman, Wei and Xie 2004) and external financing (Richardson and Sloan 2003). For brevity, the results are not tabulated but described below.

We first find that RI_GROW generates the second strongest return separation across quintiles (9.4%), stronger than accruals and capital expenditures, but weaker than external financing (12.5%). We then partition our sample into quintiles on the basis of the other anomaly variables, further partition on the basis of RI_GROW within each quintile and test to see if the returns to the RI_GROW strategy persist within each quintile of the other variables.

We find that the RI_GROW strategy is effective within all accrual quintiles, with the greatest return difference in firms with extreme accruals. The strategy is also effective within all capital expenditure quintiles with the greatest effectiveness for firms with highest capital expenditure. Finally, we find strongly significant results for RI_GROW in all quintiles of external financing other than the lowest quintile. The strategy is especially effective within the top quintile of external financing, where the subset with the lowest RI_GROW earns -6.4%, while the subset with the highest RI_GROW earns 6.7%. This provides additional insight to the negative relationship between external financing and future returns demonstrated by Richardson and Sloan (2003), who interpret their finding as related to over-investment due to empire building. Using our decomposition helps isolate firms least likely to waste the proceeds from external financing (highest RI_GROW) from firms most likely to do so (lowest RI_GROW).

4.5 Components of earnings growth and future earnings growth

The results indicate that markets have a more favorable assessment of earnings growth when it is derived from growth in RI. To shed light why the stock markets appear to favor growth in RI, we examine the relationship between current earnings growth and future earnings growth. Specifically, we address whether earnings growth derived primarily from growth in RI is more persistent than earnings growth from other sources.

Dechow, Kothari and Watts (1998) show that earnings changes are negatively serially correlated, suggesting that the earnings growth is mean-reverting. Elgers and Lo (1994), however, show that negative earnings changes tend to reverse more in the next period than positive earnings changes. Ghosh, Gu and Jain (2005) combine these insights in the following model to analyze the persistence of earnings growth. We use this as our baseline model.

$$\Delta NI_{t+1} = \alpha_0 + \alpha_1*NEG + \alpha_2*POS + \beta_1*\Delta NI_t*NEG + \beta_2*\Delta NI_t*POS + \varepsilon. \quad (10)$$

We define a variable called ΔRI_PROP which equals the ratio of growth in RI to growth in NI, i.e. $\Delta RI_t/\Delta NI_t$. ΔRI_PROP is set to zero for firms with negative earnings growth. We interact ΔRI_PROP with ΔNI_t*POS to test whether the persistence of positive earnings growth is greater when such growth is derived primarily from growth in RI. The model we use is

$$\Delta NI_{t+1} = \alpha_0 + \alpha_1*NEG + \alpha_2*POS + \beta_1*\Delta NI_t*NEG + \beta_2*\Delta NI_t*POS + \beta_3*\Delta RI\_PROP + \beta_4*\Delta NI_t*POS*\Delta RI\_PROP + \varepsilon. \quad (11)$$

In the above models, β_1 and β_2 represent the persistence of negative and positive earnings growth, respectively. Prior research suggests that that β_1 should be strongly negative as negative earnings growth is strongly mean reverting. Further, β_2 should either be less negative or even positive, i.e. positive earnings growth is more likely to persist than negative earnings growth. Finally, we expect β_4 to be positive, i.e. positive earnings growth is more persistent when derived primarily from growth in RI. The above regressions are run using the same specifications as earlier– pooled, pooled with fixed effects for time and industry and annual.

The results are presented in Table 8. The first three columns present regressions for the baseline model. Consistent with prior research, the coefficient β_1 on ΔNI_t*NEG is strongly negative in all specifications, indicating that negative earnings growth is strongly mean reverting. Further, the coefficient β_2 on ΔNI_t*POS is significantly positive in all specifications, indicating that positive earnings growth does, on average, persist.

The final three columns include the interactions for ΔRI_PROP. As expected, the coefficient β_4 on the interaction of ΔRI_PROP with ΔNI_t*POS is strongly significant in all three specifications. This lends support for the conjecture that earnings growth that is derived primarily from growth in RI is more likely to be persistent. Interestingly, the coefficient β_2 on ΔNI_t*POS which was formerly significantly positive is now significantly negative. This indicates that positive earnings growth, bereft of growth in RI, does not persist but mean reverts.

In summary, growth in residual income is significantly associated with future earnings growth which is valuable to shareholders. These results lend support for the use of growth in RI as an appropriate measure of growth in profitability, as it accounts for the opportunity costs of funds. This is consistent with arguments made by accounting scholars such as Anthony (1973) enumerating the shortcomings of earnings-based measures of profitability and advocating the use of residual income as an alternative measure of profitability.

5. Conclusion

Earnings and growth in earnings have been considered fundamental determinants of stock returns. However, accounting earnings has been criticized as an incomplete measure of firm profitability as it does not control for the opportunity cost of the capital employed. Accounting scholars have long recommended the use of residual income (RI) as a proxy for economic profits, as it incorporates a charge for capital employed. In this paper, we decompose earnings growth into growth in RI, growth in invested capital, and other components and use this decomposition to refine the relationship between earnings and returns (Easton and Harris 1991).

We first find that the RI based decomposition explains more of the cross-sectional variation in stock returns than the basic specification. Further, while both growth in RI and growth in invested capital have a positive association with returns, the coefficient on growth in RI is significantly greater. This suggests that the markets contemporaneously consider the growth in RI component to be more valuable.

When we analyze the relationship between the components of earnings growth and future returns, we find that growth in RI continues to be positively associated with future returns, while the growth in invested capital is negatively associated with future returns. This suggests that markets contemporaneously underreact to growth in RI and overreact to growth in invested capital. A trading strategy based on a preference for earnings growth derived from growth in RI and an avoidance of earnings growth derived from growth in invested capital generates significant abnormal returns that persist after controlling for known risk factors. Finally, we show that earnings growth is likely to be more persistent when the proportion of growth coming from growth in RI is greater. This suggests that growth in RI empirically identifies sustainable growth in profitability which creates value for shareholders.

Our findings suggest that the markets undervalue earnings growth from growth in RI and overvalue earnings growth from growth in invested capital. The positive relationship between growth in RI and stock returns validates the contention in Anthony (1973) that RI is a superior metric of economic performance. The negative relationship between growth from investment and future returns confirms prior research documenting negative returns after large investments in mergers and acquisitions (Roll 1986; Harding & Yale 2002; Bower 2001) and capital expenditures (Titman Wei and Xie 2004).

Our paper contributes to the literature on the usefulness of RI vis-à-vis earnings by showing that these two measures of performance need not be viewed as competing measures as prior research does (Biddle, Bowen and Wallace 1997; Chen and Dodd 1997). Instead, we show that RI complements earnings, as it helps us better understand the sources of earnings growth. The value of RI lies as an effective conditioning variable that separates out different components of earnings growth.

A recent paper by Balachandran and Mohanram (2010) uses the RI based decomposition of earnings growth developed here to ask whether boards consider the differential valuation implications of the components of earnings growth while determining CEO compensation. They find that boards in fact place a greater weight on earnings growth from growth in invested capital as opposed to earnings growth from growth in RI. They conclude that the boards are, in a sense, incentivizing CEOs to destroy shareholder value.

The results of the present paper apply to shareholders in aggregate. An interesting extension would be to consider the implications of investor sophistication. For instance, does the presence of institutional shareholders reduce the drift with respect to growth in RI and also reduce the reversal with respect to growth in invested capital?

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Table 1 Sample selection procedure

	Firm-Years	*Distinct Firms*
Data on Compustat with information on Net Income (#18), Total Assets (#6), Price (#25), Shares Outstanding (#24) and Invested Capital (#37) in the 1975-2004 period	192,290	21,317
LESS firms with non-December fiscal year-ends	76,997	7,651
December fiscal year-end firms with adequate financial information	115,293	13,666
LESS firms with missing lagged information on net income and missing lagged and twice-lagged information on invested capital	25,525	2,552
December fiscal year-end firms with adequate current and lagged financial information	89,768	11,114
LESS firms with deflators that are too small (lagged assets, market capitalization or invested capital under one million dollars)	2,953	415
December fiscal year-end firms with adequate current and lagged financial information and reasonable deflators	86,815	10,699
LESS firms with missing current returns on CRSP	12,248	1,377
December fiscal year-end firms with adequate current and lagged financial information, reasonable deflators and current returns	74,567	9,322
LESS firms with missing one-year-ahead returns on CRSP	1,523	212
December fiscal year-end firms with adequate current and lagged financial information, reasonable deflators, and current and future returns	73,044	9,110
LESS firms in Utilities (2 digit SIC code 49) or Financial Services (2 digit SIC Code between 60-69)	20,854	2,465
Final Sample	52,190	6,645

Table 2 Sample descriptive statistics

For Panel A, the following data items are from the annual Compustat file: Sales (#12), Assets (#6), Total Invested Capital (#37), Book Value of Equity (#60), Market Value of Equity (shares outstanding (#25) * stock price (#199)) and Net Income before Extraordinary items (#18). NOPAT is net income before extraordinary items plus interest expense (#15) times (1-tax rate). Cost of debt is estimated as after-tax interest expense deflated by prior year's balance of short term and long term debt. Cost of equity is measured using CAPM betas estimated using 60 lagged months of returns (ensuring that at least 24 returns are available) and a market premium of 5%. wacc is estimated from cost of equity and cost of debt, using book value of debt and market value of equity for weights. Residual income or RI is NOPAT minus lagged Invested Capital*wacc. Panel B compares sample industry distribution to the population of Compustat excluding financial and utilities.

Panel A: Descriptive statistics for sample firm-years (N=52190)

	Mean	Std. Dev.	Q1	Median	Q3
Sales ($millions)	1812.0	7982.6	39.8	162.5	760.1
Assets	2184.0	12209.7	42.5	159.9	788.9
Total Beginning Invested Capital	1163.0	5250.7	26.9	101.4	492.4
Book Value of Equity	738.2	3224.8	18.3	71.6	317.7
Market Value of Equity	1723.1	10135.8	28.3	120.0	602.9
Book-to-Market	0.871	0.983	0.321	0.597	1.051
Net Income	84.4	619.7	-0.8	4.0	30.3
Net Income/Lagged Assets	0.2%	18.4%	-1.5%	4.1%	8.7%
NOPAT	118.2	711.9	0.3	6.5	42.6
NOPAT/Lagged Assets	1.9%	18.2%	0.7%	6.0%	10.3%
Cost of Debt	7.9%	5.1%	4.7%	6.3%	9.2%
Cost of Equity	12.8%	4.5%	9.5%	12.2%	15.3%
Wacc	11.3%	4.2%	8.2%	10.7%	13.5%
RI	7.2	533.8	-11.0	-0.9	4.6
RI/Lagged Assets	-6.2%	19.0%	-8.0%	-1.3%	2.8%

Panel B: Industry distribution

SIC Code	Description	Firm-Years	Sample %	Compustat %
28	Chemicals and allied products	4876	9.34%	8.62%
73	Business services	4640	8.89%	9.46%
36	Electronic and other electric equipment	4043	7.75%	7.20%
35	Industrial machinery and equipment	3981	7.63%	6.68%
38	Instruments and related products	3334	6.39%	5.59%
13	Oil and gas extraction	2983	5.72%	5.38%
48	Communication	2218	4.25%	5.60%
37	Transportation equipment	1604	3.07%	2.98%
50	Wholesale trade-durable goods	1550	2.97%	2.69%
34	Fabricated metal products	1363	2.61%	2.44%
20	Food and kindred products	1328	2.54%	2.70%
33	Primary metal industries	1282	2.46%	2.64%
26	Paper and allied products	1209	2.32%	2.02%
30	Rubber and misc. plastics products	1066	2.04%	1.84%
27	Printing and publishing	1035	1.98%	1.95%
87	Engineering and management services	1024	1.96%	1.93%
10	Metal mining	967	1.85%	2.03%
29	Petroleum and coal products	945	1.81%	1.58%
80	Health services	885	1.70%	1.65%
	ALL OTHER INDUSTRIES	11857	22.72%	25.04%
	TOTAL	52,190	100.00%	100.00%

Table 3 Descriptive statistics for analysis variables

NI_{t-1} is the lagged net income before extraordinary items (#18). RI_{t-1} is lagged residual income, where residual income is as defined in the header to Table 2. ΔNI_t and ΔRI_t are the change in net income and residual income respectively. ΔIC_{t-1} is the lagged change in invested capital (#37). $Wacc_t$ is the weighted average cost of capital, computed as described in Table 2. ΔINT_t*(1-t) is the change in after-tax interest expense (#15). IC_{t-1} is lagged invested capital. As discussed in section 2.3, we decompose $\Delta NI_t = \Delta RI_t + \Delta IC_{t-1} * wacc_t - \Delta Int_t*(1-t) + IC_{t-2} * \Delta wacc_t$ All variables above are scaled by lagged market value of equity (#25*#199). $RETM_t$ and $RETM_{t+1}$ are, respectively, contemporaneous and one-year-ahead annual buy and hold returns, adjusted by subtracting value-weighted market returns compounded over the same time period. Returns are compounded starting 4 months after the prior fiscal year end for $RETM_t$ and starting 4 months after the current fiscal year end for $RETM_{t+1}$. Panel A presents the univariate statistics for the variables. Panel B presents the time series average of annual correlation coefficients amongst the components of earnings growth and stock returns.

Panel A: Univariate statistics (n= 52,190 observations)

	Mean	Std. Deviation	Q1	Median	Q3
NI_{t-1}	-1.0%	27.0%	-1.2%	4.9%	9.4%
RI_{t-1}	-10.3%	30.9%	-10.6%	-1.2%	2.6%
ΔNI_t	1.96%	23.30%	-3.19%	0.84%	4.44%
ΔRI_t	1.91%	25.05%	-4.20%	0.21%	4.18%
$\Delta IC_{t-1}*wacc_t$	0.24%	4.77%	-0.29%	0.54%	1.62%
$\Delta INT_t*(1-t)$	0.17%	2.89%	-0.19%	0.00%	0.51%
$IC_{t-1}*\Delta wacc_t$	-0.03%	4.41%	-1.17%	-0.05%	0.90%
$RETM_0$	3.4%	58.7%	-31.4%	-5.4%	23.5%
$RETM_1$	4.4%	57.9%	-29.9%	-3.7%	24.8%

Panel B: Time-series means of cross-sectional correlation coefficients

Figures above (below) diagonal are Pearson (Spearman) correlations

	NI_{t-1}	RI_{t-1}	ΔNI_t	ΔRI_t	$\Delta IC_{t1}*$ $wacc_t$	ΔINT_t* (1-t)	$IC_{t-2}*$ $\Delta wacc_t$	$RETM_t$	$RETM_{t+1}$
NI_{t-1}		0.935	-0.519	-0.571	0.549	0.128	0.010	-0.006	0.023
RI_{t-1}	0.726		-0.483	-0.554	0.588	0.113	0.017	-0.031	-0.003
ΔNI_t	-0.224	-0.198		0.963	-0.336	-0.203	0.017	0.249	0.024
ΔRI_t	-0.273	-0.272	0.898		-0.441	-0.159	-0.063	0.221	0.022
$\Delta IC_{t-1}*wacc_t$	0.355	0.396	-0.180	-0.333		0.272	-0.167	-0.053	-0.015
$\Delta INT_t*(1-t)$	0.030	0.044	-0.152	-0.119	0.278		0.314	-0.072	-0.039
$IC_{t-2}*\Delta wacc_t$	0.013	0.059	0.071	-0.094	-0.079	0.140		0.073	-0.019
$RETM_t$	0.123	0.047	0.344	0.297	-0.042	-0.099	0.076		0.037
$RETM_{t+1}$	0.112	0.044	0.032	0.035	-0.015	-0.052	-0.034	0.073	

Table 4 Regression of contemporaneous returns with components of income growth

NI_{t-1} is the lagged net income before extraordinary items (#18). ΔRI_t is the change in residual income, computed as described in the header to Table 2. ΔIC_{t-1} is the lagged change in invested capital (#37). $Wacc_t$ is the weighted average cost of capital, computed as described in Table 2. $\Delta INT_t*(1-t)$ is the change in after-tax interest expense (#15). IC_{t-1} is lagged invested capital. As discussed in section 2.3, we decompose $\Delta NI_t = \Delta RI_t + \Delta IC_{t-1}* wacc_t - \Delta Int_t*(1-t) + IC_{t-2}* \Delta wacc_t$. All variables are scaled by lagged market value of equity (#25*#199). The dependent variable, $RETM_t$, is the contemporaneous annual buy and hold returns adjusted by subtracting value-weighted market return compounded over the same time period. Returns are compounded starting 4 months after the prior fiscal year end. For Panels A and B, regressions are run in both pooled and annual specifications, with and without fixed effects. Pooled fixed effects regressions includes effects for year and industry (2 digit SIC code). Annual fixed effects regressions include effects for industry. Figures in parentheses are t-statistics. T-statistics for the pooled regression include Newey-West (1987) corrections for clustering. Parameters for the annual regressions are time series averages of individual annual regressions using the Fama and Macbeth (1973) methodology as modified by Litzenberger and Ramaswamy (1979), who weight parameter estimates by precision (inverse of standard error). The adjusted R^2 for the annual regressions is the time series average of the adjusted R^2 of the individual annual regressions. The number of observations for all regressions is 52,190 across all years. In Panel A, we regress $RETM_t$ on lagged income (NI_{t-1}) and current change in income (ΔNI_t). In Panel B, we regress $RETM_t$ on lagged income (NI_{t-1}) and components of change in income : ΔRI_t, $\Delta IC_{t-1}*wacc_t$, $\Delta INT_t*(1-t)$ and $IC_{t-2}* \Delta wacc_t$. In Panel C, we rerun the pooled regression with alternative definitions of RI and in Panel D, we rerun the pooled regression with alternative multipliers and no multipliers (see section 4.1.2 for details).

Panel A: Regression of contemporaneous returns on lagged income and income Growth

Variable	Expected Sign	Pooled	Pooled with fixed effects	Annual
Intercept	?	0.0219 (8.26)		-0.0075 (-0.31)
NI_{t-1}	+	0.2196 (12.00)	0. 2532 (22.33)	0.3520 (5.95)
ΔNI_t	+	0.7265 (37.57)	0.7328 (57.92)	0.7766 (17.18)
Adj. R^2		6.09%	13.10%	9.91%

Panel B: Regression of contemporaneous returns on lagged income and components of income growth

Variable	Expected Sign	Pooled	Pooled with fixed effects	Annual
Intercept	?	0.0262 (9.80)		-0.0066 (-0.26)
NI_{t-1}	+	0.2530 (12.91)	0.2666 (20.60)	0.3646 (6.04)
ΔRI_t	+	0.6750 (34.95)	0.6826 (54.39)	0.7200 (16.95)
$\Delta IC_{t-1}*wacc_t$	+	0.1955 (2.09)	0.3960 (5.68)	0.4987 (3.39)
$\Delta INT_t*(1-t)$	-	-1.5692 (-12.14)	-1.5596 (-16.57)	-1.5596 (-7.86)
$IC_{t-2}*\Delta wacc_t$	+	1.2027 (15.57)	1.4615 (23.08)	1.5047 (9.85)
Adj. R^2		6.43%	13.41%	10.73%

Panel C: Regressions for alternative specifications of RI

Variable	Expected Sign	Constant wacc	Time varying wacc	Factor Model wacc	RI based on NI
Intercept	?	0.0257	0.0216	0.0248	0.0204
		(9.63)	(8.11)	(9.35)	(7.69)
NI_{t-1}	+	0.2524	0.2520	0.2320	0.2877
		(13.14)	(13.18)	(11.97)	(12.31)
ΔRI_t	+	0.6794	0.6820	0.6653	0.6992
		(35.27)	(35.81)	(34.55)	(36.59)
$\Delta IC_{t-1}*wacc_t$	+	0.2053	0.2825	0.3503	-0.0454
		(2.52)	(3.52)	(4.10)	(-0.31)
$\Delta INT_t*(1-t)$	-	-1.3095	-1.0957	-1.6726	
		(-11.11)	(-9.26)	(-13.49)	
$IC_{t-2}* \Delta wacc_t$	+		-0.3667	1.4515	-0.1807
			(-5.36)	(21.25)	(-2.04)
Adj. R^2		6.16%	6.50%	6.62%	6.35%

Panel D: Regressions with alternative multipliers

Using $ROIC_{t-1}$ instead of $wacc_t$			No multipliers		
Variable	Expected Sign		Variable	Expected Sign	
Intercept	?	0.0273	Intercept	?	0.0263
		(10.13)			(9.71)
NI_{t-1}	+	0.2473	NI_{t-1}	+	0.2632
		(12.70)			(13.45)
Δ RI_ADJ_t	+	0.6755	Δ RI_t	+	0.6666
		(34.86)			(34.48)
Δ $IC_{t-1}*ROIC_{t-1}$	+	0.2823	Δ IC_{t-1}	+	-0.0058
		(3.49)			(-0.07)
Δ $INT_t*(1-t)$	-	-1.5834	Δ $INT_t*(1-t)$	-	-1.1165
		(-12.14)			(-9.30)
$IC_{t-2}* \Delta wacc_t$	+	1.2354	$\Delta wacc_t$	+	1.1930
		(15.17)			(11.79)
Adj. R^2		6.41%	Adj. R^2		6.08%

Table 5 Regression of one-year-ahead returns with components of income growth

NI_{t-1} is the lagged net income before extraordinary items (#18). ΔRI_t is the change in residual income, computed as described in the header to Table 2. ΔIC_{t-1} is the lagged change in invested capital (#37). $Wacc_t$ is the weighted average cost of capital, computed as described in Table 2. ΔINT_t*(1-t) is the change in after-tax interest expense (#15). IC_{t-1} is lagged invested capital. As discussed in section 2.3, we decompose $\Delta NI_t = \Delta RI_t + \Delta IC_{t-1} * wacc_t - \Delta Int_t*(1-t) + IC_{t-2} * \Delta wacc_t$ All variables above are scaled by lagged market value of equity (#25*#199). The dependent variable, $RETM_{t+1}$, is the one-year-ahead annual buy and hold returns adjusted by subtracting value-weighted market return compounded over the same time period. Returns are compounded starting 4 months after the prior fiscal year end. For Panels A and B, regressions are run in both pooled and annual specifications, with and without fixed effects. Pooled fixed effects regressions includes effects for year and industry (2 digit SIC code). Annual fixed effects regressions include effects for industry. Figures in parentheses are t-statistics. T-statistics for the pooled regression include Newey-West (1987) corrections for clustering. Parameters for the annual regressions are time series averages of individual annual regressions using the Fama and Macbeth (1973) methodology as modified by Litzenberger and Ramaswamy (1979), who weight parameter estimates by precision (inverse of standard error). The adjusted R^2 for the annual regressions is the time series average of the adjusted R^2 of the individual annual regressions. The number of observations for all regressions is 52,190 across all years. In Panel A, we regress $RETM_{t+1}$ on lagged income (NI_{t-}1) and current change in income (ΔNI_t). In Panel B, we regress $RETM_{t+1}$ on lagged income (NI_{t-}1) and components of change in income: ΔRI_t, $\Delta IC_{t-1}*wacc_t$, $\Delta INT_t*(1-t)$ and $IC_{t-2} * \Delta wacc_t$. In Panel C, we rerun the pooled regression with alternative definitions of residual income and in Panel D, we rerun the pooled regression with alternative multipliers and no multipliers (see section 4.2.2 for details).

Panel A: Regression of one-year-ahead returns on lagged Income and income Growth

Variable	Expected Sign	Pooled	Pooled with fixed effects	Annual
Intercept	?	0.0428 (15.69)		0.0169 (0.69)
NI_{t-1}	?	0.0494 (3.24)	0.0462 (3.99)	0.0927 (1.85)
ΔNI_t	?	0.1046 (6.29)	0.0765 (5.93)	0.1002 (2.64)
Adj. R^2		0.12%	7.05%	1.19%

Panel B: Regression of one-year-ahead returns on lagged income and components of income growth

Variable	Expected Sign	Pooled	Pooled with fixed effects	Annual
Intercept	?	0.0454 (18.80)		0.0148 (0.61)
NI_{t-1}	?	0.0755 (4.33)	0.0741 (5.61)	0.1273 (2.30)
ΔRI_t	?	0.0814 (4.97)	0.0611 (4.77)	0.0812 (2.17)
$\Delta IC_{t-1}*wacc_t$	?	-0.1902 (-2.16)	-0.2367 (-3.32)	-0.2342 (-2.08)
$\Delta INT_t*(1-t)$	?	-0.8072 (-6.90)	-0.5418 (-5.63)	-0.5144 (-3.08)
$IC_{t-2} * \Delta wacc_t$	?	0.1021 (1.45)	-0.1402 (-2.17)	-0.1190 (-0.96)
Adj. R^2		0.29%	7.18%	1.86%

Panel C: Regressions for alternative specifications of RI

Variable	Expected Sign	Constant wacc	Time varying wacc	Factor Model wacc	RI based on NI
Intercept	?	0.0452 (16.63)	0.0465 (16.68)	0.0452 (16.63)	0.0439 (15.93)
NI_{t-1}	?	0.0744 (4.33)	0.0621 (3.66)	0.0668 (3.86)	0.0955 (4.65)
ΔRI_t	?	0.0872 (5.36)	0.0776 (4.80)	0.0783 (4.75)	0.0925 (5.64)
ΔIC_{t-1}*$wacc_t$	?	-0.1268 (-1.79)	-0.1258 (-1.73)	-0.1582 (-2.11)	-0.3724 (-2.85)
ΔINT_t*(1-t)	?	-0.8059 (-7.43)	-0.8738 (-7.95)	-0.8588 (-7.60)	
IC_{t-2}* $\Delta wacc_t$	?		0.3285 (4.69)	0.1728 (2.78)	0.3106 (3.67)
Adj. R^2		0.30%	0.30%	0.28%	0.16%

Panel D: Regressions with alternative multipliers

Using $ROIC_{t-1}$ instead of $wacc_t$			No multipliers		
Variable	Expected Sign		Variable	Expected Sign	
Intercept	?	0.0459 (16.77)	Intercept	?	0.0457 (16.65)
NI_{t-1}	?	0.0700 (4.09)	NI_{t-1}	?	0.0727 (4.22)
ΔRI_ADJ_t	?	0.0820 (4.99)	ΔRI_t	?	0.0829 (5.07)
ΔIC_{t-1}*$ROIC_{t-1}$	?	-0.1269 (-1.73)	ΔIC_{t-1}	?	-0.1466 (-1.97)
ΔINT_t*(1-t)	?	-0.8285 (-7.07)	ΔINT_t*(1-t)	?	-0.7818 (-7.01)
IC_{t-2}* $\Delta wacc_t$	?	0.1141 (1.55)	$\Delta wacc_t$	?	0.0991 (0.96)
Adj. R^2		0.28%	Adj. R^2		0.27%

Table 6 Controlling for the effect of conservatism and growth

NI_{t-1} is the lagged net income before extraordinary items (#18). ΔRI_t is the change in residual income, computed as described in the header to Table 2. ΔIC_{t-1} is the lagged change in invested capital (#37). $Wacc_t$ is the weighted average cost of capital, computed as described in Table 2. $\Delta INT_t*(1\text{-}t)$ is the change in after-tax interest expense (#15). IC_{t-1} is lagged invested capital. As discussed in section 2.3, we decompose $\Delta NI_t = \Delta RI_t + \Delta IC_{t-1}* wacc_t - \Delta Int_t*(1\text{-}t) + IC_{t-2}* \Delta wacc_t$ All variables above are scaled by lagged market value of equity (#25*#199). CONS is a dummy variable that equals 1 if a firm's C-SCORE is greater than the contemporaneous median across all other firms in the same industry (on the basis of 2-digit SIC code). SLOW is a dummy variable which equals 1 if the firm's recent annualized growth rate in invested capital is less than its wacc, and 0 otherwise. FAST is a dummy variable which equals 1 if the firm's recent annualized growth rate in invested capital is greater than its wacc and 0 otherwise. The dependent variable is either $RETM_t$ for contemporaneous returns or $RETM_{t+1}$ for one-year-ahead returns. Returns are annual buy and hold returns adjusted by subtracting value-weighted market return compounded over the same time period. Returns are compounded starting 4 months after prior or current fiscal year end. The regression is a pooled regression. Figures in parentheses are t-statistics. The number of observations is 52,190.

	Contemporaneous returns		Future returns	
Variable	Expected sign		Expected sign	
Intercept	?	0.0238 (7.02)	?	0.0366 (10.58)
CONS*SLOW	?	-0.0013 (-0.22)	?	0.0303 (5.01)
CONS*FAST	?	0.0192 (2.59)	?	0.0014 (0.19)
NI_{t-1}	+	0.2575 (13.13)	?	0.0782 (4.47)
ΔRI_t	+	0.6435 (27.81)	?	0.1073 (5.51)
ΔRI_t*CONS*SLOW	-	0.0374 (1.10)	?	-0.0632 (-2.15)
ΔRI_t*CONS*FAST	+	0.2153 (3.49)	?	-0.0415 (-0.92)
$\Delta IC_{t-1}*wacc_t$	+	0.1597 (1.70)	?	-0.1843 (-2.11)
$\Delta INT_t*(1\text{-}t)$	-	-1.5547 (-11.93)	?	-0.7848 (-6.70)
$IC_{t-2}*\Delta wacc_t$	+	1.2155 (15.02)	?	0.0924 (1.26)
Adj. R^2		6.50%		0.35%

Table 7 Returns to hedge strategies based on components of earnings growth

NI_t is net income before extraordinary items (#18). RI_t is residual income as defined in the header to Table 2. ΔNI_t (ΔRI_t) is the change in net income (residual income). ΔIC_{t-1} is the lagged change in invested capital (#37). $Wacc_t$ is the weighted average cost of capital, computed as described in Table 2. All variables above are scaled by lagged market value of equity (#25*#199). As discussed in section 2.3, we decompose $\Delta NI_t = \Delta RI_t + \Delta IC_{t-1} * wacc_t - \Delta Int_t*(1-t) + IC_{t-2} * \Delta wacc_t$. In addition, we combine ΔRI_t and $\Delta IC_{t-1}* wacc_t$ into a composite measure, RI_GROW, that incorporates a preference for earnings growth from growth in RI with an avoidance of earnings growth from growth in invested capital, as described in section 4.4. In each year, we form equally weighted deciles on the basis of ΔNI_t , ΔRI_t, $\Delta IC_{t-1}* wacc_t$ and RI_GROW. The below presents the annual hedge returns ($HRET_{t+1}$) for a strategy of going long in firms in the highest deciles of ΔNI_t , ΔRI_t, and RI_GROW (lowest decile of $\Delta IC_{t-1}* wacc_t$) and going short in firms in the lowest deciles of ΔNI_t , ΔRI_t, and RI_GROW (highest decile of $\Delta IC_{t-1}* wacc_t$). Figures in parentheses are t-statistics, calculated from the distribution of annual hedge returns. Panels B and C present results of time-series regressions with the monthly return for deciles based on RI_GROW as the dependent variable, and the Fama and French (1993) risk factors as independent variables. Panel B uses the 3-factor model with the market factor (Rm-Rf), size factor (SMB), book-to-market factor (HML). Panel C uses the 4-factor model that additionally includes momentum (UMD). The regressions pool 30 years of monthly returns for each portfolio, i.e. 360 observations for each regression. The intercepts (alpha) to these portfolios represent the monthly excess returns earned in the year following portfolio formation.

Panel A: Hedge returns based on deciles of components of earnings growth

		Deciles of ΔNI_t		Deciles of ΔRI_t		Deciles of $\Delta IC_{t-1}*wacc_t$		Deciles of RI_GROW	
Year	Decile Size	$HRET_{t+1}$	Positive	$HRET_{t+1}$	Positive	$HRET_{t+1}$	Positive	$HRET_{t+1}$	Positive
1975	129	0.8%	Yes	0.4%	Yes	1.7%	Yes	8.7%	Yes
1976	131	-2.4%	No	-9.0%	No	-2.2%	No	-9.3%	No
1977	127	6.3%	Yes	5.5%	Yes	-0.3%	No	2.1%	Yes
1978	124	12.5%	Yes	11.6%	Yes	1.8%	Yes	5.1%	Yes
1979	119	15.6%	Yes	7.4%	Yes	-4.6%	No	0.3%	Yes
1980	118	15.1%	Yes	16.1%	Yes	19.1%	Yes	16.6%	Yes
1981	121	17.0%	Yes	22.7%	Yes	10.2%	Yes	-4.5%	No
1982	124	-2.2%	No	1.9%	Yes	1.1%	Yes	14.6%	Yes
1983	134	12.1%	Yes	14.3%	Yes	5.3%	Yes	14.7%	Yes
1984	128	8.4%	Yes	1.8%	Yes	-13.5%	No	-7.7%	No
1985	134	0.0%	No	1.9%	Yes	20.4%	Yes	13.4%	Yes
1986	134	-3.0%	No	-3.1%	No	4.1%	Yes	15.3%	Yes
1987	135	5.9%	Yes	7.6%	Yes	-13.1%	No	-3.0%	No
1988	138	15.9%	Yes	12.9%	Yes	12.9%	Yes	10.7%	Yes
1989	146	10.2%	Yes	5.5%	Yes	-2.3%	No	15.3%	Yes
1990	145	5.1%	Yes	13.3%	Yes	1.8%	Yes	18.8%	Yes
1991	151	6.0%	Yes	1.2%	Yes	6.8%	Yes	19.0%	Yes
1992	157	0.8%	Yes	5.0%	Yes	10.7%	Yes	3.4%	Yes
1993	171	-5.9%	No	-12.6%	No	5.6%	Yes	8.2%	Yes
1994	185	15.7%	Yes	11.9%	Yes	19.4%	Yes	22.9%	Yes
1995	209	11.8%	Yes	9.2%	Yes	5.2%	Yes	7.4%	Yes
1996	226	3.0%	Yes	2.9%	Yes	2.1%	Yes	11.5%	Yes
1997	242	-7.6%	No	-5.9%	No	13.6%	Yes	14.1%	Yes
1998	260	-22.8%	No	-1.9%	No	41.7%	Yes	29.5%	Yes
1999	260	13.6%	Yes	9.9%	Yes	-9.0%	No	2.2%	Yes
2000	252	-3.1%	No	-1.1%	No	-1.4%	No	3.8%	Yes
2001	255	-3.0%	No	0.3%	Yes	10.6%	Yes	17.0%	Yes
2002	257	-1.8%	No	9.5%	Yes	54.9%	Yes	27.3%	Yes
2003	250	-10.8%	No	-13.7%	No	-11.7%	No	0.2%	Yes
2004	246	33.5%	Yes	32.5%	Yes	10.1%	Yes	17.4%	Yes
Avg.	174	4.9%	19/30	5.3%	23/30	6.7%	21/30	9.8%	26/30
		(2.48)		(2.94)		(2.53)		(5.51)	

Panel B: Fama-French 3-factor model regressions for portfolios of a composite measure (RI_GROW)

Decile	Alpha	R_m-R_f	SMB	HML	Adj. R^2
1	-0.37%	1.12	0.95	0.36	78.3%
	(-2.20)	(26.37)	(17.51)	(5.56)	
2	-0.23%	1.09	0.86	0.29	85.8%
	(-1.81)	(34.39)	(21.31)	(6.04)	
3	0.04%	1.08	0.82	0.18	87.4%
	(0.30)	(36.24)	(21.67)	(3.91)	
4	0.06%	1.04	0.71	0.19	89.8%
	(0.65)	(42.32)	(22.49)	(5.12)	
5	0.20%	1.00	0.72	0.17	89.1%
	(2.03)	(40.07)	(22.43)	(4.45)	
6	0.13%	1.03	0.71	0.21	90.1%
	(1.37)	(43.18)	(23.36)	(5.92)	
7	0.25%	0.98	0.77	0.22	90.0%
	(2.66)	(41.51)	(25.47)	(6.04)	
8	0.35%	1.00	0.75	0.17	89.7%
	(3.58)	(40.78)	(23.92)	(4.48)	
9	0.44%	0.95	0.89	0.19	85.8%
	(3.70)	(31.84)	(23.36)	(4.22)	
10	0.67%	0.95	1.04	0.22	77.5%
	(4.07)	(22.78)	(19.55)	(3.48)	
(10-1)	1.04%				
	(4.41)				

Panel C: Fama-French 4-factor model regressions for portfolios of a composite measure (RI_GROW)

Decile	Alpha	R_m-R_f	SMB	HML	UMD	Adj. R^2
1	-0.09%	1.10	1.00	0.31	-0.29	81.6%
	(-0.57)	(27.94)	(19.76)	(5.13)	(-8.02)	
2	0.02%	1.07	0.90	0.24	-0.26	88.8%
	(0.17)	(37.93)	(24.96)	(5.70)	(-9.89)	
3	0.28%	1.05	0.86	0.13	-0.25	90.5%
	(2.67)	(40.65)	(25.87)	(3.30)	(-10.66)	
4	0.24%	1.03	0.74	0.16	-0.19	91.7%
	(2.68)	(46.07)	(25.74)	(4.66)	(-9.04)	
5	0.38%	0.99	0.74	0.14	-0.18	91.0%
	(4.10)	(43.35)	(25.51)	(3.93)	(-8.77)	
6	0.29%	1.02	0.74	0.18	-0.16	91.6%
	(3.21)	(46.14)	(26.08)	(5.51)	(-8.03)	
7	0.37%	0.97	0.78	0.19	-0.12	90.9%
	(4.04)	(42.94)	(27.20)	(5.64)	(-6.03)	
8	0.49%	0.99	0.77	0.14	-0.14	90.8%
	(5.17)	(42.59)	(25.92)	(4.00)	(-6.68)	
9	0.55%	0.94	0.90	0.17	-0.12	86.5%
	(4.69)	(32.26)	(24.33)	(3.82)	(-4.51)	
10	0.83%	0.93	1.06	0.19	-0.17	78.6%
	(5.04)	(22.96)	(20.42)	(3.07)	(-4.43)	
(10-1)	0.92%					
	(4.02)					

Table 8 Relation between persistence of earnings growth and components of earnings growth

The dependent variable is the future change in earnings (ΔNI_{t+1}) while the main independent variable is the current change in earnings (ΔNI_t), both computed from net income before extra-ordinary items (Compustat #18) and scaled by the corresponding beginning market value of equity (Compustat #25 * Compustat #199). NEG is an indicator variable that equals 1 if $\Delta NI_t < 0$ and 0 otherwise. POS is an indicator variable that equals 1 if $\Delta NI_t > 0$ and 0 otherwise. ΔRI_PROP is defined as the ratio of ΔRI_t to ΔNI_t, where ΔRI_t is the change in RI, computed as described in the header to Table 2. ΔRI_PROP is only computed when $\Delta NI_t > 0$ and is set to zero for all other observations. Regressions are run in pooled specifications, with and without fixed effects, as well as annually. Pooled fixed effects regressions includes effects for year and industry (2 digit SIC code). Figures in parentheses are t-statistics. T-statistics for the pooled regression include Newey-West (1987) corrections for clustering. Parameters for the annual regressions are time series averages of individual annual regressions using the Fama and Macbeth (1973) methodology as modified by Litzenberger and Ramaswamy (1979), who weight parameter estimates by precision (inverse of standard error). The adjusted R^2 for the annual regressions is the time series average of the adjusted R^2 of the individual annual regressions. The number of observations for all regressions is 44,746 across all years.

Variable	Pooled	Pooled with fixed effects	Annual	Pooled	Pooled with fixed effects	Annual
Intercept	0.0083		-0.0089	0.0083		-0.0056
	(0.11)		(-0.51)	(0.11)		(-0.33)
NEG	-0.0485	-0.052	-0.0305	-0.0485	-0.0533	-0.0338
	(-0.67)	(-0.75)	(-1.83)	(-0.67)	(-0.77)	(-2.03)
POS	-0.0272	-0.02	-0.0041	-0.0238	-0.0196	-0.0037
	(-0.37)	(-0.29)	(-0.27)	(-0.33)	(-0.28)	(-0.24)
ΔNI_t*NEG	-0.8852	-0.8792	-0.855	-0.8852	-0.8795	-0.855
	(-85.04)	(-88.44)	(-17.15)	(-85.22)	(-88.56)	(-17.15)
ΔNI_t*POS	0.2319	0.0327	0.139	-0.089	-0.1837	-0.2330
	(41.19)	(5.46)	(4.58)	(-3.66)	(-7.64)	(-3.06)
ΔRI_PROP				-0.0003	-0.0001	-0.0001
				(-0.80)	(-0.24)	(-0.32)
ΔNI_t*POS*ΔRI_PROP				0.2956	0.2009	0.3442
				(13.57)	(9.29)	(4.08)
Adj. R^2	17.3%	22.6%	17.8%	17.6%	22.9%	18.4%