

# Accruals, Investment, and the Accrual Anomaly

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**ABSTRACT:** This paper investigates two competing hypotheses for the accrual anomaly: investment/growth and persistence. Both investment/growth and persistence information in accruals are likely to vary cross-sectionally, depending on a firm's business model, a fact that generates different cross-sectional implications for the accrual anomaly. I find that the magnitude of the accrual anomaly monotonically increases with the investment information contained in accruals, as measured by the co-variation between accruals and employee growth. In industries/firms in which accruals co-vary with employee growth, accruals show strong predictive power for future stock returns. In industries/firms in which accruals show little correlations with employee growth, the accrual anomaly is much weaker. In contrast, the evidence from the cross-sectional analysis is inconsistent with the persistence argument. From the earnings perspective, the evidence on one-year-ahead earnings growth is inconclusive, but the results on longer-term earnings growth support the investment argument but not the persistence argument. Collectively, I conclude that these results support the view that the accrual anomaly is attributable to the fundamental investment information contained in accruals.

**Keywords:** *accruals; investment; persistence; accrual anomaly; earnings management.*

**JEL Classification:** *G12, G14, M41.*

## I. INTRODUCTION

It has long been recognized that accruals, as a component of earnings, are less persistent than cash flows (Sloan 1996). The lower persistence of accruals is often attributed to the subjectivity of accrual measures (Richardson et al. 2004, 2005; Hirshleifer et al.

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2005). This paper investigates another property of accruals—their ability to capture fundamental investment/growth in working capital.<sup>1</sup> Traditionally, the accounting literature measures accruals as changes in working capital.<sup>2</sup> Like investment in fixed assets, changes in working capital represent one form of investment and are an integral part of a firm's business growth. Economically, investing in working capital should co-vary with other growth-related business activities, such as hiring new employees, issuing new debt and equity, and investing in fixed assets in order to support corporate growth. Investment in working capital should also be positively related to the outcomes of firms' investment activities (e.g., actual sales) if investment is, on average, optimal. I find that accruals co-vary strongly with other growth attributes, such as growth in the number of employees, external financing, and cash sales growth, suggesting that accruals, at least partially, capture fundamental investment information.

Both persistence and investment information contained in accruals are likely to vary cross-sectionally, depending on a firm's business Model (i.e., its production function). In this paper, I test different implications of persistence and investment in the context of the accrual anomaly, which is first documented in Sloan (1996). While there is a general consensus that accruals are negatively related to future stock returns, the interpretation of this phenomenon is more controversial. Sloan (1996) and a large body of follow-up studies follow the persistence story, arguing that investors tend to overestimate the persistence of accruals and underestimate the persistence of cash flows when forming earnings expectations.<sup>3</sup> As a result, stock returns are systematically lower when realized earnings are less than expected for high-accrual firms. Alternatively, Fairfield et al. (2003) interpret accruals as growth in short-term net operating assets and argue that the accrual anomaly is a special case of a more general anomaly based on growth in net operating assets. Lakonishok et al. (1994) and Titman et al. (2004) show that investment/growth is negatively related to future stock returns. The issue of whether investment/growth or persistence explains the accrual anomaly is controversial because persistence and growth have the same prediction for the relation between accruals and future stock returns. From the evidence in the prior literature, we cannot distinguish one explanation from the other.

This paper advances our understanding of the underlying cause of the accrual anomaly by examining cross-sectional variation in the anomaly based on a firm's business model. One key feature of my approach is its reliance on employee growth, which is not an outcome of the financial reporting system and thus is not related to the accounting-based persistence argument. By focusing on the different information content of accruals across industries/firms, my approach generates different cross-sectional implications based on investment and persistence, a fact that allows me to distinguish between these two competing views. While investment and persistence are not mutually exclusive for the accrual anomaly, my goal is to test which factor is more dominant.

Under the investment argument, accruals capture fundamental investment in working capital, which co-varies with employee growth and other growth attributes of the firm. The investment/growth information contained in accruals predicts future stock returns. Under the persistence argument, accruals, as a component of earnings, are less persistent than cash flows, and investors misestimate accruals' persistence. The lower persistence of accruals

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<sup>1</sup> By fundamental investment, I mean investment associated with positive expected net present values in a firm's business.

<sup>2</sup> Accruals based on the statement of cash flows measure organic growth in working capital; while accruals based on the balance sheet measure both organic growth and growth via mergers and acquisitions.

<sup>3</sup> I use persistence to refer to investors' mispricing of accrual persistence relative to cash flows, and I use persistence and accrual persistence interchangeably in the paper.

relative to cash flows explains future stock returns. The investment and persistence information contained in accruals varies cross-sectionally, depending on a firm's business model. If in some industries/firms accruals co-vary strongly with employee growth, then accruals are more likely to capture fundamental investment information than to reflect subjective estimates of assets and liabilities that are going to reverse in the next year. A testable implication of the investment argument is that the accrual anomaly is stronger for industries/firms in which accruals co-vary strongly with employee growth. Similarly, if accrual persistence is industry- or firm-specific based on the type of business model employed by the firm, then the persistence argument suggests a stronger accrual anomaly for industries/firms with less persistent accruals.

Investment and persistence also offer different predictions for future earnings. If accruals capture firms' fundamental investment information and if investment is optimal, on average, then high-accrual firms should have higher earnings in the future, although profitability is likely to be lower due to lower marginal returns to incremental investment. The effect of investment on future earnings could be intermediate or long term, depending on a firm's investment cycle. The cross-sectional implication of the investment argument is that the positive correlation between earnings growth and accruals should be stronger when accruals are more likely to capture investment information. On the other hand, the persistence argument suggests that high-accrual firms should have lower subsequent earnings and that the negative correlation between earnings growth and accruals should be stronger when accruals are the least persistent relative to cash flows.

My empirical evidence supports the investment argument but not the persistence argument. In particular, I find that the accrual anomaly varies across industries/firms in a predictable way based on the co-variation between accruals and employee growth. In industries/firms where accruals co-vary highly with employee growth, accruals have strong predictive power for future stock returns. In industries/firms where accruals do not co-vary with employee growth, the accrual anomaly is much weaker. On the other hand, I find that the magnitude of the accrual anomaly increases with the persistence of accruals relative to cash flows, an outcome going against the persistence argument. Empirical results on subsequent earnings are somewhat mixed. Accruals/growth are negatively related to one-year-ahead earnings growth, probably due to the mean reversal of earnings growth and special items in year  $t$  earnings. Cross-sectional results on one-year-ahead earnings growth support both the investment and the persistence arguments, making the evidence inconclusive. Longer-term earnings growth increases with accruals, and the increase is stronger when accruals co-vary highly with employee growth, supporting the investment argument. Collectively, I view these results as supporting the idea that the accrual anomaly is largely attributable to the fundamental investment information contained in accruals rather than to the lower persistence of accruals relative to cash flows.

This paper contributes to the accounting literature in several ways. This is the first paper that disentangles accrual persistence from investment/growth in explaining the accrual anomaly. Given the amount of research on the accrual anomaly, it is important to understand its underlying forces. Additionally, the lower future returns for high-accrual firms and the lower persistence of accruals relative to cash flows are widely used to justify the idea that accruals capture earnings quality (see Dechow and Schrand [2004] and papers cited therein). My findings in favor of the investment/growth explanation suggest that we should keep searching for a proxy for earnings quality. Also, my evidence that the investment/growth information contained in accruals goes far beyond that captured by current sales growth has broad implications for accrual-related studies. For example, discretionary accruals based on the Jones or the modified Jones model are likely to capture

growth rather than earnings management due to incomplete controls for fundamental investment information in accruals. The long-term underperformance after certain corporate events, such as mergers and acquisitions, IPOs, and SEOs, may be due to high growth of these firms rather than the earnings management so frequently sighted in the literature (see related comments in McNichols 2000). The evidence that discretionary accruals do not reverse in the following years (e.g., Teoh et al. 1998; Shivakumar 2000) further suggests the plausibility of this explanation.

This paper proceeds as follows. The next section reviews prior literature and develops testable hypotheses. Section III describes the sample data and provides evidence on the covariation between accruals and other growth attributes. Section IV presents empirical evidence on cross-sectional variation in the accrual anomaly to test the investment and persistence hypotheses. Section V conducts some robustness checks, and Section VI concludes.

## II. PRIOR LITERATURE AND HYPOTHESIS DEVELOPMENT

This paper is related to two lines of research. The first one considers the information content of accruals and the second one examines the link between accruals and future stock returns.

### **Prior Literature: The Information Content of Accruals**

The accounting literature has long focused on the measurement perspective in studying the information content of accruals by examining the measurement error of cash flows and earnings in capturing a firm's performance. On the one hand, Dechow (1994) and Dechow et al. (1998) argue that accruals mitigate the noise in operating cash flows that arises from exogenous or manipulative variation in firms' working capital levels. Compared to accounting income, operating cash flow is noisy because it incorporates period-to-period variation in working capital assets and liabilities, such as inventory, prepayments, and accounts payable. On the other hand, Sloan (1996) and Richardson et al. (2004) suggest that accruals are more subjective and, therefore, less persistent than cash flows. Sloan (1996) and Bradshaw et al. (2001) show that accruals reverse very quickly. The persistence argument for the accrual anomaly in Sloan (1996) and many follow-up studies is derived from this measurement perspective of accruals.

Building on the measurement perspective, accrual models typically capture short-term accrual reversal in estimating "normal" accruals. For example, Dechow and Dichev (2002) measure accruals as a function of past, current, and future cash flows. In earnings management studies, the popular Jones (1991) model measures accruals as a function of revenue changes and gross property, plant, and equipment on the premise that working capital accounts, such as accounts receivable, are proportionate to revenues and that depreciation expense is directly calculated from gross property, plant, and equipment.

Surprisingly, little is known in the literature about the investment perspective of accruals despite the fact that, by definition, accruals measure investment in working capital. The investment perspective of accruals is related to their long-term smoothing role in earnings over firms' business and life cycles, a property that is distinguished from accruals' short-term role of mitigating cash flow noise. Take a firm's life cycle as an example. The sum of accruals (changes in working capital) is zero over a firm's life. Accrual accounting smoothes earnings by recognizing higher earnings than cash flows at the growth stage and lower earnings than cash flows at the maturity stage (e.g., Stickney et al. 2003). Like employee growth, changes in working capital are closely related to the firm's business

stage.<sup>4</sup> During expansions, firms increase their production capacity and build up inventory, which often leads to positive accruals. In contractions, firms often dispose of inventory at a discount, write off accounts receivable, and stretch out payments on payables, which often leads to negative accruals. The long-term smoothing role of accruals is critical in accrual accounting. If the short-term smoothing role is the only objective of the accounting system, it could be easily achieved by measuring earnings as a moving average of operating cash flows. In this way, changes in working capital still exist, but they are not called accruals, nor do they pose any persistence or measurement problem.

### Prior Literature: The Accrual Anomaly

The second line of research examines the link between accruals and future stock returns. In an influential paper, Sloan (1996) shows that accruals are negatively related to future stock returns, a relationship well-known as the accrual anomaly. He suggests that investors tend to overestimate the persistence of accruals when forming earnings expectations only to be systematically surprised when realized earnings are less than expected for high-accrual firms.

While the literature largely follows the persistence argument for the accrual anomaly, the evidence in Desai et al. (2004) and Fairfield et al. (2003) suggests that the accrual anomaly might be related to growth. Desai et al. (2004) study whether the accrual anomaly is related to the value-glamour anomaly in the finance literature and find that cash flow from operations scaled by stock price captures both anomalies. Fairfield et al. (2003) interpret accruals as growth in short-term net operating assets and find a similar stock anomaly for long-term net operating assets. They argue that growth in net operating assets increases the denominator of the profitability measure (return on assets), but investors do not understand the implication of growth in net operating assets for future profitability.<sup>5</sup> Richardson et al. (2004, 2005) dispute Fairfield et al.'s (2003) conjecture and argue that both traditional accruals and growth in long-term net operating assets are measured with a high degree of subjectivity (lower persistence) and, therefore, are negatively related to future stock returns. Therefore, they reinterpret Fairfield et al.'s (2003) results as being consistent with Sloan's (1996) persistence argument and argue that the accrual anomaly is more likely to be rooted in accrual persistence induced by transitory estimation errors or accounting distortion.<sup>6</sup>

<sup>4</sup> For example, changes in manufacturing and trade inventory are a leading indicator of business cycle stage, as industrial production is pro-cyclical. See the websites of The National Bureau of Economic Research (NBER, <http://www.nber.org/cycles.html>) and The Conference Board for indicators of the business cycle (<http://www.tcb-indicators.org/>).

<sup>5</sup> The profitability measure in Fairfield et al. (2003) is equivalent to the earnings measure in Sloan (1996) because both measures are earnings scaled by assets.

<sup>6</sup> The prior literature widely uses the Mishkin test to examine the accrual anomaly. I caution against using this test to identify the underlying cause of the accrual anomaly. The underlying assumption of the Mishkin test, as used in the accrual literature, is that, aside from firm size, only unexpected earnings (residuals from the forecasting equation) are priced by the market (see two equations below):

$$\text{Forecasting: } Earnings_{t+1} = \gamma_0 + \gamma_1 Accruals_t + \gamma_2 CashFlows_t + v_{t+1}; \quad (1)$$

$$\text{Valuation: } SRET_{t+1} = \delta_0 + \delta_1(Earnings_{t+1} - \gamma_0 - \gamma_1 * Accruals_t - \gamma_2 * CashFlows_t) + e_{t+1}; \quad (2)$$

where *SRET* is size-adjusted returns.

(continued on next page)

## Hypothesis Development

From the investment perspective, accruals measure fundamental investment in working capital, which is an integral part of the firm's overall business growth. Therefore, in order to support a firm's growth, investment in working capital should co-vary with other growth-related business activities, such as hiring new employees, issuing new debt and equity, and investing in fixed assets. Furthermore, if a firm's business activities are, on average, optimal, then investment in working capital should also be positively related to the outcomes of the firm's business activities, such as actual sales. From the measurement perspective, if accruals are only meant to mitigate the noise in cash flows and thus reverse very quickly, then accruals are unlikely to capture fundamental growth information. Taken together, a testable implication of accruals' investment perspective is that accruals co-vary with other growth attributes of the firm. This leads to my first hypothesis.

**H1:** Accruals capture fundamental investment information and, therefore, co-vary with firms' other growth attributes.

The investment/growth perspective of accruals has appealing implications for the accrual anomaly because it is well established that investment/growth is negatively related to future stock returns. For example, Fama and French (1995, 1996) suggest that growth firms are less likely to be financially distressed and, therefore, are compensated with lower expected returns. Lakonishok et al. (1994) argue that investors extrapolate past strong growth information too far into the future, and as a result, stock prices tend to reverse for growth firms. Titman et al. (2004) suggest that firms with high capital expenditures tend to be overinvesting and, therefore, earn lower future stock returns than the benchmark.

It seems plausible that multiple factors, such as accrual persistence and investment, play a role in the accrual anomaly, but it is unclear which factor has a dominant effect. Investment and accrual persistence have different implications for cross-sectional variation in the anomaly based on a firm's business model, a fact that allows me to disentangle these two competing views. In particular, the investment argument suggests that accruals predict future stock returns due to the investment/growth information contained in accruals. Cross-sectionally, accruals are more likely to capture fundamental investment information if they co-vary highly with other growth attributes. Alternatively, if increases in working capital are not accompanied by other growth-related activities, then accruals are less likely to capture fundamental investment information and may simply be viewed as subjective estimates of assets and liabilities. A testable implication of this argument is that the magnitude of the accrual anomaly is stronger in industries/firms in which accruals co-vary strongly with other growth attributes.

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Footnote 6, continued

This assumption does not hold if past earnings or earnings components are priced due to risk or mispricing. For example, if accruals contain growth information and, therefore, are negatively related to future stock returns (e.g., the value-growth phenomenon in the finance literature), then the true valuation model takes the following form:

$$\begin{aligned} SRET_{t+1} &= \delta_0 + \delta_1(Earnings_{s,t+1} - \gamma_0 - \gamma_1'Accruals_t - \gamma_2'CashFlows_t) + \delta_2Accruals_t + e_{t+1} \\ &= \delta_0 + \delta_1(Earnings_{s,t+1} - \gamma_0 - \gamma_1^*Accruals_t - \gamma_2^*CashFlows_t) + e_{t+1}. \end{aligned} \quad (3)$$

The accrual coefficient in the true valuation Equation ( $-\gamma_1^*$ ) should be more negative than in the case when accruals were not priced (Equation (2)). Put differently, even if investors estimate accrual persistence precisely,  $\gamma_1^*$  should be larger than  $\gamma_1$ , which is precisely what the prior literature finds.

Similarly, if accrual persistence is industry- or firm-specific, depending on a firm's specific business model, then the persistence argument suggests a stronger accrual anomaly for industries/firms with less persistent accruals. Francis and Smith (2005) find that accruals are reliably less persistent than cash flows for only about 15 percent of the firms in a firm-specific setting. The above discussion leads to the following testable hypotheses:

**H2:**

**The investment hypothesis:** In the cross-sectional setting, the magnitude of the accrual anomaly is positively related to the co-variation between accruals and other growth attributes.

**The persistence hypothesis:** In the cross-sectional setting, the magnitude of the accrual anomaly is negatively related to the persistence of accruals relative to cash flows.

Investment and persistence also have different implications for future earnings. If accruals capture investment and firms' investment is optimal, on average, then the level of future earnings should increase more for high-investment firms, especially in the intermediate and long term when the investment projects are materialized. A cross-sectional implication of the investment argument is that the increase in future earnings should be more pronounced when accruals are more likely to capture fundamental investments. On the other hand, the level of future earnings should decrease if earnings are not persistent due to lower quality, and the decrease should be larger when accruals are less persistent relative to cash flows. This leads to my last hypothesis:

**H3:**

**The investment hypothesis:** Future earnings increase with accruals, and the increase is more pronounced when accruals strongly co-vary with other growth attributes.

**The persistence hypothesis:** Future earnings decrease with accruals, and the decrease is more pronounced when accruals are less persistent relative to cash flows.

### III. SAMPLE DATA AND THE CO-VARIATION BETWEEN ACCRUALS AND OTHER GROWTH ATTRIBUTES

#### Sample Data

The sample data come from two sources. Accruals, cash flows, and other financial data are from the Compustat Annual Industrial, Full Coverage, and Research files. Stock return data are from CRSP monthly return files for NYSE, AMEX, and NASDAQ firms. Starting with all public firms, I exclude utility ( $4900 \leq \text{SIC} \leq 4999$ ) and financial firms ( $6000 \leq \text{SIC} \leq 6999$ ), as these two industries are highly regulated in much of my sample period and the measure of accruals is significantly different from that in other industries. I

further exclude firms with a negative book value of equity. The final sample spans a 40-year period from 1964 to 2003 and includes 118,500 firm-year observations with non-missing accruals and future stock return data.<sup>7</sup>

Earnings represent earnings before extraordinary items. Accruals are measured as changes in noncash working capital minus depreciation expense, where noncash working capital is equal to the change in noncash current assets minus the change in current liabilities less short-term debt and taxes payable.<sup>8</sup> Cash flows are computed as earnings minus total accruals. For ease of comparison across firms, earnings and earnings components are scaled by average total assets. To examine the co-variation between accruals and other growth attributes, I consider the following growth variables: market-to-book, growth in cash sales, growth in total assets, growth in the number of employees, external financing, capital expenditures, and analyst consensus forecast of the long-term earnings growth (see Table 1 for detailed variable definition). External financing and capital expenditures measure corporate growth from financing and investing activities, respectively, as opposed to operating activities for accruals. Growth in the number of employees is particularly appealing because it is a non-accounting-based variable and, therefore, is free of any measurement error inherent in the accounting system.

Table 1, Panel A provides descriptive statistics for variables of interest. To avoid the effect of outliers, I winsorize all variables at 1 percent and 99 percent with the following two exceptions:<sup>9</sup> Analyst forecast of the long-term earnings growth is not winsorized, since this variable is well-defined; capital expenditures are winsorized at 99 percent because they are bounded at zero. As shown in Table 1, accruals tend to be negative, largely because of depreciation expense, with a mean of  $-0.023$  and a median of  $-0.030$ . Market value ranges from \$1.12 million to \$14.35 billion. Cash sales growth has a mean of 21.1 percent and a median of 10.8 percent. The mean (median) firm shows a 12.1 percent (3.8 percent) increase in the number of employees. The median firm raises debt and equity (*XFIN*) equal to 1.4 percent of total assets. Future stock returns, defined as buy-and-hold annual returns beginning from the fifth month after a firm's fiscal year-end, have a mean of 13.6 percent and a median of 3.5 percent.

Panel B of Table 1 shows the correlation matrix, which exhibits two striking patterns. First, future stock returns are negatively related to each growth variable, suggesting that growth is negatively related to future stock returns, regardless of which growth attribute is concerned. Second, accruals and other growth variables are all positively related to each other. For instance, the Spearman correlation coefficients show that accruals have correlations of 0.305 with growth in the number of employees, 0.207 with cash sales growth, and 0.322 with external financing, which are all highly significant at the 0.01 percent level. These results provide preliminary evidence supporting the idea that accruals are simply one aspect of corporate growth.

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<sup>7</sup> Kraft et al. (2004) discuss three research design issues related to accrual studies: the restriction of sample to NYSE and AMEX firms, the requirement of year  $t+1$  financial data, and the effect of outliers. These issues are less of a problem here, as I do not require financial data in year  $t+1$  in testing the accrual anomaly and my sample includes all NYSE, AMEX, and NASDAQ firms. The concern of outliers is mitigated, as I winsorize stock returns at 1 percent and 99 percent in the regression analysis.

<sup>8</sup> I use the accrual measure based on the balance sheet approach in order to be comparable with the prior literature and to ensure consistency with other growth measures, such as growth in the number of employees. As a robustness check, I repeat the main analysis using the accrual measure based on the cash flow statement in the post-1988 period, and the tenor of the paper is unchanged (see Section V).

<sup>9</sup> In subsequent empirical analyses, I winsorize stock returns at 1 percent and 99 percent in the regression analysis to avoid the effect of outliers. In portfolio analysis, I follow the finance literature and use unwinsorized returns.

**TABLE 1**  
**Descriptive Statistics**

**Panel A: Descriptive Statistics**

	<u>n</u>	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Q1</u>	<u>Median</u>	<u>Q3</u>	<u>Max</u>
<i>RET</i>	118500	0.136	0.623	-0.851	-0.252	0.035	0.373	2.885
<i>MV</i>	118500	570.88	1879.96	1.12	14.45	55.13	253.95	14351.9
<i>MB</i>	118500	2.779	3.675	0.255	0.938	1.648	3.019	25.276
<i>ACC</i>	118500	-0.023	0.111	-0.356	-0.079	-0.030	0.027	0.360
<i>CSGR</i>	109516	0.211	0.557	-0.718	-0.005	0.108	0.259	3.834
<i>TAGR</i>	118496	0.288	0.804	-0.461	-0.008	0.096	0.262	5.711
<i>EMPGR</i>	109525	0.121	0.390	-0.564	-0.045	0.038	0.174	2.382
<i>XFIN</i>	117577	0.118	0.328	-0.300	-0.036	0.014	0.131	1.788
<i>CAPEXP</i>	116750	0.441	0.655	-1.019	0.139	0.245	0.455	4.591
<i>ANAGR</i>	47068	19.92	12.85	-99.8	12	16.5	25	327

**Panel B: Correlation Matrix (Pearson correlations are shown above the diagonal and Spearman correlations are shown below)**

	<i>RET</i>	<i>MV</i>	<i>MB</i>	<i>ACC</i>	<i>CSGR</i>	<i>TAGR</i>	<i>EMPGR</i>	<i>XFIN</i>	<i>CAPEXP</i>	<i>ANAGR</i>
<i>RET</i>	1	-0.019	-0.113	-0.047	-0.060	-0.096	-0.072	-0.122	-0.074	-0.047
<i>MV</i>	0.001*	1	0.145	-0.052	-0.006*	0.005*	-0.002*	-0.046	-0.030	-0.112
<i>MB</i>	-0.174	0.406	1	0.007	0.185	0.200	0.178	0.324	0.217	0.317
<i>ACC</i>	-0.044	-0.016	0.076	1	0.118	0.225	0.260	0.211	0.166	0.104
<i>CSGR</i>	-0.049	0.116	0.250	0.207	1	0.401	0.419	0.361	0.336	0.387
<i>TAGR</i>	-0.084	0.186	0.314	0.388	0.489	1	0.533	0.807	0.534	0.402
<i>EMPGR</i>	-0.074	0.141	0.304	0.305	0.494	0.583	1	0.456	0.427	0.320
<i>XFIN</i>	-0.171	0.004*	0.267	0.322	0.297	0.649	0.401	1	0.497	0.481
<i>CAPEXP</i>	-0.090	0.107	0.312	0.207	0.370	0.510	0.428	0.436	1	0.430
<i>ANAGR</i>	-0.118	-0.193	0.393	0.176	0.421	0.386	0.398	0.436	0.493	1

\* Insignificant at the 5 percent level. All others are significant at the 0.01 percent.

The sample includes all U.S. firms except for utilities (4900 ≤ SIC ≤ 4999) and financial firms (6000 ≤ SIC ≤ 6999) and firms with negative book value of equity. There are 118,500 firm-year observations with non-missing accruals and future return data from 1964 to 2003. All variables are winsorized at 1 percent and 99 percent with two exceptions: *ANAGR* is unwinsorized and *CAPEXP* is winsorized at 99 percent.

Variable Definitions:

*RET* = raw buy-and-hold annual returns beginning from the fifth month after a firm's fiscal year-end;

*MV* = market value at fiscal year-end (data199\*data25);

*MB* = market-to-book ratio measured as market value divided by the book value of equity (data60);

*ACC* = total accruals measured as  $(\Delta CA - \Delta Cash) - (\Delta CL - \Delta STD - \Delta TP) - DEPEXP$  scaled by average total assets, where  $\Delta CA$  = change in current assets (data4),  $\Delta Cash$  = change in cash and cash equivalents (data1),  $\Delta CL$  = change in current liabilities (data5),  $\Delta STD$  = change in short-term debt (data34), and  $\Delta TP$  = change in tax payable (data71), and *DEPEXP* = depreciation and amortization expense (data14);

*CSGR* = cash sales growth measured as  $[(S_t - \Delta AR_t) - (S_{t-1} - \Delta AR_{t-1})] / (S_{t-1} - \Delta AR_{t-1})$ , where *S* is net sales (data12) and  $\Delta AR$  = change in accounts receivable (data2);

*TAGR* = growth in total assets measured as  $(TA_t - TA_{t-1}) / TA_{t-1}$ , where *TA* is total assets (data6);

*EMPGR* = growth in the number of employees measured as  $(EMP_t - EMP_{t-1}) / EMP_{t-1}$ , where *EMP* is the number of employees (data29);

*XFIN* = external financing measured as changes in equity and debt minus net income,  $\Delta data60$  (common equity) +  $\Delta data130$  (prefer stock) +  $\Delta data9$  (long-term debt) +  $\Delta data34$  (short-term debt) -  $data172$  (net income), scaled by average total assets;

*CAPEXP* = capital expenditures measured as capital expenditures (data128) scaled by net property, plant, and equipment; and

*ANAGR* = consensus analyst forecast of long-term earnings growth.

### The Co-Variation between Accruals and Other Growth Attributes

To examine the investment information contained in accruals (growth reflected in the operating activities), I consider the following four growth attributes in detail: growth in the number of employees (nonaccounting variable), capital expenditures (growth reflected in the investing activities), external financing (growth reflected in the financing activities), and cash sales growth (outcome of a firm's business activities). If accruals capture fundamental investment information, then they should co-vary with these growth variables.

Panel A of Table 2 presents results based on univariate regressions. To control for cross-sectional correlations, all regressions in this panel and thereafter are based on the Fama-MacBeth approach. As expected, accruals co-vary positively with other growth attributes. In each case, the t-statistic of the variable of interest is greater than 8.0. For example, Model (1) shows that accruals are strongly positively related to growth in the number of employees, with a t-statistic of 22.73. Positive co-variation between accruals and other growth attributes supports H1.

**TABLE 2**  
Co-Variation between Accruals and Other Growth Attributes

#### Panel A: Univariate Regressions of Accruals on Growth Variables

	<u>Intercept</u>	<u>EMPGR<sub>t</sub></u>	<u>XFIN<sub>t</sub></u>	<u>CAPEXP<sub>t</sub></u>	<u>CSGR<sub>t</sub></u>	<u>Adj. R<sup>2</sup></u>
Model 1	-0.029 (-10.15)	0.081 (22.73)				0.082
Model 2	-0.029 (-11.01)		0.175 (8.72)			0.126
Model 3	-0.034 (-12.78)			0.039 (13.09)		0.042
Model 4	-0.028 (-9.70)				0.033 (9.37)	0.027

#### Panel B: Regressions of Accruals on Lead, Current, and Lag Growth (X) Variables

	<u>Intercept</u>	<u>X<sub>t-1</sub></u>	<u>X<sub>t</sub></u>	<u>X<sub>t+1</sub></u>	<u>Adj. R<sup>2</sup></u>
Model 1 (X = EMPGR)	-0.034 (-12.43)	0.028 (9.50)	0.082 (22.89)	0.007 (3.06)	0.095
Model 2 (X = XFIN)	-0.029 (-11.16)	-0.024 (-4.68)	0.207 (10.19)	-0.013 (-3.10)	0.132
Model 3 (X = CAPEXP)	-0.043 (-16.22)	0.008 (4.75)	0.037 (12.04)	0.016 (9.67)	0.046
Model 4 (X = CSGR)	-0.039 (-14.65)	0.017 (7.87)	0.029 (9.03)	0.047 (15.06)	0.066

The dependent variable is accruals scaled by average total assets (*ACC*). *EMPGR* is growth in the number of employees. *XFIN* is external financing measured as changes in equity and debt minus net income scaled by average total assets. *CAPEXP* is capital expenditures scaled by average total assets. *CSGR* is cash sales growth. See Table 1 for detailed definition.

The sample period is from 1964 to 2003.

t-statistics in parentheses are Fama-MacBeth t-statistics.

All variables are winsorized at 1 percent and 99 percent except that *CAPEXP* is winsorized at 99 percent.

The univariate regressions of accruals on other contemporaneous growth variables in Panel A of Table 2 provide an incomplete picture of how these growth attributes are related to each other because they do not take into account the lead-lag relation among these variables. For instance, a manufacturing firm needs to produce products before it can sell them. It is also very common for a retailer to build up inventory if it anticipates higher demand in the future. Therefore, it seems reasonable that sales growth lags growth in working capital (accruals). To address the lead-lag relation, I regress accruals on lead, current, and lag growth variables. In particular, I consider the following four models:

$$ACC_t = \alpha_0 + \alpha_1 EMPGR_{t-1} + \alpha_2 EMPGR_t + \alpha_3 EMPGR_{t+1} + \varepsilon_t; \quad (4)$$

$$ACC_t = \beta_0 + \beta_1 XFIN_{t-1} + \beta_2 XFIN_t + \beta_3 XFIN_{t+1} + \varepsilon_t; \quad (5)$$

$$ACC_t = \gamma_0 + \gamma_1 CAPEXP_{t-1} + \gamma_2 CAPEXP_t + \gamma_3 CAPEXP_{t+1} + \varepsilon_t; \quad (6)$$

$$ACC_t = \theta_0 + \theta_1 CSGR_{t-1} + \theta_2 CSGR_t + \theta_3 CSGR_{t+1} + \varepsilon_t; \quad (7)$$

where:

$ACC$  = the dependent variable is accruals;  
 $EMPGR$  = growth in the number of employees;  
 $XFIN$  = external financing;  
 $CAPEXP$  = capital expenditures; and  
 $CSGR$  = cash sales growth.

Panel B of Table 2 reports the regression results. Model (1) shows that accruals are not only strongly positively related to current employee growth (coeff = 0.082,  $t = 22.89$ ), but are also significantly related to both lead (coeff = 0.028,  $t = 9.50$ ) and lag employee growth (coeff = 0.007,  $t = 3.06$ ).<sup>10</sup> Model (2) suggests that accruals are positively related to the current external financing variable and negatively related to both lead and lag variables, but clearly current external financing dominates (coeff = 0.207,  $t = 10.19$ ).<sup>11</sup> Model (3) shows that accruals are positively related to three capital expenditure variables, confirming the idea that investment in working capital and investment in fixed assets often go hand-in-hand. Model (4) suggests a significantly positive coefficient of current sales growth ( $t = 9.03$ ). After controlling for current sales growth, both lead and lag cash sales growth have strong positive coefficients, with  $t$ -statistics of 7.87 to 15.06, respectively, suggesting

<sup>10</sup> Accruals could be mechanically related to the number of employees if salary payable increases with the number of employees. But this mechanical relation suggests a negative correlation between accruals and employee growth, as opposed to a positive relation that I predict in the paper.

<sup>11</sup> The negative coefficients on both lead and lag variables are somewhat surprising. Unreported analysis suggests that this might be due to the multicollinearity among three external financing variables. The lead, current, and lag external financing variables are highly positively correlated with each other, and the correlations are higher than those of employee growth, capital expenditures, or cash sales growth. In univariate regressions in which the lead, current, and lag external financing variables act as the independent variable separately, the coefficient of the external financing variable is highly positive in each case.

that accruals contain much more growth information than that captured by current sales growth. Among the three cash sales growth variables, lag cash sales growth has the largest coefficient. Given that growth in the number of employees is not an outcome of the financial reporting system and, thus, is relatively free of measurement errors associated with persistence or earnings quality, I focus on this variable to test the investment hypothesis of the accrual anomaly.<sup>12</sup>

#### IV. EMPIRICAL EVIDENCE

This section tests the investment and persistence hypotheses for the accrual anomaly based on their different implications for the cross-sectional variation of the anomaly. I first estimate industry-specific measures of the co-variation between accruals and growth in the number of employees (*COVAR*) and the relative persistence of accruals to cash flows (*PERS*).<sup>13</sup> Then I examine cross-sectional variation in the accrual anomaly based on *COVAR* and *PERS* using the regression and the portfolio approaches. Finally I examine the earnings evidence.

##### The Industry-Specific *COVAR* and *PERS* Measures

The investment information contained in accruals varies across industries depending on a firm's production function. *Ex ante*, I expect accruals to co-vary strongly with other growth attributes in some industries, such as manufacturing and retail. In these industries, a firm's inventory and accounts receivable are very sensitive to the business cycle and are good indicators of the firm's growth stage. In other industries, accruals may not be a good indicator of investment or growth. For example, for mining or agriculture companies, inventories are more likely to develop as a result of luck than an indicator of a firm's business stage. Similarly, growth in consulting and service companies is unlikely to be reflected in changes in working capital.

I use the co-variation between accruals and growth in the number of employees to quantify the investment information contained in accruals. Specifically, for each industry in year  $t$ , I run Equation (4) based on observations in the most recent two years (years  $t-2$  and  $t-1$ ). I skip year  $t$  because  $EMPGR_{t+1}$  is not available when examining the accrual anomaly in year  $t$ , and use two years' data to ensure a sufficient number of observations in each industry.<sup>14</sup> *COVAR* is  $\alpha_1 + \alpha_2 + \alpha_3$  from Equation (4). A higher value of *COVAR* suggests that accruals co-vary strongly with other growth attributes.

Table 3, Panel A provides descriptive statistics of the parameter estimates of Equation (4). The mean coefficients of lead, current, and lag *EMPGR* are all positive, suggesting that the positive relation between accruals and *EMPGR* documented in Table 2, Panel B also applies to the industry-specific regressions (the magnitude of coefficients is similar too).

<sup>12</sup> I acknowledge that the number of employees is a proxy that contains measurement errors as well, since I do not distinguish between high- and low-skill workers, between executives and blue-collar workers, etc. Industry- and time-specific measurement errors are mitigated, as I use industry-year measures of the co-variation between accruals and growth in the number of employees.

<sup>13</sup> An alternative approach is to test firm-specific *COVAR* and *PERS* measures. In unreported analysis, I estimate firm-specific *COVAR* and *PERS* using time-series regression based on the data from the most recent 15 years (with a minimum of ten years). The findings are qualitatively similar, although the results are albeit weaker. The main problem of using firm-specific *COVAR* and *PERS* is that time-series regressions require ten years' data and thus introduce a serious survivorship bias (young firms are excluded from the sample). To the extent that younger firms are more likely to be growth firms, this time-series approach excludes many growth firms from the sample and thus reduces variation in accruals.

<sup>14</sup> Results are robust when I use three years' or one year's data to estimate *COVAR* and *PERS*.

**TABLE 3**  
**Descriptive Statistics of the Growth and Persistence Models**

	<u>Mean</u>	<u>Std. Dev.</u>	<u>Min</u>	<u>Q1</u>	<u>Median</u>	<u>Q3</u>	<u>Max</u>
<b>Panel A: The Growth Model:</b> $ACC_t = \alpha_0 + \alpha_1 EMPGR_{t-1} + \alpha_2 EMPGR_t + \alpha_3 EMPGR_{t+1} + e_t$							
$\alpha_0$	-0.039	0.031	-0.186	-0.058	-0.038	-0.019	0.118
$\alpha_1$	0.035	0.092	-0.839	-0.002	0.028	0.069	0.532
$\alpha_2$	0.092	0.109	-0.574	0.025	0.085	0.151	0.894
$\alpha_3$	0.011	0.096	-0.835	-0.025	0.009	0.046	0.954
Adj. R <sup>2</sup>	0.151	0.186	-0.423	0.023	0.130	0.245	0.912
<i>COVAR</i> ( $\alpha_1 + \alpha_2 + \alpha_3$ )	0.138	0.171	-1.152	0.046	0.129	0.219	1.194
<b>Panel B: The Persistence Model:</b> $E_t = \beta_0 + \beta_1 ACC_{t-1} + \beta_2 CF_{t-1} + e_t$							
$\beta_0$	0.001	0.026	-0.178	-0.010	0.004	0.017	0.128
$\beta_1$	0.620	0.306	-1.084	0.461	0.625	0.787	2.587
$\beta_2$	0.705	0.257	-0.419	0.565	0.720	0.850	2.179
Adj. R <sup>2</sup>	0.477	0.225	-0.156	0.336	0.481	0.641	0.995
<i>PERS</i> ( $\beta_1 - \beta_2$ )	-0.086	0.213	-1.554	-0.168	-0.079	0.008	1.356

Each year, I calculate the co-variation between accruals and growth (*COVAR*) and the accrual persistence relative to cash flows (*PERS*) for each two-digit SIC industry based on the most recent two years' data (a minimum of ten observations). Specifically, I run the following two regressions:

$$ACC_t = \alpha_0 + \alpha_1 EMPGR_{t-1} + \alpha_2 EMPGR_t + \alpha_3 EMPGR_{t+1} + e_t$$

$$E_t = \beta_0 + \beta_1 ACC_{t-1} + \beta_2 CF_{t-1} + e_t$$

where *ACC* = accruals; *EMPGR* = growth in the number of employees; *E* = income before extraordinary items scaled by average total assets; and *CF* = cash flows measured as earnings minus accruals. See Table 1 for detailed definition.

*COVAR* is  $\alpha_1 + \alpha_2 + \alpha_3$  from the first regression based on all available observations from years  $t-2$  to  $t-1$ , and *PERS* is  $\beta_1 - \beta_2$  from the second regression based on all available observations from years  $t-1$  to  $t$ . Panels A and B reports descriptive evidence on parameter estimates for the above two regressions, respectively. The sample period is from 1964 to 2003. All variables are winsorized at 1 percent and 99 percent.

The *COVAR* measure ranges from -1.152 to 1.194, suggesting substantial cross-sectional variation in the information content of accruals.<sup>15</sup>

Detailed analysis (untabulated) shows that, as expected, *COVAR* varies across industries depending on the firm's production function. In general, retailers, wholesalers, and manufacturers are more likely to fall into the top *COVAR* quartile. The top five industries (two-digit SIC code in parentheses) are Tobacco Products (21), Leather and Leather Products (31), Apparel and Other Finished Products (23), Home Furniture and Equipment Store (57),

<sup>15</sup> The information content of accruals depends on the firm's business models and, therefore, the *COVAR* measure should be persistent over time. In untabulated analysis, I regress *COVAR*<sub>*t*</sub> on its lagged values using the following model:

$$COVAR_t = \alpha_0 + \alpha_1 COVAR_{t-1} + \alpha_2 COVAR_{t-2} + \alpha_3 COVAR_{t-3} + \alpha_4 COVAR_{t-4} + e_t$$

Consistent with my prediction, the coefficient estimate on *COVAR*<sub>*t-1*</sub> is positive and highly significant ( $\alpha_1 = 0.539$ ,  $t = 14.21$ ). The coefficient estimate remains highly significant when I consider the second ( $\alpha_1 = 0.273$ ,  $t = 8.23$ ), third ( $\alpha_1 = 0.246$ ,  $t = 7.25$ ) or fourth lag of *COVAR* ( $\alpha_1 = 0.215$ ,  $t = 6.20$ ) in the model.

and Building Materials, Hardware, and Garden—Retailer (52). On the other extreme, service, mining, and agriculture production industries tend to fall into the bottom *COVAR* quartile. The bottom five industries are Miscellaneous Repair Services (76), Amusements and Recreation (79), Social Services (83), Metal Mining (10), and Educational Services (82). Taken as a whole, the mean *COVAR* is 0.20 and 0.14 for manufacturing and retail/wholesale industries, respectively, as opposed to 0.09 and 0.06 for service and agriculture/mining industries, respectively, suggesting some fundamental difference in the information content of accruals across industries. The variations in accruals and growth in the number of employees are comparable for most industries in the sense that both variables have similar standard deviations, negative values in the 25th percentile, and positive values in the 75th percentile.

To estimate industry-specific accrual persistence relative to cash flows, I follow Sloan (1996) and run the following regression for each two-digit SIC industry based on the data from two most recent years (years  $t-1$  and  $t$ ):

$$E_t = \beta_0 + \beta_1 ACC_{t-1} + \beta_2 CF_{t-1} + e_t \quad (8)$$

Following the accrual literature,  $\beta_1$  and  $\beta_2$  measure the persistence of accruals and cash flows, respectively. Therefore,  $\beta_1 - \beta_2$  measures the relative persistence of accruals to cash flows (*PERS*). A negative value of *PERS* implies that accruals are less persistent than cash flows, and a positive value of *PERS* suggests that accruals are more persistent than cash flows.

Table 3, Panel B provides descriptive statistics of the parameters of Equation (8) and the *PERS* measure. Consistent with the prior literature, accruals are less persistent than cash flows, on average, with a mean *PERS* of  $-0.086$  and a median of  $-0.079$ . However, there is considerable variation in the *PERS* measure, which ranges from  $-1.554$  to  $1.356$ . Since this paper examines cross-sectional variation in the accrual anomaly based on *COVAR* or *PERS*, it is interesting to see whether *COVAR* and *PERS* are correlated. Untabulated results show that the Pearson correlation between *COVAR* and *PERS* is  $0.010$ , with a  $p$ -value of  $0.674$ , suggesting that these two measures are largely orthogonal.

### Cross-Sectional Variation in the Accrual Anomaly—The Regression Approach

The investment hypothesis suggests that the predictive power of accruals for future stock returns is positively related to the degree to which accruals capture fundamental investment information. As a result, the magnitude of the accrual anomaly should be positively related to *COVAR*. To test this hypothesis, I estimate the following regression:

$$RET_{t+1} = \alpha_0 + \alpha_1 ACC_t + \alpha_2 COVAR_t + \alpha_3 COVAR*ACC_t + \varepsilon_t \quad (9)$$

where *RET* is annual returns. The coefficient of *ACC* is expected to be significantly negative, if the accrual anomaly exists in my sample. The main variable of interest is *COVAR\*ACC*. The investment hypothesis predicts a negative coefficient on this interaction term, suggesting that the accrual anomaly is stronger for high-*COVAR* firms.

Similarly, the persistence hypothesis suggests that the accrual anomaly should be stronger when accruals are less persistent. Therefore, it predicts a positive coefficient on the interaction term (*PERS\*ACC*) in the following model:

$$RET_{t+1} = \alpha_0 + \alpha_1 ACC_t + \alpha_2 PERS_t + \alpha_3 PERS*ACC_t + \epsilon_t. \tag{10}$$

Table 4 reports evidence on the investment and persistence hypotheses. Model (1) replicates the accrual anomaly. Consistent with the prior literature, I find a significant negative coefficient on accruals, suggesting that high-accrual firms earn lower future stock returns. Model (2) tests the investment hypothesis. I find that the coefficient of *COVAR\*ACC* is negative and highly significant (coeff = -0.204, t = -2.49), an outcome supporting the investment hypothesis and suggesting that the accrual anomaly is stronger when accruals co-vary with other growth attributes. In contrast to the prediction of the persistence hypothesis, I find a negative but insignificant coefficient of *PERS\*ACC* in Model (3). A negative coefficient suggests that the accrual anomaly is stronger when accruals are more persistent than cash flows, a result that goes against the persistence argument. In Model (4), I include *COVAR* and *PERS* as well as their interactions with accruals. The coefficient of *COVAR\*ACC* remains highly negative while that of *PERS\*ACC* is still insignificant.

**TABLE 4**  
**Cross-Sectional Variation in the Accrual Anomaly—The Regression Approach**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
Intercept	0.138 (4.08)	0.122 (3.59)	0.145 (3.85)	0.135 (3.55)
<i>ACC</i>	-0.293 (-6.38)	-0.204 (-3.42)	-0.265 (-3.33)	-0.160 (-1.70)
<i>COVAR</i>		0.014 (0.96)		0.016 (1.03)
<i>COVAR*ACC</i>		-0.204 (-2.49)		-0.207 (-2.88)
<i>PERS</i>			-0.025 (-1.19)	-0.027 (-1.20)
<i>PERS*ACC</i>			-0.071 (-0.63)	-0.086 (-0.75)
Adj. R <sup>2</sup>	0.006	0.009	0.011	0.013

The dependent variable is annual stock returns beginning from the fifth month after a firm’s fiscal year-end. Each year, I calculate the co-variation between accruals and growth (*COVAR*) and the accrual persistence relative to cash flows (*PERS*) for each two-digit SIC industry based on the most recent two years’ data (a minimum of ten observations) using the following two models:

$$ACC_t = \alpha_0 + \alpha_1 EMPGR_{t-1} + \alpha_2 EMPGR_t + \alpha_3 EMPGR_{t+1} + e_t$$

$$E_t = \beta_0 + \beta_1 ACC_{t-1} + \beta_2 CF_{t-1} + e_t$$

where *ACC* = accruals; *EMPGR* = growth in the number of employees; *E* = income before extraordinary items scaled by average total assets; and *CF* = cash flows measured as earnings minus accruals. See Table 1 for detailed definition.

*COVAR* is  $\alpha_1 + \alpha_2 + \alpha_3$  from the first regression, and *PERS* is  $\beta_1 - \beta_2$  from the second regression. Both *COVAR* and *PERS* are transformed into percentile rankings and converted to a [0,1] scale, where rankings are obtained by annually ranking observations and assigning them in equal numbers to 100 portfolios. All other variables are winsorized at 1 percent and 99 percent.

The sample period is from 1964 to 2003.

t-statistics in parentheses are Fama-MacBeth t-statistics.

Overall, I find that *COVAR* explains cross-sectional variation in the accrual anomaly, supporting the investment hypothesis. On the other hand, the *PERS* results are inconsistent with the persistence hypothesis.

### Cross-Sectional Variation in the Accrual Anomaly—The Portfolio Approach

Compared to the regression approach, the portfolio approach offers a number of advantages. First, it allows for nonlinearity in variables of interest and, therefore, offers a clearer picture of the relationship between returns and variables of interest. Second, it mitigates the effect of outliers by averaging stock returns, as oppose to minimizing squared errors in the regression analysis. Finally, this approach facilitates gauging the economic significance.

To test the effect of *COVAR* on the accrual anomaly, I sort firms into four equal-size *COVAR* groups each year. For each *COVAR* group, I rank stocks into five *ACC* quintiles. The returns of the Q1–Q5 hedge portfolio, which has a long position in the bottom *ACC* quintile stocks and a short position in the top *ACC* quintile stocks, measure the magnitude of the accrual anomaly in each *COVAR* group. The investment hypothesis predicts a stronger accrual anomaly in the high-*COVAR* group.

Table 5, Panel A replicates the accrual anomaly. Accruals are negatively related to future stock returns. The raw and size-adjusted returns for the Q1–Q5 hedge portfolio are 9.76 percent and 8.28 percent, with t-statistics of 6.09 and 5.48, respectively. Panel B reports raw and size-adjusted returns as well as accruals for five *ACC* quintiles and the Q1–Q5 hedge portfolio across four *COVAR* groups. Consistent with the investment hypothesis, I find that the magnitude of the accrual anomaly monotonically increases with *COVAR*. When accruals co-vary strongly with employee growth in the top *COVAR* group, they have strong predictive power for future stock returns. The Q1–Q5 hedge portfolio achieves raw and size-adjusted returns of 13.68 percent ( $t = 7.80$ ) and 11.78 percent ( $t = 7.19$ ), respectively. When accruals show little correlation with growth in the number of employees in the bottom *COVAR* group, the accrual anomaly is rather weak. The raw and size-adjusted returns of the Q1–Q5 hedge portfolio are 7.06 percent ( $t = 2.77$ ) and 6.03 percent ( $t = 2.69$ ), respectively. The difference in the magnitude of the accrual anomaly, as measured by the return to the Q1–Q5 hedge portfolio, between the top and the bottom *COVAR* groups is significantly positive ( $\Delta RET_{t+1} = 6.62$  percent,  $t = 2.58$ ;  $\Delta SRET_{t+1} = 5.75$ , percent  $t = 2.37$ ). While the magnitude of the accrual anomaly increases monotonically from the bottom to the top *COVAR* group, the level of accruals is similar across four *COVAR* groups. The accrual difference between *ACC1* and *ACC5* is more than  $-25$  percent of total assets in each *COVAR* group, suggesting that the return difference across four *COVAR* groups is unlikely to be explained by the magnitude of accruals.<sup>16</sup> This evidence provides strong support to the investment hypothesis that the accrual anomaly is attributable to the fundamental investment information contained in accruals.

To test the persistence hypothesis, I partition the sample into three groups based on the persistence of accruals and cash flows. The first *PERS* group consists of observations for which accruals are significantly less persistent than cash flows. In the second *PERS* group,

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<sup>16</sup> As I scale accruals by average total assets, one concern about the magnitude of accruals is that the level of assets differs across four *COVAR* groups. For example, service firms (e.g., consulting firms) are likely to have low balance sheet assets. To address this issue, I also compare accruals scaled by sales across *COVAR* groups. Unreported results show that, for the low accrual quintile (Q1), accruals increase from the bottom to the top *COVAR* groups, and for the high accrual quintile (Q5), accruals are similar across four *COVAR* groups. As a result, the accrual differential between Q1 and Q5 tends to be more negative for the bottom *COVAR* group, which again cannot explain the return difference across *COVAR* groups.

**TABLE 5**  
**Cross-Sectional Variation in the Accrual Anomaly—The Portfolio Approach**

	Accrual Quintiles					Q1–Q5
	Q1	Q2	Q3	Q4	Q5	
<b>Panel A: The Accrual Anomaly for the Whole Sample</b>						
$RET_{t+1}$	19.79%	17.77%	16.81%	14.79%	10.03%	9.76% (6.09)
$SRET_{t+1}$	2.39%	2.35%	1.78%	-0.42%	-5.89%	8.28% (5.48)
$ACC_t$	-15.21%	-6.35%	-2.59%	1.62%	13.00%	-28.21% (-41.45)
<b>Panel B: The Accrual Anomaly across Four COVAR Quartiles</b>						
The accrual anomaly in the bottom COVAR group:						
$RET_{t+1}$	16.89%	15.91%	15.03%	14.20%	9.83%	7.06% (2.77)
$SRET_{t+1}$	0.16%	0.47%	0.43%	-0.69%	-5.87%	6.03% (2.69)
$ACC_t$	-16.51%	-7.92%	-4.47%	-0.90%	9.03%	-25.54% (-40.21)
The accrual anomaly in the second COVAR group:						
$RET_{t+1}$	19.70%	18.68%	17.83%	13.50%	10.45%	9.25% (4.10)
$SRET_{t+1}$	3.08%	3.91%	3.37%	-0.72%	-4.93%	8.01% (3.61)
$ACC_t$	-15.61%	-6.42%	-2.60%	1.49%	12.56%	-28.16% (-38.19)
The accrual anomaly in the third COVAR group:						
$RET_{t+1}$	19.81%	16.27%	16.89%	14.24%	9.34%	10.47% (3.89)
$SRET_{t+1}$	2.82%	1.13%	2.30%	-0.13%	-6.00%	8.82% (3.44)
$ACC_t$	-14.43%	-5.52%	-1.55%	2.93%	14.67%	-29.10% (-39.87)
The accrual anomaly in the top COVAR group:						
$RET_{t+1}$	20.51%	17.50%	15.51%	12.64%	6.84%	13.68% (7.80)
$SRET_{t+1}$	3.08%	2.64%	0.61%	-2.55%	-8.69%	11.78% (7.19)
$ACC_t$	-14.45%	-5.43%	-1.53%	3.13%	15.03%	-29.48% (-39.48)

The difference in the magnitude of the accrual anomaly between the top and the bottom COVAR groups:  $\Delta RET_{t+1} = 6.62\%$  ( $t = 2.58$ ),  $\Delta SRET_{t+1} = 5.75\%$  ( $t = 2.37$ ).

(continued on next page)

TABLE 5 (continued)

	Accrual Quintiles					Q1-Q5
	Q1	Q2	Q3	Q4	Q5	
<b>Panel C: The Accrual Anomaly across Three PERS Groups</b>						
Accruals are significantly less persistent than cash flows ( $\beta_1 < \beta_2$ ):						
$RET_{t+1}$	19.78%	19.35%	15.35%	14.91%	10.83%	8.95% (3.57)
$SRET_{t+1}$	3.53%	4.85%	0.94%	0.06%	-4.54%	8.07% (3.57)
$ACC_t$	-15.14%	-6.06%	-2.23%	2.05%	13.20%	-28.34% (-35.23)
No significant difference between accrual and cash flow persistence ( $\beta_1 = \beta_2$ ):						
$RET_{t+1}$	17.95%	16.60%	15.85%	13.51%	8.00%	9.95% (4.98)
$SRET_{t+1}$	0.84%	1.36%	0.90%	-1.39%	-7.59%	8.44% (4.65)
$ACC_t$	-15.23%	-6.63%	-2.98%	1.15%	12.66%	-27.89% (-44.70)
Accruals are significantly more persistent than cash flows ( $\beta_1 > \beta_2$ ):						
$RET_{t+1}$	20.37%	21.85%	22.54%	15.28%	12.92%	7.45% (1.67)
$SRET_{t+1}$	1.61%	5.46%	6.86%	-1.16%	-4.00%	5.61% (1.31)
$ACC_t$	-16.28%	-7.25%	-3.42%	0.87%	10.67%	-26.95% (-15.23)

The difference in the magnitude of the accrual anomaly between the first and the third PERS groups:  $\Delta RET_{t+1} = 1.50\%$  ( $t = 0.37$ ),  $\Delta SRET_{t+1} = 2.46\%$  ( $t = 0.53$ )

Each year, I calculate the co-variation between accruals and growth ( $COVAR$ ) and the accrual persistence relative to cash flows ( $PERS$ ) for each two-digit SIC industry based on the most recent two years' data (a minimum of ten observations) using the following two models:

$$ACC_t = \alpha_0 + \alpha_1 EMPGR_{t-1} + \alpha_2 EMPGR_t + \alpha_3 EMPGR_{t+1} + e_t$$

$$E_t = \beta_0 + \beta_1 ACC_{t-1} + \beta_2 CF_{t-1} + e_t$$

where  $ACC$  = accruals;  $EMPGR$  = growth in the number of employees;  $E$  = income before extraordinary items scaled by average total assets; and  $CF$  = cash flows measured as earnings minus accruals. See Table 1 for detailed definition.

$COVAR$  is  $\alpha_1 + \alpha_2 + \alpha_3$  from the first regression, and  $PERS$  is  $\beta_1 - \beta_2$  from the second regression.

Panel A examines the accrual anomaly in the whole sample by sorting stocks into five accrual quintiles.

In Panel B, I sort firms into four equal-size  $COVAR$  groups.

In Panel C, I sort firms into three  $PERS$  groups based on whether accruals are significantly less persistent than, as persistent as, or significantly more persistent than cash flows. For each resulting group, I examine the accrual anomaly by sorting stocks into five accrual quintiles.  $RET$  ( $SRET$ ) is equal-weighted raw (size-adjusted) annual return beginning from the fifth month after a firm's fiscal year-end.

The sample period is from 1964 to 2003.

t-statistics in parentheses are Fama-MacBeth t-statistics.

the difference in the accrual and cash flow persistence is insignificant. Finally, the third  $PERS$  group consists of observations in which accruals are significantly more persistent

than cash flows. There are 56,517, 57,293, and 3,088 observations in the first, second, and third *PERS* groups, respectively.<sup>17</sup> If I can measure accruals and cash flow persistence precisely, then the persistence hypothesis predicts a strong accrual anomaly in the first *PERS* group, an insignificant accrual anomaly in the second *PERS* group, and an opposite accrual anomaly in the third *PERS* group. At a minimum, the accrual anomaly should be stronger in the first *PERS* group than in the second or the third *PERS* group in order to support the persistence hypothesis.

Table 5, Panel C reports raw and size-adjusted returns as well as accruals for the three *PERS* groups. I find that high-accrual firms have lower future returns in each *PERS* group. Both raw and size-adjusted returns to the Q1–Q5 hedge portfolio are significant in the first and the second *PERS* groups and are marginally significant in the third *PERS* group. In terms of magnitude, the second *PERS* group has a stronger accrual anomaly than the first, although the difference is insignificant. The magnitude of the accrual anomaly in the first *PERS* group is not significantly different from that in the third *PERS* group either ( $\Delta RET_{t+1} = 1.50$  percent,  $t = 0.37$ ,  $\Delta SRET_{t+1} = 2.46$  percent,  $t = 0.53$ ). These results do not support the persistence hypothesis.

As the final portfolio analysis, I sort stocks independently by *COVAR* and *PERS*, with four groups in each dimension. For each resulting portfolio, I measure the magnitude of the accrual anomaly as the return difference between the bottom and top accrual quartiles. To ensure diversification of idiosyncratic risk, I require each accrual quartile to have at least ten stocks.<sup>18</sup> The results are reported in Table 6. Consistent with the investment argument, the magnitude of the accrual anomaly increases when I move from low- to high-*COVAR* quartiles. When *COVAR* is in the bottom quartile, none of the four *PERS* portfolios has a significant accrual anomaly. When *COVAR* is in the top quartile, the accrual anomaly is significant in each *PERS* portfolio. On the other hand, I do not observe a decreasing pattern of the magnitude of the accrual anomaly from low- to high-*PERS* portfolios. In fact, the magnitude increases from low- to high-*PERS* portfolios except for the top *PERS* quartile, a result consistent with that from the regression analysis (a negative coefficient of *PERS\*ACC* in Table 4). If anything, such evidence goes against the persistence argument.

### Empirical Tests on Future Earnings

Persistence and investment may have different implications for future earnings.<sup>19</sup> If accruals capture persistence and earnings quality, then future earnings should fall for high-accrual firms. If accruals capture fundamental investment information, then future earnings should increase for high-accrual firms if investment is optimal, on average. As the accounting system recognizes earnings gradually over time, the effect of investment on future earnings is likely to spread over a number of years, depending on a firm's investment cycle.

One compounding issue in testing the investment/growth hypothesis is that near-term earnings growth could be unusual in nature for high- and low-growth firms due to at least

<sup>17</sup> One caveat to this approach is that the third group has considerably fewer observations than the first or second group. The readers may exercise caution in interpreting the results for the third group. In a robustness check, I partition the sample into four equal-size groups similar to Panel B. The accrual anomaly is highly significant in each group, and in terms of the magnitude, the bottom residual *PERS* group has a smaller accrual anomaly than the second or third group, a result inconsistent with the persistence argument.

<sup>18</sup> The three-way sort by *COVAR*, *PERS*, and accruals partitions the sample into 64 portfolios each year. As a result, the number of stocks is small in early years and the results could be affected by outliers.

<sup>19</sup> One caveat of the earnings evidence is that it does not directly address the accrual anomaly because I do not control for the market's expected earnings or earnings growth. Rather, I examine the information content of accruals by testing different implications of investment and persistence for future earnings. I thank an anonymous referee for suggesting these tests.

**TABLE 6**  
**The Magnitude of the Accrual Anomaly across COVAR and PERS Portfolios**

	<u>Q1 (COVAR)</u>	<u>Q2 (COVAR)</u>	<u>Q3 (COVAR)</u>	<u>Q4 (COVAR)</u>
Q1 (PERS)	3.09% (1.17)	8.78% (4.13)	5.47% (1.78)	5.83% (2.32)
Q2 (PERS)	2.58% (0.73)	10.42% (2.94)	10.95% (3.23)	9.26% (3.16)
Q3 (PERS)	7.43% (1.95)	13.44% (3.49)	14.25% (4.93)	12.13% (3.20)
Q4 (PERS)	1.25% (0.49)	6.05% (1.71)	2.51% (0.77)	12.09% (6.33)

Each year, I calculate the co-variation between accruals and growth (*COVAR*) and the accrual persistence relative to cash flows (*PERS*) for each two-digit SIC industry based on the most recent two years' data (a minimum of ten observations) using the following two models:

$$ACC_t = \alpha_0 + \alpha_1 EMPGR_{t-1} + \alpha_2 EMPGR_t + \alpha_3 EMPGR_{t+1} + e_t$$

$$E_t = \beta_0 + \beta_1 ACC_{t-1} + \beta_2 CF_{t-1} + e_t$$

where *ACC* = accruals; *EMPGR* = growth in the number of employees; *E* = income before extraordinary items scaled by average total assets; and *CF* = cash flows measured as earnings minus accruals.

*COVAR* is  $\alpha_1 + \alpha_2 + \alpha_3$  from the first regression, and *PERS* is  $\beta_1 - \beta_2$  from the second regression.

I sort firms into four *COVAR* quartiles and independently sort firms into four *PERS* quartiles. The intersection between *COVAR* and *PERS* results in 16 portfolios. For each resulting portfolio, I measure the magnitude of the accrual anomaly as the return difference between the bottom and top accrual quartiles, where accrual quartiles with fewer than ten stocks are eliminated.

The sample period is from 1964 to 2003.

t-statistics in parentheses are Fama-MacBeth t-statistics.

two reasons. First, high (low) growth in fundamentals, such as the number of employees and working capital investment, is often accompanied with high (low) growth in earnings, which tends to reverse in the next period. For instance, low-growth firms often suffer setbacks in sales and are often temporarily distressed. During such bad times, firms not only have bad economic performance, but also are more likely to take big accounting charges, the real effect of which could spread over a number of years. Second, it is recognized in the literature that accounting conservatism often lead to lower earnings in year  $t+1$  for high-investment/growth firms, as firms recognize expenses immediately but the new investment has not generated much revenue yet (e.g., Fairfield et al. 2003; Harris and Nissim 2006).

As a first pass, I examine how the traditional one-year-ahead earnings growth varies with accruals and standard growth variables. One-year-ahead earnings growth is defined as  $\frac{E_{t+1} - E_t}{TA_t}$ , where *E* is income before extraordinary items, and *TA* is total assets. I scale earnings growth by total assets instead of earnings for two reasons: (1) about 27.1 percent of observations in my sample have negative earnings, and the percentage gets higher in later years (28.29 percent, 34.51 percent, and 41.64 percent in 1980s, 1990s, and 2000s, respectively); and (2) low earnings introduce a small denominator problem.

The first panel of Table 7 reports the average one-year-ahead earnings growth across five quintiles based on accruals and standard growth variables. I find that high-growth/

**TABLE 7**  
**Earnings Growth across Five Growth/Accruals Quintiles**

<b>Earnings Growth across Five Quintiles Sorted By:</b>					
	<u>Employee Growth</u>	<u>Sales Growth</u>	<u>Total Accruals</u>	<u>Working Capital Accruals</u>	<u>Changes in Inventory</u>
One-year-ahead earnings growth based on actual earnings:					
Q1	2.26%	1.49%	3.04%	2.77%	2.24%
Q2	0.42%	0.46%	0.46%	0.40%	0.16%
Q3	0.30%	0.44%	0.05%	0.17%	0.32%
Q4	0.02%	0.32%	-0.24%	-0.16%	0.06%
Q5	-0.37%	0.19%	-1.09%	-0.97%	-0.50%
Q5-Q1	-2.63%	-1.30%	-4.13%	-3.73%	-2.74%
	(-4.97)	(-4.32)	(-8.77)	(-9.71)	(-9.56)
Ex ante longer-term earnings growth based on analysts' forecasts:					
Q1	15.69%	15.59%	17.99%	18.22%	16.34%
Q2	15.12%	14.64%	16.88%	16.85%	19.46%
Q3	16.89%	16.38%	17.25%	17.20%	17.99%
Q4	20.55%	19.67%	19.46%	19.24%	18.73%
Q5	26.22%	26.67%	23.54%	23.60%	23.14%
Q5-Q1	10.53%	11.08%	5.55%	5.38%	6.80%
	(14.64)	(16.15)	(6.90)	(7.55)	(15.05)
Ex post longer-term earnings growth based on actual earnings:					
Q1	0.51%	-0.97%	2.07%	1.78%	1.53%
Q2	1.49%	1.08%	2.09%	1.74%	1.69%
Q3	2.52%	2.44%	2.18%	2.25%	2.38%
Q4	3.33%	4.00%	2.42%	2.76%	2.69%
Q5	4.25%	5.70%	3.28%	3.52%	3.84%
Q5-Q1	3.74%	6.66%	1.21%	1.74%	2.31%
	(6.87)	(17.67)	(3.91)	(6.32)	(8.54)

This table reports the average earnings growth across five quintiles based on employee growth, sales growth, total accruals, working capital accruals, or changes in inventory. One-year-ahead earnings growth is defined as  $(E_{t+1} - E_t)/TA_t$ , where  $E$  is income before extraordinary items and  $TA$  is total assets. Ex ante longer-term earnings growth is proxied by analysts' forecasts of long-term earnings growth and ex post longer-term earnings growth is defined as  $((E_{t+1} + E_{t+2} + E_{t+3})/3 - (E_{t-1} + E_{t-2} + E_{t-3})/3)/((TA_{t-1} + TA_{t-2} + TA_{t-3})/3)$ .

The sample period is from 1967 to 2001.

t-statistics in parentheses are Fama-MacBeth t-statistics.

accrual firms have significantly lower earnings growth in year  $t+1$  than low-growth/accrual firms, a result that does not support the simple version of the investment argument, but is consistent with the unusual near-term earnings growth discussed earlier. In order to shed further light on this issue, I examine the unusual nature of near-term earnings growth from the following two aspects and find supportive evidence. First, high-growth firms have higher earnings growth in year  $t$  than low-growth firms, and earnings growth tends to be mean reverting. Table 8, Panel A shows that the time-series patterns of unscaled earnings from

**TABLE 8**  
**Special Items and Time-Series Earnings for Low- and High-Growth Firms**

**Panel A: The Time-Series Pattern of Earnings for Low- and High-Growth Firms**

	$E_{t-3}$	$E_{t-2}$	$E_{t-1}$	$E_t$	$E_{t+1}$	$E_{t+2}$	$E_{t+3}$
The bottom and top employee growth quintiles:							
Q1 (low-growth)	29.32	28.76	24.08	20.51	27.68	32.63	32.22
Q5 (high-growth)	16.45	19.79	24.36	26.78	20.43	25.19	26.65
The bottom and top sales growth quintiles:							
Q1 (low-growth)	26.59	27.33	25.63	14.11	18.24	25.73	27.03
Q5 (high-growth)	16.43	18.68	23.86	29.50	27.33	28.27	32.72
The bottom and top accrual quintiles:							
Q1 (low-growth)	33.09	34.25	32.40	26.53	40.43	45.36	46.32
Q5 (high-growth)	11.18	12.44	16.31	19.02	17.62	18.02	20.17
The bottom and top quintiles based on changes in inventory:							
Q1 (low-growth)	24.07	23.46	20.63	19.13	26.72	29.34	32.56
Q5 (high-growth)	15.68	18.38	22.76	25.56	22.78	28.00	31.89

**Panel B: The Magnitude/Frequency of Special Items for Low- and High-Growth Firms**

	Quintiles Sorted By:			
	<u>Employee Growth</u>	<u>Sales Growth</u>	<u>Total Accruals</u>	<u>Changes in Inventory</u>
Average special items scaled by lag total assets:				
Q1 (low-growth)	-0.011	-0.010	-0.013	-0.010
Q5 (high-growth)	-0.007	-0.007	-0.004	-0.004
Q5-Q1	0.004 (3.16)	0.003 (3.87)	0.009 (5.93)	0.006 (7.58)
Percentage of firms with negative special items:				
Q1 (low-growth)	24.96%	23.08%	23.89%	23.13%
Q5 (high-growth)	14.99%	14.55%	12.57%	12.58%
Q5-Q1	9.97% (8.37)	8.53% (8.41)	11.32% (9.01)	10.55% (10.64)

Each year, I sort firms into five quintiles based on employee growth, sales growth, total accruals, or changes in inventory. Panel A presents average earnings (unscaled income before extraordinary items, in million dollars) from years  $t-3$  to  $t+3$ . Panel B reports average special items scaled by lagged total assets for the bottom and top quintiles.

The sample period is from 1967 to 2001 in Panel A and from 1964 to 2003 in Panel B.

years  $t-3$  to  $t+3$  across different partitions on accruals and standard growth variables.<sup>20</sup>

<sup>20</sup> By using average unscaled earnings, I essentially aggregate all firms in the same accrual/growth quintile into one observation because the number of observations is the same across the five quintiles. An alternative approach is to calculate average earnings per share (*EPS*), although some firms never split their stocks and thus have large *EPS*s. I find similar time-series patterns based on *EPS* winsorized at 1 percent and 99 percent.

Earnings in the low-growth/accrual quintile (Q1) experience a big drop from year  $t-1$  to year  $t$  but quickly recover in one or two years. On the other hand, earnings in the high-growth/accrual quintile (Q5) show a temporary spike in year  $t$ , which leads to a reversal in year  $t+1$ . Second, both the frequency and the magnitude of negative special items are higher in year  $t$  for low-growth firms than for high-growth firms (Table 8, Panel B). By definition, special items are transitory in nature and thus tend to reverse in year  $t+1$ . Taken together, it appears that growth/investment and one-year-ahead earnings growth are negatively correlated due to economic fundamentals coupled with accounting recognition rules.

Because of the unusual nature of near-term earnings growth, the investment/growth argument suggests that low-growth/accrual firms tend to have higher earnings growth in year  $t+1$  than high-growth/accrual firms. The persistence argument also predicts higher earnings growth in year  $t+1$  for low-accrual firms. Therefore, the investment/growth and persistence arguments have similar predictions of year  $t+1$  earnings growth for low- and high-accrual firms. I hope to distinguish between these two alternative views by examining the cross-sectional variation in the relationship between earnings growth and accruals. If accruals and one-year-ahead earnings growth are negatively correlated because of the unusual effect of investment/growth on near-term earnings growth, the growth argument suggests that the negative relationship should be stronger when accruals are more likely to capture the growth information. If earnings growth and accruals are negatively correlated due to the lower persistence of accruals, then the persistence argument suggests that the negative relationship should be stronger when accruals are less persistent.

The first block of Table 9, Panel A presents empirical results on the relationship between one-year-ahead earnings growth and accruals across four *COVAR* groups. I find that the negative correlation between accruals and one-year-ahead earnings growth, as measured by the difference in earnings growth between Q5 and Q1 (the Q5–Q1 hedge portfolio), increases monotonically from  $-3.65$  percent ( $t = -7.57$ ) in the bottom *COVAR* group to  $-4.63$  percent ( $t = -9.01$ ) in the top *COVAR* group, resulting in a difference of  $0.98$  percent ( $t = 1.97$ ) between these two groups. These results support the investment argument. The first block of Panel B reports the results across three *PERS* groups. Consistent with the persistence argument, I find that the negative relationship between accruals and one-year-ahead earnings growth is stronger when accruals are less persistent. The earnings growth differentials between Q5 and Q1 are  $-4.71$  percent ( $t = -8.28$ ) and  $-1.29$  percent ( $t = -1.35$ ) for the least and most persistent groups, respectively, resulting in a difference of  $-3.24$  percent ( $t = 2.82$ ) between these two groups.<sup>21</sup> Therefore, the cross-sectional analysis generates mixed evidence, as both the investment and persistence arguments are supported by the data.

To address the issue that the effect of investment on future earnings is likely to last more than a year and to bypass the unusual effect of investment on near-term earnings growth, I turn to the relation between accruals and longer-term earnings growth, for which investment/growth and persistence have opposite predictions. The investment/growth argument predicts that high-accrual/growth firms tend to have higher longer-term earnings growth than low-accrual/growth firms if the transitory year  $t$  earnings are appropriately controlled for. To the extent that persistence affects longer-term earnings (recall that the

<sup>21</sup> As discussed in Section IV, the most persistent group has considerably fewer observations than other groups. As a robustness check, I partition the sample into four equal-size *PERS* groups similar to Panel A. The Q5–Q1 hedge portfolio has earnings growth of  $-4.51$  percent ( $t = -8.06$ ),  $-4.62$  percent ( $t = -8.28$ ),  $-4.19$  percent ( $t = -7.66$ ), and  $-3.49$  percent ( $t = -6.85$ ) for *PERS1* (least persistent), *PERS2*, *PERS3*, and *PERS4* (most persistent) groups, respectively. The difference in earnings growth between *PERS1* and *PERS4* is  $-1.02$  percent, with a t-statistic of  $1.68$ .

**TABLE 9**  
**Cross-Sectional Variation in the Relation between Earnings Growth and Accruals**

**Panel A: The Relation between Earnings Growth and Accruals across Four COVAR Quartiles**

**Earnings Growth across Five Accrual Quintiles For:**

	<u>The Bottom COVAR Quartile</u>	<u>The Second COVAR Quartile</u>	<u>The Third COVAR Quartile</u>	<u>The Top COVAR Quartile</u>
One-year-ahead earnings growth based on actual earnings:				
Q1	2.51%	3.19%	3.39%	3.40%
Q2	0.35%	0.35%	0.37%	0.42%
Q3	0.09%	-0.39%	-0.02%	0.09%
Q4	-0.25%	-0.33%	-0.35%	-0.35%
Q5	-1.14%	-1.31%	-1.12%	-1.23%
Q5-Q1	-3.65% (-7.57)	-4.50% (-6.80)	-4.51% (-9.47)	-4.63% (-9.01)
Ex ante longer-term earnings growth based on analysts' forecasts:				
Q1	19.61%	20.46%	18.21%	16.89%
Q2	16.79%	18.03%	16.95%	15.41%
Q3	16.92%	18.61%	18.07%	16.34%
Q4	18.10%	21.10%	20.54%	18.43%
Q5	22.10%	24.25%	24.04%	22.94%
Q5-Q1	2.49% (3.48)	3.79% (3.82)	5.83% (9.03)	6.05% (6.73)
Ex post longer-term earnings growth based on actual earnings:				
Q1	2.43%	1.99%	1.52%	2.12%
Q2	2.53%	2.12%	1.99%	1.91%
Q3	2.32%	1.86%	2.08%	2.11%
Q4	1.66%	2.60%	2.79%	2.62%
Q5	2.20%	3.47%	3.24%	3.69%
Q5-Q1	-0.23% (-0.40)	1.48% (3.14)	1.71% (3.52)	1.57% (3.70)

**Panel B: The Relation between Earnings Growth and Accruals across Three PERS Groups**

**Earnings Growth across Five Accrual Quintiles For:**

	<u>Accruals are Less Persistent than Cash Flows (<math>\beta_1 &lt; \beta_2</math>)</u>	<u>No Difference in Persistence (<math>\beta_1 = \beta_2</math>)</u>	<u>Accruals are MORE Persistent than Cash Flows (<math>\beta_1 &gt; \beta_2</math>)</u>
One-year-ahead earnings growth based on actual earnings:			
Q1	3.34%	2.95%	2.08%
Q2	0.47%	0.40%	1.72%
Q3	-0.14%	0.06%	-0.96%
Q4	-0.41%	-0.25%	0.62%
Q5	1.37%	-0.83%	0.79%
Q5-Q1	-4.71% (-8.28)	-3.78% (-7.93)	-1.29% (-1.35)

*(continued on next page)*

TABLE 9 (continued)

	Earnings Growth across Five Accrual Quintiles For:		
	Accruals are Less Persistent than Cash Flows ( $\beta_1 < \beta_2$ )	No Difference in Persistence ( $\beta_1 = \beta_2$ )	Accruals are MORE Persistent than Cash Flows ( $\beta_1 > \beta_2$ )
<i>Ex ante</i> longer-term earnings growth based on analysts' forecasts:			
Q1	20.18%	17.41%	16.21%
Q2	17.74%	15.71%	15.88%
Q3	18.40%	15.84%	15.70%
Q4	21.11%	17.35%	16.05%
Q5	25.20%	21.19%	19.46%
Q5-Q1	5.02% (6.14)	3.78% (6.20)	3.22% (2.85)
<i>Ex post</i> longer-term earnings growth based on actual earnings:			
Q1	2.12%	2.18%	3.54%
Q2	2.08%	2.01%	2.00%
Q3	1.95%	2.19%	2.55%
Q4	2.94%	2.14%	3.53%
Q5	2.99%	3.25%	3.21%
Q5-Q1	0.87% (1.82)	1.07% (2.75)	-0.33% (-0.24)

This table reports the average changes in earnings across five accrual quintiles for four *COVAR* groups (Panel A) and three *PERS* groups (Panel B), where *COVAR* (the co-variation between accruals and growth) and *PERS* (the accrual persistence relative to cash flows) are defined in Table 3. One-year-ahead earnings growth is defined as  $(E_{t+1} - E_t)/TA_t$ , where  $E$  is income before extraordinary items and  $TA$  is total assets. *Ex ante* longer-term earnings growth is proxied by analysts' forecasts of long-term earnings growth, and *ex post* longer-term earnings growth is defined as  $((E_{t+1} + E_{t+2} + E_{t+3})/3 - (E_{t-1} + E_{t-2} + E_{t-3})/3)/((TA_{t-1} + TA_{t-2} + TA_{t-3})/3)$ . The sample period is from 1967 to 2001.

t-statistics in parentheses are Fama-MacBeth t-statistics.

accrual anomaly lasts for at least three years [Sloan 1996]), the persistence argument suggests that high-accrual firms should have lower future earnings growth. I use analysts' forecasts of long-term earnings growth as a proxy for earnings growth, as this variable is not subject to the effect of transitory earnings. I also construct an *ex post* earnings growth measure using the average earnings over the next three years minus the average earnings over the past three years, scaled by the average total assets in the past three years,  $\frac{(E_{t+1} + E_{t+2} + E_{t+3})/3 - (E_{t-1} + E_{t-2} + E_{t-3})/3}{(TA_{t-1} + TA_{t-2} + TA_{t-3})/3}$ .<sup>22</sup> I skip year  $t$  earnings to avoid the confounding effect of transitory earnings discussed earlier.

<sup>22</sup> Both practical and academic papers often use average earnings across years to mitigate noise (e.g., Asness 2003; Campbell and Vuolteenaho 2004). To ensure the robustness of my results, I try a variety of earnings growth measures by varying the length of future earnings and the base earnings. Specifically, future earnings are the simple average of either three-year or five-year earnings. The base earnings take the following format: (1) The average of earnings in years  $t-1$ ,  $t-2$ , and  $t-3$   $((E_{t-1} + E_{t-2} + E_{t-3})/3)$ ; (2) The average of earnings in years  $t-1$  and  $t-2$   $((E_{t-1} + E_{t-2})/2)$ ; (3) Earnings in year  $t-1$   $(E_{t-1})$ ; and (4) Earnings in year  $t-2$   $(E_{t-2})$ . I find that *ex post* long-term earnings growth increases fairly monotonically with accruals for all specifications except for the  $E_{t-1}$  case. When  $E_{t-1}$  acts as the base earnings, earnings growth has a "U" shape with accruals in the sense that both low- and high-accrual firms have higher earnings growth than medium-accrual ones. This "U" shape gets weaker for working capital accruals and the inventory component of accruals. I also find similar patterns of these earnings growth variables when partitioned by employee growth.

The second and third blocks in Table 7 report longer-term earnings growth across five quintiles based on employee growth, sales growth, accruals, and refined versions of accruals. As predicted by the investment hypothesis, high-accrual/growth firms have higher future earnings growth (both *ex ante* and *ex post*) than low-accrual/growth firms. For example, the bottom employee growth quintile has average expected earnings growth of 15.69 percent, compared to 26.22 percent for the top employee growth quintile. The *ex post* earnings growth increases monotonically from 0.51 percent in the bottom employee growth quintile to 4.25 percent in the top employee growth quintile. Similar patterns exist for accruals and their refined versions (working capital accruals and the inventory component). In sum, longer-term earnings growth increases with accruals and standard growth variables, a result supporting the investment hypothesis but not the persistence hypothesis.

As a final test, I examine cross-sectional variation in the relationship between accruals and longer-term earnings growth. The investment argument suggests that the positive relationship is stronger when accruals are more likely to capture investment information. The second and third blocks in Table 9, Panel A show that the positive relationship, as measured by the earnings growth differential between Q5 and Q1, increases monotonically with the level of *COVAR*. For example, the Q5–Q1 difference based on analysts' forecasted earnings growth is 2.49 percent ( $t = 3.48$ ) for the bottom *COVAR* quartile and 6.05 percent ( $t = 6.73$ ) for the top *COVAR* quartile, resulting in a difference of 3.55 percent ( $t = 3.57$ ) between these two quartiles. Similar results hold for the *ex post* measure of earnings growth. Overall, these results suggest that future earnings growth increases more with accruals when accruals co-vary highly with employee growth, a result consistent with the investment argument. The last two blocks in Table 9, Panel B show the relationship between accruals and earnings growth across three *PERS* groups. On average, earnings growth increases (though not monotonically) with accruals in each *PERS* group. In terms of magnitude, the bottom *PERS* group seems to have the most positive correlation between accruals and earnings growth, while the persistence argument suggests the most negative correlation for this group. In general, the empirical results do not support the persistence argument.

In summary, I find mixed evidence from the earnings analysis in distinguishing between the investment and persistence arguments. One-year-ahead earnings growth is higher for low-accrual (low-growth) firms than for high-accrual (high-growth) firms. The results from the cross-sectional analyses support both the investment and growth arguments, suggesting that the evidence is inconclusive in distinguishing between these two alternative views. Using longer-term earnings growth measures, I find that both *ex ante* and *ex post* earnings growth increases with accruals, and this increase is stronger when accruals co-vary with employee growth, a result supporting the investment argument but not the persistence argument. In both one-year-ahead and longer-term earnings growth analyses, the earnings patterns are remarkably similar when partitioned on accruals and standard growth measures, such as employee growth, suggesting that accruals are likely to capture economic fundamentals rather than just earnings persistence/quality.

## V. ROBUSTNESS CHECKS

In this section, I conduct a number of robustness checks to test cross-sectional variation in the accrual anomaly by using alternative *COVAR* and *PERS* measures, alternative accrual measures, and alternative portfolio formation techniques. I also examine the relationship between future stock returns and other growth attributes.

### The *COVAR* Measure Based on Co-Variation between Accruals and External Financing

The main analysis uses the co-variation between accruals and growth in the number of employees to measure *COVAR*. In this section, I use external financing as an alternative growth attribute to estimate *COVAR* and examine its implications for the accrual anomaly. Compared to sales growth, assets growth, and other growth variables, external financing is relatively free of accounting subjectivity (see e.g., Richardson et al. 2005) and thus provides clean evidence on the investment hypothesis. Untabulated results show that the coefficient estimate of *COVAR\*ACC* is  $-2.00$  in Model (9), with a *t*-statistic of  $-2.36$ . Robust results on external financing provide further evidence that the investment information contained in accruals explains the accrual anomaly.

### Accruals from the Statement of Cash Flows

Prior literature (see Hribar and Collins 2002) indicates that the accrual measure estimated from the balance sheet suffers from measurement errors. From the economic perspective, accruals based on the cash flow statement serve to measure organic growth in working capital. The investment hypothesis suggests that accruals based on the balance sheet offer a better measure of growth because they reflect both organic growth and growth via mergers and acquisitions. Additionally, there is an inconsistency between the accrual measure based on the cash flow statement and other growth measures based on the balance sheet, such as growth in the number of employees and external financing.<sup>23</sup> Nevertheless, I conduct some robustness checks using the accrual measure based on the cash flow statement. The coefficient of *COVAR\*ACC* is significantly negative, regardless of whether employee growth or external financing is used in the *COVAR* measure, a result supporting the investment hypothesis (see Table 10). The coefficient of *PERS\*ACC* is insignificantly negative in each case, which is inconsistent with the persistence hypothesis. One caveat is in order. These results should be interpreted with caution, given that only 15 years of time-series data about the cash flow statement are available.

I also conduct other robustness checks, such as using alternative portfolio formation techniques, alternative industry definitions, and alternative persistence measures. The results are qualitatively similar in each case.<sup>24</sup>

### Anomalies Based on Different Growth Attributes

This paper shows that accruals represent one aspect of firms' business growth and, thus, co-vary with other growth attributes. One implication of this study is that these growth attributes should have similar predictive power for future stock returns. Table 11 reports average returns of ten deciles based on the following growth variables: accruals, employee growth, external financing, capital expenditures, and cash sales growth. In each case, future

<sup>23</sup> For growth in the number of employees, I cannot distinguish organic growth from growth via mergers and acquisitions in Compustat data.

<sup>24</sup> Specifically, I conduct the following three sets of robustness checks. First, in portfolio analysis, the magnitude of the accrual anomaly is measured by returns of the hedge portfolio with a long position in the bottom 30 percent stocks and a short position in the top 30 percent stocks, as opposed to the 20 percent specification in the current research design. Second, in industry-based tests, I use the Fama and French (1997) industry definition, as opposed to the two-digit SIC industry specification in the current research design. I also try the three-digit North American Industry Classification System (NAICS) industry specification. Finally, I consider alternative accrual persistence measures, such as the difference between the coefficients on accruals and cash flows divided by the sum of the coefficients, the coefficient of accruals in univariate regression of earnings on accruals, the coefficient of accruals in Regression (8), and the accrual coefficient when regressing accruals on their lagged value.

**TABLE 10**  
**Robustness Check—Accruals Based on Cash Flow Statement**

Independent Variables	<i>COVAR</i> = <i>COVAR(EMPGR)</i>				<i>COVAR</i> = <i>COVAR(XFIN)</i>	
	1	2	3	4	5	6
Intercept	0.130 (2.49)	0.127 (2.21)	0.132 (2.34)	0.134 (2.27)	0.143 (2.15)	0.144 (1.99)
<i>ACC</i>	-0.208 (-3.90)	-0.148 (-2.06)	-0.113 (-1.26)	-0.043 (-0.43)	-0.066 (-0.69)	0.031 (0.33)
<i>PERS</i>		0.008 (0.25)		-0.004 (-0.11)		0.000 (0.01)
<i>PERS*ACC</i>		-0.108 (-1.04)		-0.080 (-0.64)		-0.136 (-1.14)
<i>COVAR</i>			0.016 (0.84)	0.017 (0.71)	-0.005 (-0.15)	-0.008 (-0.26)
<i>COVAR*ACC</i>			-0.243 (-1.97)	-0.288 (-2.34)	-0.348 (-2.35)	-0.390 (-2.82)
Adj. R <sup>2</sup>	0.003	0.006	0.004	0.008	0.006	0.009

The dependent variable is annual stock returns beginning from the fifth month after a firm's fiscal year-end. *COVAR* is the co-variation between accruals and growth, which is proxied by either growth in the number of employees or external financing, and *PERS* is the relative persistence of accruals to cash flows. Specifically, each year I calculate the co-variation between accruals and growth (*COVAR*) and the accrual persistence relative to cash flows (*PERS*) for each two-digit SIC industry based on two most recent years' data (a minimum of ten observations) using the following three regressions:

$$\begin{aligned}
 ACC_t &= \alpha_0 + \alpha_1 EMPGR_{t-1} + \alpha_2 EMPGR_t + \alpha_3 EMPGR_{t+1} + e_t \\
 ACC_t &= \alpha_0 + \alpha_1 XFIN_{t-1} + \alpha_2 XFIN_t + \alpha_3 XFIN_{t+1} + e_t \\
 E_t &= \beta_0 + \beta_1 ACC_{t-1} + \beta_2 CF_{t-1} + e_t
 \end{aligned}$$

where  $E$  = income before extraordinary items scaled by average total assets;  $CF$  = cash flows (data308) scaled by average total assets;  $ACC$  = accruals measured as earnings minus cash flows;  $EMPGR$  = growth in the number of employees; and  $XFIN$  = external financing measured as changes in equity and debt minus net income scaled by average total assets.

*COVAR(EMPGR)* is  $\alpha_1 + \alpha_2 + \alpha_3$  from the first regression, *COVAR(XFIN)* is  $\alpha_1 + \alpha_2 + \alpha_3$  from the second regression, and *PERS* is  $\beta_1 - \beta_2$  from the third regression. Both *COVAR* and *PERS* are transformed into percentile rankings and converted to a [0,1] scale, where rankings are obtained by annually ranking observations and assigning them in equal numbers to 100 portfolios. All other variables are winsorized at 1 percent and 99 percent.

The sample includes 41,157 observations from 1989 to 2003. t-statistics in parentheses are Fama-MacBeth t-statistics.

stock returns decrease fairly monotonically from decile 1 to decile 10, and the D1–D10 hedge portfolio achieves an average return of more than 10 percent. While some of these anomalies have been individually studied in prior literature (e.g., Sloan 1996; Titman et al. 2004), the evidence documented in this paper suggests that these anomalies might be related to each other, as all the underlying variables capture a firm's business growth. Additionally, the return pattern based on employee growth has not been previously documented. Finally, the fact that the Fama-French three-factor model cannot fully explain the accrual anomaly (e.g., Fairfield et al. 2003) might suggest that accruals or other accounting-based measures capture a firm's investment/growth information better than the book-to-market ratio.

**TABLE 11**  
**Stock Anomalies Based on Different Growth Variables**

	<b>The Anomaly Based On:</b>				
	<u>ACC<sub>t</sub></u>	<u>EMPGR<sub>t</sub></u>	<u>XFIN<sub>t</sub></u>	<u>CAPEXP<sub>t</sub></u>	<u>CSGR<sub>t</sub></u>
D1 (low)	20.71%	20.33%	21.44%	21.18%	17.87%
D2	18.88%	20.29%	20.31%	19.03%	18.16%
D3	17.55%	18.44%	19.61%	17.69%	17.99%
D4	17.98%	16.26%	20.98%	17.00%	17.28%
D5	16.41%	16.79%	19.08%	16.51%	16.84%
D6	17.22%	15.89%	16.29%	15.16%	17.85%
D7	15.33%	15.50%	13.95%	15.22%	16.49%
D8	14.25%	14.60%	12.29%	13.82%	16.41%
D9	11.81%	12.37%	9.97%	12.30%	13.26%
D10 (high)	8.25%	9.37%	4.14%	8.81%	7.82%
D1–D10	12.46%	10.96%	17.30%	12.37%	10.05%
	(5.75)	(4.08)	(6.00)	(5.18)	(4.60)

This table reports future annual returns across ten deciles based on the following growth variables: Accruals (*ACC*), growth in the number of employees (*EMPGR*), external financing (*XFIN*), capital expenditures (*CAPEXP*), and cash sales growth (*CSGR*). See Table 1 for detailed definition.

Annual return begins from the fifth month after a firm's fiscal year-end.

The sample period is from 1964 to 2003.

t-statistics in parentheses are Fama-MacBeth t-statistics.

## VI. CONCLUSION AND LIMITATIONS

In this paper, I investigate the fundamental investment information contained in accruals and examine its implications for the accrual anomaly. By definition, accruals capture investment in working capital, which is an integral part of corporate growth. Consistent with the conventional wisdom, I find that accruals co-vary strongly with growth in the number of employees, investment in fixed assets, external financing, and other growth attributes, suggesting that accruals capture economic fundamentals rather than just earnings persistence/quality. The fundamental investment information contained in accruals goes well beyond that captured by contemporaneous sales growth.

I argue that the fundamental investment information contained in accruals has a first-order effect on the accrual anomaly. Any intentional or unintentional measurement problems associated with accruals induced by the accounting system, such as the subjectivity of accrual measures or earnings management, are likely to have a second-order effect. I examine different implications of fundamental investment and accrual persistence for cross-sectional variation in the accrual anomaly and find results consistent with my predictions. In particular, I find that, consistent with the investment hypothesis, the accrual anomaly varies across industries in a predictable way based on a firm's business model. There exists a strong accrual anomaly in industries/firms in which accruals co-vary with employee growth. On the other hand, the accrual anomaly is much weaker in industries/firms in which accruals show little correlation with employee growth. In contrast, earnings persistence exhibits no explanatory power for cross-sectional variation in the accrual anomaly. If anything, I find that the magnitude of the accrual anomaly increases with the persistence of accruals relative to cash flows, a result going against the persistence argument. From the

earnings perspective, accruals/growth are negatively related to one-year-ahead earnings growth and the evidence on cross-sectional analysis is inconclusive. The intermediate/long-term earnings growth increases with accruals and this increase is stronger when accruals co-vary with employee growth, supporting the investment argument but not the persistence argument. These results are robust to alternative accrual measures and other model specifications.

This paper proceeds with certain limitations. First, the empirical results support the investment/growth hypothesis that the investment information contained in accruals explains the accrual anomaly, but this paper is silent on the mechanism behind the results, i.e., the reason why investment/growth is negatively related to future stock returns. The hypothesis development section mentions several explanations: investor over-extrapolation, overinvestment, and financial distress risk. Second, this paper uses both cross-sectional and time-series approaches to estimate the co-variation between accruals and other growth attributes (*COVAR*), but each approach has its own limitations. The cross-sectional approach assumes homogeneity in the same industry, and the time-series approach excludes young and growth firms from the sample. As in the cases of accruals and firm size, an ideal *COVAR* measure should be at the firm level with no restrictions on the sample data. Future research may help to address this issue.

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