

Accruals and Managerial Operating Decisions Over the Firm Life Cycle

by

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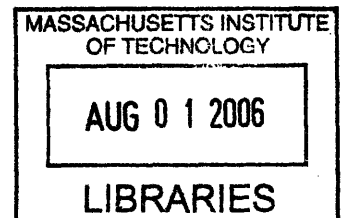
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ABSTRACT

This paper explores how accruals capture managerial operating decisions that evolve over a firm's life cycle. I argue that growing firms face different operating environments and have fundamentally different accruals properties than those of mature and declining firms. I provide evidence that accruals vary with changes in a firm's operating environment over its life cycle. I show in one example that by ignoring life cycle fundamentals, previous empirical methods would likely *misclassify* this variation in accruals as reflecting systematic differences in a firm's "accounting quality". I suggest empirical techniques to mitigate incorrect inferences about accounting quality and to better understand how operating decisions affect accruals.

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1. Introduction

This paper examines how operating decisions affect accounting accruals over a firm's life cycle. Previous empirical studies of accruals properties implicitly assume that a firm's operating decisions, and the resulting accruals properties, do not vary over its life cycle. I argue that managerial operating decisions for growing firms differ from those of mature and declining firms, which leads to variation in a firm's "normal" accruals properties. I develop a new empirical measure of a firm's life cycle stage in order to demonstrate that accruals vary with changes in a firm's operating environment. This finding has important implications for the growing number of studies that use differences in accruals properties to draw inferences about a firm's "accruals quality". I illustrate the importance of incorporating life cycle fundamentals by replicating a previous study that documents a significant relation between auditor tenure and proxies for accruals quality. I show that this apparent relation disappears once these tests control for accruals variation that arises from a firm's life cycle fundamentals. This result suggests that previous empirical methods can *misclassify* "normal" variation in a firm's accruals properties as reflecting systematic differences in overall accounting quality.

I argue that over a firm's life cycle, managerial operating decisions and the resulting accruals properties are richer and more complex than those previously characterized by widely-used accruals expectation models. A firm in the growth stage of its life cycle makes working capital investments that result in large positive accruals. Working capital accruals are typically expected to generate cash flow realizations within one year. However, a firm in the growth stage of its life cycle makes investments in working capital that are expected to generate long-term benefits, as realized in cash flow

and changes in revenues *beyond* the subsequent one year period. Widely-used accruals expectation models only capture the relation between accruals and near-term (i.e., occurring within one year) cash flow and changes in revenues and thus are likely to erroneously identify positive “abnormal” accruals for a growing firm.

Similarly, I argue that a declining firm conducts liquidation activities that lead to negative accruals adjustments. Accruals’ role in timely loss recognition implies that a firm’s negative accruals adjustments recognize the impact of economic losses in periods prior to the realization of the losses in cash. Timely recognition of economic losses is a desirable accruals property from the perspective of a firm’s investors and other stakeholders. However, a declining firm’s tendency to record these timely negative accruals is likely to cause “one size fits all” accruals expectation models to erroneously identify negative “abnormal” accruals.

I also argue that the relation between a firm’s working capital accruals adjustments and near-term (occurring within one year) cash flow and changes in sales is also likely to vary over its life cycle. A firm experiencing rapid growth will make working capital investments that affect its *far-term* (beyond one year) cash flow and changes in revenues. As the firm’s growth slows down, the benefits of the working capital investments are likely to shift to *near-term* (within one year) cash flow and changes in revenues. The firm’s growth activities are likely to result in a strong association between working capital accruals and near-term (within one year) cash flow and changes in revenues. In contrast, a declining firm’s working capital accruals (such as inventories and accounts receivables) are unlikely to generate near-term (within one year) cash flow and changes in revenues, which is likely to result in a weak association

between accruals and near-term cash flows and changes in revenues. Consequently, the association between accruals and near-term firm performance variables is expected to be stronger for a growing firm and weaker for a declining firm.

My first prediction is that the working capital accruals of growing (declining) firms are positive (negative) compared to those of mature firms. My second prediction is that widely-used accruals expectations models are likely to identify positive (negative) abnormal working capital accruals for growing (declining) firms compared to those of mature firms. My third prediction is that the association between working capital accruals and near-term (within a year) cash flow and changes in revenues is stronger for growing firms and weaker for declining firms. My empirical results support these predictions.

As part of my empirical analysis, I construct a new empirical measure of a firm's life cycle stage. I begin my analysis by identifying five firm-level operating variables that are hypothesized to capture managerial operating decisions over a firm's life cycle. I use the firm-level operating variables of capital expenditures, changes in revenues, cost of goods sold, firm age, and the profile of cash flow from operations and cash flow from financing. I obtain all firm-years from Compustat for the period of 1960-2004. I assign each firm-year a life cycle rank within its industry based on relative values of each operating variable. I divide a firm's life cycle into five stages, which consist of rapid growth, slow growth, maturity, early decline, and late decline. I then assign firm-years to each stage based on values of its life cycle rank in order to document variation in accruals over these stages.

My findings are consistent with the notion that accruals variation driven by managerial operating decisions over a firm's life cycle is *distinct from* accruals variation attributed to differences in the quality of a manager's accounting decisions. I draw on existing research that examines a manager's incentives to increase earnings around the initial public offering (IPO) of shares and the impending violation of debt covenants. I use these arguments to develop predictions under a competing explanation that managerial incentives to increase earnings in periods of growth and decline create variation in accruals over a firm's life cycle. This competing explanation predicts a V-shaped pattern of positive, negative, then positive abnormal accruals for growing, mature, and declining firms, respectively. In contrast, I document that abnormal accruals are, on average, positive for growing firms and negative for declining firms.

The observed pattern of abnormal accruals is inconsistent with the competing explanation that accruals variation over a firm's life cycle is driven by systematic differences in overall accounting quality. A more plausible explanation for the overall declining pattern of abnormal accruals is that a growing (declining) firm records more positive (negative) "normal" accruals than predicted by "one size fits all" accruals expectation models. The empirical results suggest that widely-used accruals expectation models do not correctly adjust for changes in a firm's operating environment over its life cycle.

I further illustrate how inferences in empirical accruals studies can change after controlling for life cycle fundamentals. In addition to the construction of five empirical life cycle stages, I also perform a factor analysis on the set of firm-level operating variables in order to extract a factor that captures a firm's life cycle fundamentals. I then

incorporate a firm's life cycle stages, as well as the extracted life cycle factor, in two replications of a previous empirical study of accruals properties (see Myers, Myers, and Omer, 2003). The previous study documents a significant negative relation between length of auditor tenure and proxies for accruals quality. The authors draw the inference that the longer an auditor works for a firm, the more likely the firm reports high quality financial information, as captured by proxies for accruals quality. However, after including a firm's life cycle stages or the life cycle factor in these tests, the relation between auditor tenure and accruals quality proxies becomes insignificant. This example underscores two crucial points: First, accruals properties are linked to a firm's life cycle fundamentals. Second, empirical studies must exercise caution when using variation in accruals to draw inferences about systematic differences in overall accounting quality.

My study makes several contributions to the current stream of research on accruals, accruals expectation models, and economic fundamentals. First, previous empirical studies of accruals examine associations between a firm's accruals properties and a variety of financial variables. However, the choice of variables differs across empirical studies and is not motivated by theory. My choice of operating variables uses an economics-based framework motivated by firm life cycle characterizations, as articulated in several sources, including Spence (1977, 1979). These operating variables are hypothesized to affect a firm's non-discretionary accruals policies over its life cycle. This approach allows me to demonstrate that: (1) accruals evolve in direct response to fundamental operating decisions, which vary over a firm's life cycle, and (2) controlling for a firm's life cycle fundamentals can impact inferences drawn in prior empirical studies.

Second, the view that accounting properties are related to economic fundamentals that evolve over a firm's life cycle is frequently articulated in textbooks on introductory accounting and financial statement analysis (see, for example, Stickney and Weil, 2006; Stickney and Brown, 1999, among others). Most of the analyses offered depict the trajectory of a firm's sales, net income, and cash flow for growing, mature, and declining firms. However, there is currently little evidence to support these textbook assertions. I provide empirical evidence that supplements existing assertions on the relation between a firm's accruals and its life cycle fundamentals.

The remainder of this paper is organized as follows: Section 2 reviews related studies. Section 3 develops the hypotheses. Section 4 gives details on the descriptive statistics and the empirical classification of life cycle stages. Section 5 presents the results from empirical tests. Section 6 gives the results of robustness tests. Section 7 shows the effect of life cycle fundamentals on prior studies of accruals quality. Section 8 concludes.

2. Literature Review

My paper draws on two separate views of a firm's life cycle. The first view of a firm's life cycle is that articulated in accounting textbooks, including Stickney and Weil (2006) and Stickney and Brown (1999). The second view of a firm's life cycle includes those offered by empirical accounting research involving accruals. In this section, I give an overview and highlight connections between these two views.

2.1 Textbook Discussions of a Firm's Life Cycle

Financial accounting textbook discussions of a firm's operating, investing, and financing activities typically introduce students to the concept of a firm's life cycle. The texts usually draw either an explicit or implicit link between a firm's life cycle and its accruals properties. Without giving a formal definition of a firm's life cycle, Stickney and Weil (2006) assert in their text that (1) a firm's life cycle is related to its accruals properties, and (2) managerial operating decisions have a direct impact on a firm's accruals and cash flows.

Stickney and Weil (2006) argue that when a firm's "increased earnings result from *expanding operations* (that is, more units of sales in contrast to merely *increases in selling price* or *reductions in cost*), they usually lead to decreased cash flow from operation". This textbook passage is consistent with the notion that a firm that expands its operations would likely exhibit positive accruals (which would increase earnings) and negative operating cash flows. Dechow (1994) argues that these will lead to a negative correlation between accruals and contemporaneous cash flows from operations. The textbook passage also emphasizes that the operating decisions involved in expanding a firm's operations are different than those required to manage the firm's prices or costs.

Stickney and Weil (2006) also state that reduced earnings can also be associated with cash flow increases. They argue that a firm that is experiencing operating problems and *reduces the scope of its activities* will likely report "reduced net income or even losses. However, it might experience positive cash flow from operations because it collects accounts receivables from prior periods *but does not replace inventories*, thus saving cash". This passage alludes to two accruals relations: (1) the relation between

accounts receivable accruals and subsequent period cash flow from operations and (2) the relation between inventory accruals and contemporaneous cash flow from operations. Although this passage characterizes the decisions of a declining firm as involving negative accruals (from collecting accounts receivables and drawing down inventory levels) and *positive* cash flows, the characterization found in Ball and Shivakumar (2005) is vastly different. Ball and Shivakumar (2005) argue that a firm that experiences economic losses would likely exhibit *negative* cash flow from operations and write-offs that result in negative working capital accruals.

Stickney and Weil (2006) and Stickney and Brown (1999) also argue that several firm level variables (accounts receivables, cash flows from operations, plant and equipment, and external financing) are likely to vary over a firm's life cycle. Accounts receivables and inventories are expected to be built up for a new, rapidly growing firm and to be liquidated for a declining firm. Cash flow from operations is expected to be negative for a new, rapidly growing firm and positive for a somewhat more seasoned but still growing firm. For a mature firm, cash flow will be positive and sufficient to fund purchases of plant and equipment. Moreover, for a declining firm, cash flow from operations is expected to be positive but declining.

Such textbook characterizations also address investments in property, plant, and equipment, which is a long-term asset that is associated with a depreciation accrual. Stickney and Weil (2006) suggest that a new, rapidly growing firm would heavily invest in plant and equipment, but a seasoned firm would fall short of cash needed to fund more acquisitions of plant, and equipment. A mature firm generates cash flows that are sufficient to finance purchases of plant and equipment, but a declining firm will cut down

on its capital expenditures involving plant and equipment. Although these textbook discussions do not address whether a firm's investment in property, plant, and equipment is correlated with its investment in working capital, Bushman, Smith, and Zhang (2005) argue that when a firm expands its operations, investments in fixed assets are likely linked with investments in working capital to support anticipated growth.

Stickney and Weil (2006) also discuss how a firm's reliance on external financing sources would likely vary over its life cycle. A firm is likely to rely on external sources of cash to finance both its operating and its investing activities when it is in both the rapid and seasoned stages of growth. By the time a firm reaches maturity, it has internally generated cash that it can use to repay financing from earlier periods and to start paying dividends. Additionally, a declining firm is expected to repay all of its outstanding financing.

Appendix 1 illustrates examples from Stickney and Weil (2006) and Stickney and Brown (1999) of firms in different stages of the firm life cycle. Examples of growing firms include Amazon.com for the year 2000, Discount Auto Parts for 1999, Netscape for 1996, and Wal-Mart for 1996. An example of a mature firm is Anheuser-Busch for 2000, while an example of a declining firm is Levitz Furniture for 1997. Based on the distribution of these examples, one would likely infer that the textbook authors view the characteristics of a growing firm to be more clearly defined and more recognizable to accounting students than the characteristics of a mature or declining firm.

2.2 Empirical Research on a Firm's Life Cycle and Accruals

Previous empirical accounting studies offer descriptions of how a firm's operating activities evolve over time. Dechow (1994) describes a steady state firm as one that is

“neither growing nor declining, i.e., neither increasing nor reducing sales.” Dechow (1994) further describes a steady state firm as having relatively stable cash requirements for working capital, investments, and financing. Arguments in several studies suggest that a firm’s accruals patterns are likely to vary over its life cycle. In a discussion of Guay, Kothari, and Watts (1996), Healy (1996) suggests that accruals patterns are likely to differ over the stages of a firm’s life cycle. Kaplan (1985) notes that a firm’s working capital accounts serve a useful economic purpose. He suggests that a firm’s accruals are expected to vary depending on its changes in sales and its production for the year. Jones (1991) uses revenues as “an objective measure of the firm’s operations.” A firm’s growth in sales, as well as other financial ratios, has been shown to evolve over time (Nissim and Penman, 2001).

Dechow and Ge (2005) argue that the accounting rules applicable to growing and declining firms have different perspectives and different implications for the persistence of earnings relative to the persistence of cash flow (see a similar argument in Healy, 1996).¹ Dechow and Ge (2005) document that the persistence of earnings relative to cash flow differs for firms with high accruals versus firms with low accruals. The authors demonstrate that this empirical result is driven by a firm’s special items.

¹ Healy (1996) argues that the conservatism doctrine implies that “an increase in nondiscretionary earnings is more likely to be followed by another increase, whereas a decrease is more likely to be followed by a reversal. Thus, a firm with a new product introduction can show successive years of increase in nondiscretionary earnings because future sales growth is not recognized until it is realized. In contrast, a firm that expects to have a decline in current and future earnings because of increased competition in a major product line may be required to take a write-down, exacerbating the loss today but leading to an earnings reversal the following year. The accounting principles which affect reporting these events have implications that are not reflected in our current models.”

2.3 Empirical Research on Accruals Expectation Models

Widely-used accruals expectation models specify accruals as a function of a firm's near-term performance variables. Jones (1991) models total accruals as a function of a firm's changes in revenues and a firm's property, plant, and equipment. Dechow and Dichev (2002) focus on accruals' role in shifting or adjusting the recognition of cash flow over time. The authors specify working capital accruals as a function of a firm's current, previous, and subsequent period cash flow. McNichols (2002) adjusts the Dechow and Dichev (2002) model to incorporate a firm's changes in revenues and a firm's property, plant, and equipment. Ball and Shivakumar (2005) explore accruals' role in asymmetrically timely gain and loss recognition. The authors modify the models in Dechow and Dichev (2002) and Jones (1991) to incorporate a non-linear relation between working capital accruals and cash flow from operations.

Widely-used accruals expectation models, such as Jones (1991), Dechow and Dichev (2002), and McNichols (2002), generally focus on properties of the residuals from these regressions in order to draw inferences about a firm's accruals quality. However, the properties of these regression models are not well understood. For example, Wysocki (2005) shows that the Dechow and Dichev (2002) model cannot differentiate between non-discretionary and discretionary accruals. Additionally, Liu and Wysocki (2005) show that prior studies that rely on these accruals models can incorrectly attribute increases in a firm's cost of capital to information risk rather than to underlying operating risk. Despite these arguments, widely-used accruals expectation models implicitly assume that accruals properties do not vary over a firm's life cycle.

In contrast, Anthony and Ramesh (1992) argue that the ability of earnings to convey information about future cash flow varies over a firm's life cycle.² The authors examine whether the market reaction to earnings varies predictably over a firm's life cycle by examining cross-sectional variation in earnings response coefficients. They predict and find evidence that the market reaction to a firm's accounting variables differs by life cycle stage.³ Additionally, Johnson (1999) documents that earnings persistence and earnings response coefficients are positively associated with the rate of growth in economic activity. Since earnings are composed of accruals and cash flow, it is an empirical question whether accruals also vary over a firm's life cycle. The arguments in these studies motivate a deeper exploration of the relation between a firm's accruals properties and its life cycle fundamentals.

2.4 Empirical Research: ROA Adjustment to Accruals Expectation Models

Previous empirical studies have suggested that widely-used accruals expectation models should be adjusted for a firm's return on assets (ROA). Kothari, Leone, and Wasley (2005), hereafter referred to as K LW, make the assumption that firms with similar ROA will also face similar incentives to manipulate accruals.⁴ Under the K LW approach, comparing the accruals of the firm of interest to the accruals of an ROA-

² See Kothari (2001, p. 22) for a discussion of earnings response coefficients and the firm life cycle.

³ Anthony and Ramesh (1992) assume a specific pattern of a firm's sales, net income, cash flow from operations, investing, and financing over the firm's life cycle and incorporate this pattern directly in their research design. They categorize firm-years into three life cycle stages (i.e., growth, maturity, and stagnancy) based on firm-year measures of dividend payout, capital expenditures, sales growth, and firm age. Specifically, Anthony and Ramesh (1992) assume that a firm's progression from the life cycle stages of growth into decline is characterized by increases in dividend payout, decreases in sales growth, decreases in capital expenditures, and increases in firm age. The authors run a pooled regression within each stage of a firm's life cycle in order to examine differences in the market reaction to accounting variables. They reject the null hypothesis at the 10% level of no association between the market reaction to accounting variables and the firm's life cycle stage.

⁴ K LW's choice of ROA to identify a performance-matched firm is due to its empirical strength in accruals tests performed in Dechow, Kothari, and Watts (1998) and Barber and Lyon (1996).

matched firm will (1) filter out manipulated accruals, which are assumed to be the of a similar magnitude for both sets of firms, and (2) isolate any “abnormal” manipulated accruals by the firm of interest.

A discussion in Stickney and Brown (1999) suggests that a firm’s ROA varies predictably over its life cycle. The passage states that during the “introduction and early growth phases, expenditures on product development and marketing, coupled with relatively low sales levels, lead to operating losses and negative ROAs... As sales accelerate during the high growth phase, operating income and ROAs turn positive...ROA increases significantly during the maturity phase... ROA deteriorates during the decline phase...” (Stickney and Brown, 1999). This argument suggests that a firm’s ROA would likely exhibit a high correlation with the firm’s managerial operating decisions over its life cycle. However, previous analysis by McNichols (2000) suggests that ROA and a firm’s expected earnings growth capture separate aspects of a firm’s underlying economics. McNichols (2000) relates a firm’s discretionary accruals (as a dependent variable) to a firm’s ROA and analyst’s estimates of earnings growth. She documents that both variables are significantly related to a firm’s discretionary accruals.

It is an empirical issue whether a firm’s ROA and its life cycle stage will both exhibit significant explanatory power when included directly in accruals expectation models. I argue that controlling for a firm’s ROA does not necessarily eliminate the effect of a firm’s life cycle stage on accruals. For example, a growing firm and a declining firm are likely to report a negative ROA. If the firm of interest is in a rapid growth stage of its life cycle, then a performance-matched firm based on negative ROA could yield either a rapid growth firm or a declining firm. If the performance-match firm

is another rapid growth firm, then it is likely that both firms will report positive working capital accruals, thereby resulting in no significant differences in the firms' working capital accruals. However, if the performance-match firm is a declining firm, then it is likely that the positive working capital accruals of the firm of interest will appear even more positive when compared to the negative working capital accruals of a declining firm.

In order to resolve this empirical issue, I run a robustness check according to the methods suggested in Kothari, Leone, and Wasley (2005), or K LW. K LW discuss two approaches to incorporate ROA into accruals expectation models. One approach is to calculate the difference between the firm of interest's residual from the accruals expectation models and a performance matched firm's residual. Another approach is to include ROA as an explanatory variable in the model, then examine the properties of the residual from the model for the firm of interest. I will use both approaches from K LW in my robustness tests.

3. Hypothesis Development

Prior research investigates how a firm's fundamental economic operating decisions change over the stages of its life cycle (see Spence, 1977; Spence, 1979; and Wernerfelt, 1985, among others). I draw on this research to show that managerial operating decisions of growing, mature, and declining firms directly affect, and introduce variation in, a firm's normal or expected accruals properties.

3.1 The Sign of Working Capital Accruals Over a Firm's Life Cycle

Managerial operating decisions of growing firms necessitate large investments in working capital. Designing, launching, and selling a new product require a firm to build productive capacity, to purchase fixed assets, and to manufacture large quantities of inventory. Large scale production increases a firm's current period inventories but facilitates long term benefits,⁵ such as economies of scale, lower fixed costs per unit,⁶ and reduced probability of inventory shortages. For a firm that is expanding its operations, investments in fixed assets are accompanied by investments in working capital to support growth (Bushman, Smith, and Zhang, 2005).

Zhang (2005) finds evidence that a firm's working capital accruals are positively related to other growth attributes, such as growth in the number of employees, growth in sales, growth in fixed assets, and growth in financing activities. The nature of accrual accounting during periods of a firm's growth and decline leads a growing firm to record large positive accruals.⁷ Consequently, a growing firm makes working capital investments that generate large positive working capital accruals.

A mature firm sells products that have limited growth opportunities, which implies that substantial investments in working capital are not likely to generate long-term sales growth. However, these products have a customer base that actively makes

⁵ Hribar (2002) notes that abnormally high or low accruals might arise out of the natural course of operations of a firm. For instance, bloated inventory levels might provide fundamental signals about the future performance of the firm. These accruals do not necessarily indicate earnings management behavior by the firm. For example, inventory purchases do not directly impact net income, but rather decrease the cash from operations, thereby increasing the accrual component of earnings.

⁶ A firm lowers its fixed costs per unit by allocating its total fixed costs in the current period over a larger number of units manufactured.

⁷ Bushman, Smith, and Zhang (2005) observe the following: "Accrual accounting by its nature smoothes earnings by recognizing higher (lower) earnings than cash flows during periods of growth (decline), suggesting a positive correlation between accruals and growth. During expansions, investment in fixed assets is naturally accompanied by investments in working capital."

purchases, which yields positive cash flow from operations. A mature firm makes operating decisions with increasing emphasis on sustaining current profitability (through quality control, promotional spending, and a streamlined production process) and decreasing emphasis on investing in working capital.⁸ A mature firm decreases its investments in working capital, which leads to lower working capital accruals. These arguments lead to the following prediction:

Hypothesis 1a (H1a): Working capital accruals of growing firms are *positive* compared to those of mature firms, *ceteris paribus*.

A declining firm engages primarily in liquidation activities, as opposed to operating activities. One type of liquidation activity involves adjusting the book value of firm assets to reflect liquidation value. A firm that is exiting businesses, selling off inventory, downsizing, and undertaking restructurings will revalue assets and liabilities to avoid assets being overstated or liabilities being understated (Dechow and Ge, 2005). During this revaluation process, write-offs are recorded to adjust the values of inventories, accounts receivables, and property, plant and equipment (see Francis, Hanna, and Vincent, 1996; Rees, Gill, and Gore, 1996; Riedl, 2004). A declining firm is expected to record write-offs, which bring about negative accruals adjustments.

A second type of liquidation activity conducted by a declining firm involves selling off stale inventories at deep discounts and collecting outstanding accounts receivables. A declining firm conducts these activities to close out transactions initiated in prior periods. The closing out process produces negative accruals adjustments. These arguments lead to the following prediction:

⁸ Mature products exhibit sales that have either peaked or shown very little growth. Consequently, mature firms make operating decisions that maintain, rather than increase, a firm's productive capacity.

Hypothesis 1b (H1b): Working capital accruals of declining firms are *negative* compared to those of mature firms, *ceteris paribus*.

3.2 Pattern of Abnormal Working Capital Accruals Over a Firm's Life Cycle

A large number of empirical studies use accruals expectations models to produce estimates of a firm's normal accruals (see the models in Jones, 1991; Dechow, 1994; Dechow, Kothari, and Watts, 1998; Barth, Cram, and Nelson, 2001; Dechow and Dichev, 2002; McNichols, 2002; and Ball and Shivakumar, 2005). An underlying assumption of these accruals models is that a manager's normal, non-discretionary accruals decisions are captured by the association between current period working capital accruals and cash flow and changes in revenues that occur within one year. These models treat all accruals decisions as uniform and thus expect a wide variety of accruals to generate similar associations with cash flow and changes in revenues.⁹

I argue that a manager's operating decisions and the resulting accruals properties are richer and more complex than those previously characterized by accruals expectation models. By assuming that a firm's "normal" accruals decisions are predicted by cash flow and changes in sales that occur within one year, widely-used accruals expectation models are likely to erroneously classify a growing (declining) firm as reporting positive (negative) abnormal accruals.

A growing firm makes large working capital investments that lead to large working capital accruals. Working capital accruals are typically expected to generate

⁹ Some notable exceptions include the following studies. McNichols and Wilson (1988) model the behavior of a specific accrual, the provision for bad debt expense. Kothari, Leone, and Wasley (2005) use a performance-matched accruals approach. Ball and Shivakumar (2005) document that the relation between accruals and cash flow varies across economic gains and losses. Additionally, Dopuch, Mashruwala, Seethamraju, and Zach (2005) document that the relation between working capital accruals and changes in sales varies with "accrual determinants" that are derived in Dechow, Kothari, and Watts (1998).

cash flow realizations within a year. However, a new product typically becomes successful after several years of production. These working capital investments are expected to bring about long-term benefits, as realized in cash flow and changes in revenues *beyond* the subsequent one year period.¹⁰ However, widely-used accruals expectation models capture the association between accruals and near-term (within a year) cash flow and changes in revenues. Consequently, a “one-size fits all” accruals expectation model is likely to identify greater than expected accruals for a growing firm.¹¹

McNichols (2000) shows that a firm that displays higher growth in its earnings will also have higher discretionary accruals. Other studies also provide empirical evidence that a firm with higher (lower) earnings is likely to exhibit significantly positive (negative) discretionary accruals (Dechow, Sloan, and Sweeney, 1995; Kasznik, 1999; McNichols, 2000). These arguments lead to the following prediction:

Hypothesis 2a (H2a): Widely-used accruals expectation models are likely to identify *positive* “abnormal” working capital accruals for growing firms compared to those of mature firms, *ceteris paribus*.

A declining firm holds assets that do not generate sufficient cash flow to fund continued production and are likely to become impaired. A firm recognizes an impairment of its assets by recording a write-off, which leads to negative accruals

¹⁰ If a firm’s new product is successful, these investments in working capital will help protect the firm’s competitive advantage. However, if the new product does not become successful, the firm’s previous investment in working capital is a sunk cost.

¹¹ Bushman, Smith, and Zhang (2005) illustrate the following example. Consider a firm that buys inventory in response to an impending increase in demand, pays cash for it, but does not sell it by the end of the period. For this firm, cash flow from operations is lowered because the firm paid out cash, and working capital accruals are higher because inventory is increased. Although the firm’s actual cash is reduced, profits are not because unsold inventory is considered an asset, not an expense. Inventory only impacts profits in the period when it is sold. In this example, growing firms are likely to have positive working capital accruals and low cash flow realizations.

adjustments. Timely accruals recognize the impact of a firm's economic losses in a period prior to the realization of the losses in cash flow (Basu, 1997; Ball and Shivakumar, 2005).¹² Consequently, a declining firm that records timely write-offs displays more negative accruals than would be predicted by near-term (within a year) cash flow and changes in revenues. Since accruals expectation models do not adjust for these life cycle fundamentals, these models would likely identify negative abnormal accruals for a declining firm. These arguments lead to the following prediction:

Hypothesis 2b (H2b): Widely-used accruals expectation models are likely to identify *negative* “abnormal” working capital accruals for declining firms compared to those of mature firms, *ceteris paribus*.

3.3 Managerial Incentives to Record Abnormal Accruals Over a Firm's Life Cycle

A competing explanation for variation in accruals is that managerial incentives to alter reported accounting numbers also vary over a firm's life cycle. For example, McNichols (2000) documents that a firm with higher growth is likely to exhibit more positive discretionary accruals estimates than a firm with lower growth. One possible explanation for these results is that a growing firm engages in greater earnings management.¹³ Likewise, Bushman, Smith, and Zhang (2005) observe that managerial investments in working capital can occur even when managers are acting opportunistically.¹⁴ Managerial incentives to alter a firm's earnings have been examined

¹² Basu (1997, pp. 15-16) states the following. “Unrealized losses reduce current earnings but do not impact current cash flow, while unrealized gains affect neither current earnings nor current cash flow.” This argument implies that accruals' recognition of unrealized losses occurs prior to the realization of the losses in current cash flow.

¹³ McNichols (2002) argues that the findings indicate that “without explicitly partitioning on any incentive variable, firms with higher growth in earnings have higher discretionary accruals.”

¹⁴ Bushman, Smith, and Zhang (2005) argue the following. “For example, consider an empire-building executive whose investment decisions are unrelated to investment opportunities. In this case, while WCACC [working capital] contain no information regarding investment opportunities, it may still be

in specific settings, including a firm's initial public offering of shares and a firm's impending violation of debt covenants. I draw upon research in these settings in order to outline how, under a competing explanation, managerial incentives to alter earnings would likely vary across the stages of a firm's life cycle.

Teoh, Welch, and Wong (1998) demonstrate that a firm that reports unusually high accruals in the year of its initial public offering (IPO) will experience poor stock returns in subsequent years. They argue that the IPO process is particularly susceptible to earnings management because of high information asymmetry.¹⁵ Teoh, Wong, and Rao (1998) and Friedlan (1994) document that IPO firms have positive issue-year abnormal accruals. However, Aharony, Lin, and Loeb (1993) fail to find evidence that a firm records significant abnormal accruals around the time of its IPO. Although these studies provide mixed empirical evidence, they concur that managers face incentives to record *positive* abnormal accruals in order to increase a firm's earnings around an IPO.

An IPO firm and a growing firm are similar in that both types of firms are expected to (1) report high earnings in future periods and (2) obtain long term financing from external sources. Managers of both types of firms face incentives to report successful firm performance in order to obtain favorable financing terms. This competing explanation predicts that a manager of a growing firm faces incentives to record more positive abnormal accruals than a manager of a mature firm. Recall that

positively related to capital expenditure, as expanding firms likely increase both capital expenditures and working capital investments."

¹⁵ Teoh, Welch, and Wong (1998) state the following. "Managers can increase current accruals, for example, by advancing recognition of revenues with credit sales (before cash is received), by delaying recognition of expenses through assumption of a low provision for bad debts, or by deferring recognition of expenses when cash is advanced to suppliers.... It is difficult for investors to infer how much of the accruals are discretionary (i.e., unusual managerial choices given the underlying timing of cash flows). Given the business conditions typically faced by the firm in the industry, some accrual adjustments are appropriate and necessary, and so are expected by investors."

under H2(a), widely-used accruals expectation models are likely to identify positive abnormal accruals for growing firms. Note that the competing explanation and H2(a) both predict that growing firms are likely to exhibit more positive abnormal accruals than those of mature firms.

Additionally, previous research examines a manager's accruals decisions when a firm approaches financial distress, as proxied by impending violation of debt covenants. Sweeney (1994) documents that a manager of a firm approaching default responds with income-increasing accounting changes. DeFond and Jiambalvo (1994) show that in the year prior to a firm's covenant violations, a manager records significantly positive abnormal accruals. A financially distressed firm and a declining firm are similar in that both types of firms face impending shutdown of operations due to poor firm performance. Managers of both types of firms have incentives to report improved firm performance in order to avoid loss of employment and shutdown of the firm. The competing explanation predicts that a manager of a declining firm faces incentives to record more positive abnormal accruals than a manager of a mature firm. Note that the prediction under the competing explanation differs from the prediction under H2(b), which states that widely-used accruals expectation models are likely to identify more negative abnormal accruals for declining firms compared to mature firms.

3.4 Working Capital Accruals Associations Over a Firm's Life Cycle

Introducing a new product to the market entails high risk for a firm because of the substantial investments required and the high probability of failure.¹⁶ However, the

¹⁶ Consider a firm that starts production of a new good. This firm spends its available cash to finance production, and the costs incurred by the firm are capitalized in the value of current inventory. Although

introduction of a new product also promises high rewards for a firm, particularly if the firm is the first mover in a new market. A firm experiencing rapid growth will make working capital investments that affect its far-term (beyond one year) cash flow and changes in revenues. As the firm's growth slows down, the benefits of the working capital investments are likely to shift to *near-term* (within a year) cash flow and changes in revenues. Widely-used accruals expectation models match a firm's investments in working capital in the *current period* with *near-term* (within a year) realized cash flow and changes in revenues.¹⁷ Consequently, a growing firm's working capital accruals are expected to exhibit a strong association with near-term (within a year) cash flow from operations and changes revenues.

A firm that experiences growth in sales will attract the attention of competing firms.¹⁸ If competitors introduce a superior product, then a firm's working capital investments will not lead to increases in firm performance. Additionally, technological innovations will also force a firm to make additional investments in working capital to keep up with these advances. The emergence of competing firms is likely to interfere with a firm's sales growth. This scenario usually occurs as a firm enters the maturity stage of its life cycle, which is characterized by slow growth in sales, stable cash flow from operations, and numerous competing firms. Because of the operational threats from competitors, a mature firm's investments in working capital are less likely to generate

this transaction has no impact on the firm's income statement, the firm records a decrease to cash flow and an increase to working capital accruals.

¹⁷ See Jones (1991), Dechow, Kothari, and Watts (1998), Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005).

¹⁸ Although the first firm in a new product market usually enjoys a first mover advantage, this advantage diminishes as the firm, the product, and the industry mature. The larger the rents associated with a firm's new product, the higher the likelihood that competitors will enter this market. Numerous competing firms also create incentives in the entire industry for rapid technological innovation in the manufacturing process. As a result, competing firms can easily manufacture similar or identical products with lower production costs.

near-term (within a year) cash flow or changes in revenues.¹⁹ As a result, accruals' association with near-term (within a year) cash flow from operations and changes in revenues is expected to be less strong for mature firms when compared to that of growing firms. This argument leads to the following prediction:

Hypothesis 3a (H3a): The association between working capital accruals and near-term firm performance variables is *stronger* for growing firms compared to mature firms, *ceteris paribus*.

A declining firm records accruals adjustments in conjunction with its liquidation activities. These accruals adjustments are likely to involve timely recognition of economic losses. Ball and Shivakumar (2005) note that accruals' role in timely loss recognition increases the timeliness of earnings and improves the usefulness of financial reporting. However, accruals' role in timely loss recognition also increases the volatility of accruals, which has been interpreted to indicate lower accruals quality (Ball and Shivakumar, 2005). A declining firm's operational difficulties suggest that its investments in working capital accruals are unlikely to generate *near-term* (within a year) cash flow and changes in revenues.²⁰ Consequently, the association between working capital accruals and a firm's near-term (within a year) cash flow from operations and

¹⁹ A mature firm also faces limited growth opportunities for its product, which implies that substantial investments in working capital are not likely to generate long-term benefits. However, this impacts the magnitude of working capital accruals in relation to cash flow.

²⁰ In this hypothesis, I address the association of working capital accruals (such as accounts receivables, inventories, and accounts payables) with *near-term* (within a year) cash flows and changes in revenues. A related issue involves how a declining firm's accruals adjustments are likely to affect *far-term* (beyond the subsequent one year period) cash flows and changes in revenues. A firm that recognizes economic losses in a timely manner is likely to record *negative accruals* in period *t* that are likely to forecast negative cash flow from operations in periods *t+2* and beyond as well as negative changes in revenues in periods *t+2* and beyond. Since this hypothesis involves working capital accruals, which are expected to generate cash flows within one year, then I focus on the *near-term* periods and do not directly address predictions involving *far-term* period variables.

changes revenues is expected to be weaker for a declining firm. These arguments lead to the following hypothesis:

Hypothesis 3b (H3b): The association between working capital accruals and near-term firm performance variables is *weaker* for declining firms compared to mature firms, *ceteris paribus*.

4. Empirical Classification of Firm Life Cycle Stages and Sample Description

4.1 Identification of the Stages of a Firm's Life Cycle

The life cycle concept is argued to be related to the product life cycle, which is commonly taught in marketing textbooks, investment decisions in economics, and general growth variables in empirical accounting research. The categorization used in this study does not necessarily span the life cycle categorizations found in these different academic areas. The focus of this study is to examine manager's operating decisions that vary over a firm's life cycle, and several variables are used in order to decrease the reliance and influence of any one variable. Since the hypotheses tested involve a firm's accruals, it is important to identify a firm's life cycle using variables that are as independent of accruals as possible.

4.1.1 Life Cycle Variable #1: Capital Expenditures

The first variable that I use to identify a firm's life cycle stage is capital expenditures, or Capex. A firm's capital expenditures represent significant investments in plant and equipment. Due to the magnitude of the firm's investments, its capital purchasing activities are usually "lumpy" from year to year. A firm's investment in plant and equipment requires significant outlays of cash for the initial purchase, which is recorded as cash flow from investing activities. After the initial purchase of plant and

equipment, a manager must depreciate the cost of the asset over the estimated useful life. Although capital expenditures for plant and equipment are mechanically associated with depreciation expense, which is an accrual, it is unclear whether an association exists between capital expenditure activities and adjustments to working capital accounts involving accounts receivables, inventories, and accounts payables.

Arguments in Bushman, Smith, and Zhang (2005) suggest that a firm's investment in fixed assets is also linked with investments in working capital to support anticipated growth.²¹ Although a firm's capital expenditures will generate long-term accruals (through depreciation) and working capital accruals (through changes to inventories, accounts receivables, and accounts payables), the depreciation accruals arise mechanically, while the working capital accruals arise as a function of operating decisions. Additionally, variation in the depreciation accrual from year to year is typically related to a firm's choice of straight line or accelerated depreciation methods; in contrast, this study tests whether variation in working capital accruals from year to year is related to a firm's operating decisions over its life cycle.

Capital expenditures are also used in order to identify a firm's life cycle in Anthony and Ramesh (1992). They argue that a growing firm is likely to have high capital expenditures, while a declining firm is likely to have low capital expenditures. Anthony and Ramesh (1992) use a firm's capital expenditures to capture how a firm

²¹ Once a firm purchases plant and equipment, the firm can then produce inventories, which leads to increases in working capital. When the inventories are sold to customers, the firm is likely to grant credit in the form of accounts receivables, resulting in more increases to working capital. If the firm spends money on the manufacturing process of the inventories, the firm will record accounts payables that offset any inventories or accounts receivables.

increases its capital capacity.²² I choose to scale all variables by the same number, average total assets, in order to maintain consistency. Therefore, I define capital expenditures ($Capex_{j,t}$) as $data\#128 / \text{average total assets}$.

4.1.2 Life Cycle Variable #2: Changes in Revenues

The second variable that I use to identify a firm's life cycle stage is the change in a firm's revenues. Jones (1991) argues that a firm's change in revenues is an objective measure of a firm's operations, and she models a firm's total accruals as a function of change in revenues and gross property, plant, and equipment.²³ A firm's total change in revenues is also argued to capture its overall expansion of earnings through more units of sales (Stickney and Weil, 2006). Spence (1979) argues that a firm's growth phase can be characterized by "rapid and accelerating growth in sales". Anthony and Ramesh (1992) argue that a firm's growth in sales²⁴ is likely to be high for growing firms and low for declining firms. Since I scale all variables by average total assets in order to maintain consistency, I define change in sales ($\Delta Rev_{j,t}$) as $\Delta data\#12 / \text{average total assets}$.

4.1.3 Life Cycle Variable #3: Cost of Goods Sold

The third variable that I use to identify a firm's life cycle stage is level of cost of goods sold.²⁵ Stickney and Weil (2006) argue that when a firm is no longer growing, it is likely to report increased earnings associated with reductions in cost. Consequently, a

²² Anthony and Ramesh (1992) define capital expenditures as $data\#128 / (\text{market value of equity} + \text{book value of debt})$.

²³ The use of a firm's changes in revenues as an objective measure of firm performance is an open question because changes in sales can be driven by cash-based sales and accruals-based sales (e.g., accounts receivable), which can potentially be manipulated. Dechow, Sloan, and Sweeney (1995) adjust the firm's total change in revenue and subtract off the accrual-based sales (proxied by the changes in accounts receivable) in order to isolate "non-manipulated" growth in revenues.

²⁴ Anthony and Ramesh (1992) define sales growth as $((data\#12 - lagdata\#12) / lagdata\#12) * 100$.

²⁵ See section 5.4.8 for a robustness test in which *change* of cost of goods sold, as opposed to *level* of cost of goods sold, is used.

growing firm is likely to have high production costs, while a mature firm is likely to maintain its competitive position through low production costs. A firm's production costs each period typically consist of variable costs and fixed costs. Variable costs per unit are not expected to change from period to period. However, fixed costs per unit will decrease when either (1) holding total fixed costs constant, a larger number of units are produced per period, or (2) total fixed costs decrease while the number of units produced stays constant. Both scenarios involving decreases in fixed costs per unit are examples of efficiencies that a firm will experience as it enters maturity. A firm's lower fixed production costs per unit are associated with specific inventories and will be recognized as cost of goods sold in the period when the revenue is recorded. I operationalize this aspect of production costs by focusing on a firm's cost of goods sold for the period, $(CGS_{j,t})$ defined as $\text{data\#41} / \text{average total assets}$.

4.1.4 *Life Cycle Variable #4: Firm Age*

The fourth variable that I use to identify a firm's life cycle stage is firm age. Anthony and Ramesh (1992) use firm age as a non-financial life cycle variable in order "to minimize the effect of possible correlation of risk with life cycle stage." Anthony and Ramesh (1992) treat firms with lower values of firm age as growing and firms with higher firm age as stagnant. Since the variable of firm age is one that a manager is unable to manipulate from year to year, it provides an external way to measure the firm's operational progress from year to year. I use firm age ($Age_{j,t}$), as measured by the number of years the firm first appears on either Compustat or CRSP.

4.1.5 Life Cycle Variable #5: Cash Flow Profile

The fifth variable that I use to identify a firm's life cycle stage is the firm's cash flow profile, which is frequently articulated and illustrated in accounting textbooks as conveying information about the firm's operating decisions over its life cycle. Stickney and Weil (2006) argue that a firm that expands its operations would likely report increases in earnings and negative CFO. Consistent with this argument, Dechow (1994) argues that a new firm will outlay cash when it begins operations (leading to a negative CFO), but CFO is a noisy measure of the firm's current period performance.²⁶ I classify a firm with a negative CFO as a growing firm.

Stickney and Weil (2006) argue that a firm that survives in its industry and matures will likely report *positive* CFO. Dechow (1994) argues that if a firm has stable cash requirements for working capital, investment, and financing, then CFO has few timing and matching problems and is likely to be a useful measure of firm performance. I argue that this scenario is consistent with a mature firm, and thus I classify a firm with a positive CFO as a mature firm.

The cash flow profile of a declining firm is an open empirical question. Stickney and Weil (2006) argue that, in some cases, a declining firm will report negative working capital accruals (from collecting outstanding accounts receivable and selling inventories) and *positive* CFO (driven by cash collections from previous transactions). In contrast, Ball and Shivakumar (2005) argue that a firm that experiences economic losses will exhibit a *negative* CFO and negative accruals. Since the Ball and Shivakumar (2005)

²⁶ However, Ball and Shivakumar (2005) argue that a firm's negative CFO is a proxy for economic losses, and accruals will recognize economic losses in a timely manner; it is an open question whether Ball and Shivakumar's argument applies to negative CFO for growing firms because of the associated "noise" in CFO for these firms.

argument applies to the general case of economic loss, which is consistent with a firm that is declining in its operations and will likely face shutdown, then I use a negative CFO to identify a declining firm. However, since a growing firm and a declining firm are likely to both report a negative CFO, I then used another variable to distinguish between the two stages of the firm life cycle. If a firm has a negative CFO and borrows capital from shareholders, with a positive cash flow from financing or positive CFF, then I classified the firm as growing. However, if a firm has a negative CFO but repays its shareholders, thereby exhibiting a negative CFF, then I classify the firm as declining. Recall that a firm with a positive CFO is classified as maturing.

4.2 Sample Selection

I disclose the specific order of my sample selection procedures in Table 1 Panel A so that these results can be compared to and replicated by other studies. I first obtain all observations listed in the Compustat Industrial Annual database for the period 1960-2004 (741,380 firm-year observations). I require all-firm years to have non-missing values of Compustat data item #6 (298,393 firm-year observations) and average total assets greater than \$1 million to avoid small denominator problems (266,204 firm-year observations). I next assign a life cycle rank based on relative values of each of the operating variables. I do not require a minimum number of observations in order to calculate firm-year operating variables, which enables me to assign a life cycle rank to all 266,204 firm-year observations.

After assigning life cycle ranks to all 266,204 firm-year observations, I then run the accruals expectation models on the portion of the sample that has non-missing values of cash flow from operations data#308 (see Table 1 Panel B), which reduces the sample

to 126,534 firm-year observations. I delete the 1st and 99th percentiles each year of the following variables, which are required as inputs to accruals expectation models: working capital accruals (WCAccruals), cash flow from operations as calculated from the cash flow statement using data#308 (CFO_cf), changes in revenues (ΔRev), and Gross Property, Plant, and Equipment (PPE),²⁷ which results in 117,996 firm-year observations. I also require all observations to have non-missing values of WCAccruals, CFO_cf for years t, t-1, and t+1, ΔRev , and PPE, which reduces the sample size to 87,819 firm-year observations. For the firm-specific analysis, I require firms to have eight or more annual observations, consistent with the procedure in Dechow and Dichev (2002), which results in 4,968 unique firms.

4.3 Empirical Classification of Firm Life Cycle Stages

Table 2 shows my empirical classification of firm-year observations into life cycle stages. Within each Fama and French (1997) industry group, I assign each firm-year observation a rank ranging from 1-100 along several firm-year dimensions: capital expenditures (Capex), changes in revenues (ΔRev), cost of goods sold (CGS), firm age (Age), and cash flow profile (Cash Profile).²⁸

²⁷ *Accruals Regression Variable Definitions:* Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. Working capital accruals (*WCAccruals_{j,t}*) = - (data#302+ data#303+ data#304 +data#305+ data#307)/ average total assets. Any missing values of these inputs are coded as 0. Cash flow from operations (*CFO_cf_{j,t}*) = (data#308)/ average total assets, as calculated from the cash flow statement. *CFO_cf_{j,t-1}* and *CFO_cf_{j,t+1}* = Lag and lead values of truncated *CFO_cf_{j,t}* (truncated the top and bottom 1%). Changes in Revenues ($\Delta Rev_{j,t}$) = $\Delta data\#12$ / average total assets. Gross Property, Plant, and Equipment (*PPE_{j,t}*) = data#7/ average total assets.

²⁸ *Operating Variable Definitions:* Capital expenditures (*Capex_{j,t}*) = data#128/ average total assets. Changes in revenues ($\Delta Rev_{j,t}$) = $\Delta data\#12$ / average total assets. Cost of goods sold (*CGS_{j,t}*) = data#41/ average total assets. Firm age (*Age_{j,t}*) = firm age as measured by the number of years data#6 is reported in Compustat. Cash flow profile (*Cash Profile_{j,t}*) involves a comparison of the firm-year cash flow from operations (Cash Profile CFO), as calculated from the balance sheet ((data#18- ($\Delta data\#4$ - $\Delta data\#5$ - $\Delta data\#1$ + $\Delta data\#34$ - data#14))/ average total assets) to the firm-year cash flow from financing (Cash Profile CFF), as calculated

Spence (1979) argues that growing firms are likely to have high capital expenditures (Capex), large positive changes in revenues (ΔRev), and high production costs such as cost of goods sold (CGS). Anthony and Ramesh (1992) also argue that growing firms will exhibit high capital expenditures (Capex) and large positive changes in revenues (ΔRev). The authors also include firm age (Age) to capture a firm's progression through its life cycle. Finally, Black (1998) argues that a firm is likely to have positive cash flow from operations in the maturity stage and negative cash flow in the growth and decline stages of the firm's life cycle. Other texts concur with this characterization of cash flow from operations and impose additional restrictions on the profiles of cash flow from operations, investing, and financing (Stickney and Brown, 1999). I opt to use a general characterization of a firm's cash flow profile. If a firm-year exhibits cash flow from operations that is positive, then I assign a rank of 50. If a firm-year exhibits cash flow from operations that is negative, then I classify the firm-year according to cash flow from financing; if cash flow from financing is positive, then I assign a rank of 1, whereas if cash flow from financing is negative, then I assign a rank of 100.

I combine ranks for all five measures Capex, ΔRev , CGS, Age, and Cash Profile into a composite variable Life Cycle Rank ranging from 1-100 within each Fama and French (1997) industry group. Firm-year observations with ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of Rapid Growth, Slow Growth, Maturity, Early Decline, and Late Decline. Table 2 shows the ranking procedure for the 266,204 firm-year observations. My empirical classification of life cycle stages differs

from the balance sheet ($\Delta\text{data\#9} + \Delta\text{data\#34} + (\Delta\text{data\#60} - \text{data\#20}) + \Delta\text{data\#10}$)/ average total assets) and based on the methods in the appendix of Livnat and Zarowin (1990).

from the four stages of the product life cycle, which consist of introduction, growth, maturity, and decline (Kotler, 1997).

4.4 Classification of Firm Life Cycle Stages: Textbook Examples vs. Empirical Results

Stickney and Weil (2006) give examples of firms that exhibit four stages of a firm life cycle; those stages involve rapid growth, seasoned growth, maturity, and decline (see Appendix 1). In Appendix 2, I investigate Stickney and Weil (2006)'s textbook classifications in more detail. I take the cases involving Amazon.com, Discount Auto Parts, and Anheuser-Busch and identify the corresponding fiscal year described in Stickney and Weil (2006). I then compare the Stickney and Weil (2006) empirical classification of life cycle stages to my empirical classification used in Table 2 for the 266,204 firm-year observations.

Appendix 2 shows that the classifications of these two methods are similar for Amazon.com, which is in the growth stage, and for Levitz Furniture, which is in the decline stage. Although the classifications of these two methods differ for the remaining two firms (Discount Auto Parts and Anheuser-Busch), it is important to note that the *relative* life cycle ranks under my empirical methods is identical to the relative ranks of from Stickney and Weil (2006). Specifically, Stickney and Weil (2006) classifies Amazon.com as a growing firm and Discount Auto Parts, Anheuser-Busch, and Levitz Furniture as illustrating each of the subsequent stages of a firm's life cycle. My empirical classification assigns each of these firms a life cycle rank of 31, 66, 68, and 100, respectively, which shows that these firms' *relative* rankings are identical to those in and Weil (2006). The accruals regression analysis makes use of *relative* rankings, in which the hypotheses involve comparisons of a growing firm to a mature firm, as well as a

declining firm to a mature firm. Consequently, the illustration in Appendix 2 provides external validation for the use of my empirical classification of life cycle stages.

4.5 Descriptive Statistics

Although I assign life cycle ranks to each of the 266,204 firm-year observations, I run the accruals regression on the firm-year observations that have information from the statement of cash flows (which occurs for 87,819 firm-year observations). This procedure is consistent with that used in prior accruals studies (Dechow and Dichev, 2002; and Ball and Shivakumar, 2005) and is shown in Table 1 Panel B. Table 3 Panel A shows the descriptive statistics for the 87,819 firm-year observations. Average working capital accruals are .011, which is slightly lower than the mean working capital accruals of .015 reported in Dechow and Dichev (2002). Mean cash flow from operations of .033 is also lower than the mean cash flow of .075 in Dechow and Dichev (2002).

Since the variable definitions used in this study are identical to those used in Dechow and Dichev (2002), then any differences in the descriptive statistics are most likely due to either (1) the different time periods used or (2) the different observations in the two samples. First, the time period for this study spans up to the year 2004, whereas the latest year in Dechow and Dichev (2002) is 1999. I chose to extend the time period of my study up until the most recent fiscal year available (2004) in order to achieve a comprehensive empirical life cycle classification method. Second, my study uses 87,819 firm-year observations compared to 15,234 firm-year observations in Dechow and Dichev (2002). The different number of observations in the two samples is due to the Dechow and Dichev (2002) requirement that each firm has at least eight annual observations. The eight-year requirement is likely to cause the number of firm-year

observations to decrease dramatically. Additionally, the eight year requirement is also likely to affect the descriptive statistics of the sample, as firms that become successful are the ones that would be able to survive for eight years. Unreported analyses confirm the differences in descriptive statistics for the sample in this study and those used in Dechow and Dichev (2002), which tend to have more positive cash flows from operations as well as a lower volatility of many of the operating variables. These unreported statistics are consistent with the eight-year requirement contributing to the differences in descriptive statistics.

4.6 Correlations

Table 3 Panel B shows the Pearson correlations between working capital accruals, cash flow from operations, and operating variables for 87,819 firm-year observations. All correlations in the table are significant at the 1% level with the exception of the correlation between CGS and Capex of + 0.01. The variable WCAccruals exhibits a negative correlation with CFO_cf of - 0.19. Likewise, WCAccruals exhibits a positive correlation with Capex (+ 0.02), a positive correlation with ΔRev (+ 0.29), a positive correlation with CGS (+ 0.06), and a negative correlation with Age (- 0.04). If growing firms are assumed to record large positive accruals, these correlations are consistent with the empirical classifications of these variables across life cycle stages. I expect CFO_bs and CFF_bs to exhibit non-linearity over the firm life cycle. The correlation assumes a linear relation between the variables and reveals that the variable WCAccruals exhibits an overall negative correlation with CFO_bs (- 0.07) and an overall positive correlation with CFF_bs (+ 0.06).

4.7 Life Cycle Classifications As Firms Transition From Year t to Year $t+1$

I also assess how my life cycle classifications behave as firms transition from the current year (year t) to the next year (year $t+1$), which is shown in Table 3 Panel C. Because managerial operating decisions require large, often irreversible, investments in working capital, one would expect a priori that life cycle classifications would remain stable from one year to the next year. Of the 87,819 firm-year observations that were used in accruals regressions, 78,508 have data for the current year and the subsequent year. For each stage of a firm's life cycle, the life cycle rank is more likely to stay within the same stage. For the 11,636 observations in the rapid growth stage, my empirical method is most likely to classify the next year as being in rapid growth (46%), while the next most likely classification is the more advanced life cycle stage of slow growth (25%). For the 14,415 observations in slow growth, the next year's observation is most likely to be classified as slow growth (33%), while the second most likely classification is the more advanced life cycle stage of maturity (25%). This same pattern occurs for the 15,999 observations in the maturity stage, as well as the 17,628 observations in the early decline stage. As for the 18,829 observations in late decline, the next year's observations will most likely to be classified as late decline (61%), but the second most likely classification is early decline (23%), which occurs because late decline is the last stage of a firm's life cycle.

5. Results from Regression Analysis

In my regression analysis, I use a Huber-White correction for general heteroscedasticity in the standard errors, based on Huber (1967) and White (1980). The

regressions also include dummy variables for Fama and French (1997) industry groupings and fiscal years.

5.1 Results for Hypothesis 1

Hypothesis 1 predicts that growing firms record more positive working capital accruals than do mature firms, while declining firms record more negative working capital accruals than do mature firms. I test Hypothesis 1 on 87,819 firm-year observations and present the results in the first column of Table 4. I first regress the variable *WCAccruals* on the indicator variables of Rapid Growth, Slow Growth, Maturity, Early Decline, and Late Decline in order to detect variation in working capital accruals, according to the following equation:

$$WCAccruals_{j,t} = b_0 + b_1RapidGrowth_{j,t} + b_2SlowGrowth_{j,t} + b_3Maturity_{j,t} \text{ (omitted)} \\ + b_4EarlyDecline_{j,t} + b_5LateDecline_{j,t} + e_{j,t} \quad (1)$$

The coefficients on Rapid Growth and Slow Growth are both significantly positive (+ 0.037 and + 0.010) at the 1% level. Similarly, the coefficients on Early Decline and Late Decline are both significantly negative (- 0.008 and - 0.015), also at the 1% level.

The results in the first column of Table 4 provide support for H1(a) and H1(b), but what is interesting to note is the *relative magnitude* of the coefficients. The coefficient on Rapid Growth of + 0.037 is more than twice the magnitude of the coefficient on Late Decline of - 0.015. However, according to the principle of accountings' asymmetrically timely gain and loss recognition, often taking the form of conservatism, losses are capitalized whereas gains are not. Under this principal, one would expect the coefficient on Late Decline, which proxies for declining operations, to be larger than the coefficient on Rapid Growth. The empirical results in Table 4

underscore the idea that a firm's managerial operating decisions, as captured by its life cycle, are *distinct from* the accounting property of asymmetrically timely gain and loss recognition.

5.2 Results for Hypothesis 2

Table 4 also contains the results of test of Hypothesis 2, which predicts that widely-used accruals expectation models are likely to identify more positive (negative) “abnormal” working capital accruals for growing (declining) firms. First, I establish a benchmark by applying the following accruals expectation model from McNichols (2002) to the sample of 87,819 firm-year observations:

$$WCAccruals_{j,t} = b_0 + a_1CFO_cf_{j,t} + a_2CFO_cf_{j,t-1} + a_3CFO_cf_{j,t+1} + a_4\Delta Rev_{j,t} + a_5PPE_{j,t} + e_{j,t} \quad (2)$$

For this benchmark regression, the coefficient on $CFO_cf_{j,t}$ is - 0.333 with a robust t-statistic of (70.76), which is negative and significant, as shown from previous empirical studies (Dechow, 1994). The adjusted r-square from this regression is 27.7%. Next, I incorporate the indicator variables Rapid Growth, Slow Growth, Maturity (omitted), Early Decline, and Late Decline into the McNichols (2002) model in (2) as follows:

$$WCAccruals_{j,t} = b_0 + b_1RapidGrowth_{j,t} + b_2SlowGrowth_{j,t} + b_3Maturity_{j,t} + b_4EarlyDecline_{j,t} + b_5LateDecline_{j,t} + a_1CFO_cf_{j,t} + a_2CFO_cf_{j,t-1} + a_3CFO_cf_{j,t+1} + a_4\Delta Rev_{j,t} + a_5PPE_{j,t} + e_{j,t} \quad (2)'$$

If the accruals expectation model in equation (2) fully captures accruals variation over a firm's life cycle, then the additional variables Rapid Growth, Slow Growth, Maturity (omitted), Early Decline, and Late Decline should not exhibit additional explanatory power when included in regression (2)'. The last column of Table 4 shows

that the coefficient on Rapid Growth of 0.005 is significantly positive, with a robust t-statistic of 5.47, which is significant at the 1% level. However, the coefficient on Slow Growth is + 0.001 but insignificant. These results indicate that managerial operating decisions are most likely to result in major accruals changes for the rapid growth stage of a firm's life cycle, whereas the decisions in the slow growth and maturity stages are similar to each other.

In contrast, the coefficients on Early Decline and Late Decline are both significantly negative (- 0.002 and - 0.004), which are both significant at the 1% level. Similar to the case of H1, the H2 coefficient for Rapid Growth of 0.005 is larger in magnitude than the coefficient on Late Decline of - 0.004. The results provide support for H2(a) and H2(b) overall, but the results are inconsistent with accountings' property of asymmetrically timely gain and loss recognition. The adjusted r-square for model (2)' is 27.8%, which is higher than that of model (2).

I provide further evidence for Hypothesis 2 by obtaining a proxy for the abnormal accruals for each firm-year. I calculate the abnormal accruals, proxied by the residual ($\hat{e}_{j,t}$), for each of the 87,819 firm-year observations using the following accruals expectations models:²⁹

$$\text{Model 1: } WCAccruals_{j,t} = b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \quad (3)$$

$$\text{Model 2: } WCAccruals_{j,t} = b_0 + b_1CFO_cf_{j,t} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \quad (4)$$

$$\text{Model 3: } WCAccruals_{j,t} = b_0 + b_1CFO_cf_{j,t} + e_{j,t} \quad (5)$$

²⁹ Model 1 is used in McNichols (2002). In this model, gross property, plant, and equipment is included as an independent variable. However, McNichols (2002) notes that the dependent variable of working capital accruals does not include depreciation. However, this specification is used only to allow for comparability with other accruals studies. Model 2 is used in Ball and Shivakumar (2005). Model 3 relates working capital accruals to cash flow from operations and is used in Ball and Shivakumar (2005). Model 4 is used in Dechow and Dichev (2002).

$$\text{Model 4: } WCAccruals_{j,t} = b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + e_{j,t} \quad (6)$$

I sort the 87,819 firm-year residuals ($\hat{e}_{j,t}$) from each of the four models into groups representing the life cycle stages. Table 5 shows the average of 87,819 firm-year residuals $\hat{e}_{j,t}$ by each life cycle stage. All four accruals expectation models show that the average firm-year $\hat{e}_{j,t}$ is more positive during times of Rapid Growth (ranging from 0.003 in model 1 to 0.029 in model 3) and more negative during times of Late Decline (ranging from - 0.016 in model 3 to - 0.003 in model 1). Figure 1 also illustrates a remarkable pattern in the average $\hat{e}_{j,t}$ over a firm's life cycle. All four accruals expectation models show that "abnormal" accruals, as proxied by $\hat{e}_{j,t}$, are more positive for growing firms and more negative for declining firms.

5.3 Results for Hypothesis 3

Hypothesis 3 predicts that the association between working capital accruals and firm performance variables declines over a firm's life cycle. I conduct two tests to provide evidence concerning Hypothesis 3. Table 6 and Table 7 show the results of the first test for Hypothesis 3, which involves a firm-specific analysis for the 4,968 unique firms in the sample. I calculate each firm's average life cycle rank over all of its fiscal years. For each firm, I calculate the adjusted r-square, or Adj R^2 , for each of the 4,968 firms under the four accruals expectations models shown in equations (1), (2), (3), and (4).

I provide descriptive evidence on accruals associations over the firm life cycle in Table 6. I sort the firm-specific Adj R^2 from each of the four accruals models into groups representing the life cycle stages. The majority of the variation in the average firm-

specific Adj R^2 occurs for the stages of Rapid Growth, Slow Growth, and Maturity. Additionally, Figure 2 illustrates the declining pattern of Adj R^2 , which is most prominent for the stages of Rapid Growth and Slow Growth. These results suggest that Adj R^2 is quite different for growing firms than it is for mature or declining firms. The significant decline in the explanatory power of these widely-used accruals expectations models suggests that these models are not adept at capturing the operating decisions of mature or declining firms.

I also run a regression relating each firm's Adj R^2 to indicator variables for Rapid Growth, Slow Growth, Maturity (omitted), Early Decline, and Late Decline, which represent each firm's average life cycle stage. Table 7 indicates that the coefficient on Rapid Growth is significantly positive for three of the four models, while the coefficient on Slow Growth is significantly positive at the 1% level for all four models. The coefficient on Early Decline is not significant under any of the four models, while the coefficient on Late Decline is significantly negative in all four models. This result provides evidence to support H3a, which predicts that accruals' association with firm performance variables is stronger for slow growth firms compared to mature firms. The result also supports H3b, which predicts that the accruals associations are weaker for late decline firms compared to mature firms.

6. Robustness Tests

6.1 Control for Performance from Kothari, Leone, and Wasley (2005)

Kothari, Leone, and Wasley (2005), or KLW, argue that adjusting accruals expectation models for a firm's return on assets (ROA) improves the specification and power of the associated empirical tests (see Section 2.4 for a detailed discussion of this

model). K LW suggest two empirical tests to incorporate a firm's ROA into the model. The first empirical test involves performance-matched, based on ROA, discretionary accruals. The second empirical test involves including a firm's ROA as an additional independent variable in the model.

6.1.1 Control for Performance With Performance-Matched Discretionary Accruals

I perform the K LW's first suggested empirical test, which involves selecting a performance-matched firm on the basis of its ROA. For this first test, I conduct sample selection procedures based on the methods in K LW and disclosed in Table 8 Panel A. In my previous empirical tests of H1 and H2, I identify a broad sample consisting of 266,204 firm-year observations and assign each of these observations a life cycle rank. I conduct this analysis once again in my first empirical test based on K LW. I use the accruals variable definitions from K LW³⁰ and apply the Jones model with 1/ lag total assets and modified-Jones model³¹ with 1/ lag total assets to the 266,204 observations.

Since performance-matching is done on the basis of ROA, I define a firm's ROA_t as (data #18/ lag total assets), as used in K LW. For each observation, I pick a "matched" firm-year with the closest ROA_t within each industry and each fiscal year. I also pick a "matched" firm-year with the closest Life Cycle Rank_t within each industry and each fiscal year. I require each firm-year observation to have a "match" on the basis of ROA_t , ROA_{t-1} , and Life Cycle Rank_t, which reduces the sample size from 266,204 to 235,530

³⁰ *Accruals Regression Variable Definitions from K LW:* Lag Total Assets_{j,t} = lagdata#6. Total accruals (TotalAccruals_{j,t}) = (Δdata#4- Δdata#5- Δdata#1+ Δdata#34- data#14)/ lag total assets. Any missing values of these inputs are coded as 0. 1 / (lag total assets) = 1 / (lagdata#6). Changes in Revenues (ΔRev_{j,t}) = Δdata#12/ lag total assets. Modified changes in Revenues (ΔRev_{j,t} - ΔAccounts Receivable_{j,t}) = (Δdata#12 - Δdata#2) / lag total assets. Gross Property, Plant, and Equipment (PPE_{j,t}) = data#7/ lag total assets. *Control for Performance from K LW:* Each firm-year observation's return on assets (ROA) is used as a control for performance. $ROA_t = (\text{data \#18} / \text{lag total assets})$. $ROA_{t-1} = \text{lag value } ROA_t$.

³¹ Jones Model: TotalAccruals_{j,t} = $b_0 + b_1(1/\text{lagtotalassets}_{j,t}) + b_2\Delta Rev_{j,t} + b_3PPE_{j,t} + e_{j,t}$. Modified-Jones Model: TotalAccruals_{j,t} = $b_0 + b_1(1/\text{lagtotalassets}_{j,t}) + b_2(\Delta Rev_{j,t} - \Delta \text{Accounts Receivable}_{j,t}) + b_3PPE_{j,t} + e_{j,t}$.

firm-year observations, which is referred to as the Full Sample. Following the methods in K LW, I require each firm-year observation to have non-missing variables for all sub-sample tests, which reduces the sample size to 137,291, referred to as the Partial Sample.

K LW calculate a performance-matched discretionary accrual, where matching occurs on the basis of ROA_t and ROA_{t-1} , for each firm-year observation. In their Table 1, K LW examine the descriptive statistics to compare whether performance-matched discretionary accruals are, on average, closer to zero than traditional discretionary accruals. I conduct a similar analysis on the descriptive statistics for discretionary accruals applied to the Full Sample and the Partial Sample, shown in Table 8 Panels B and C.

Table 8 indicates that performance-matching on the basis of Life Cycle Rank_{*t*}, as opposed to ROA_t and ROA_{t-1} , is effective in the Full Sample in reducing systematic predictability in discretionary accruals. Within the Full Sample in Table 8 Panel B, performance matching on the basis of Life Cycle Rank_{*t*} gives a mean discretionary accrual of 0.0028, which is the closest to zero. Within the performance-matched approaches only, matching on Life Cycle Rank_{*t*} also exhibits the lowest standard deviation (2.9248) and the discretionary accruals in the lower quartile and upper quartile that are closest to zero (- 0.0757 and + 0.0786, respectively). In the Partial Sample in Table 8 Panel C, none of the three methods of performance matching dominate in producing discretionary accruals that are closest to zero. However, performance-matching on the basis of ROA_t and ROA_{t-1} outperforms that of Life Cycle Rank_{*t*} when comparing median discretionary accruals in both the Full Sample and Partial Sample.

KLW further examine the mean and median discretionary accruals for upper and lower quartiles of the Partial Sample based on each of five variables: Book/Market, Sales Growth, E/P Ratio, Size, and Operating Cash Flow.^{32 33} Within the quartiles of sub-samples shown in Table 8 Panels D and E, performance-matching on the basis of Life Cycle Rank_t outperforms the other performance-matched methods in very specific circumstances. Table 8 Panel D shows that performance-matching on the basis of Life Cycle Rank_t produces the mean discretionary accruals closest to zero in the Sales Growth sub-sample categories, with + 0.0026 for the upper quartile and + 0.0009 for the lower quartile. In the remaining sub-samples, performance-matching on the basis of ROA_t and ROA_{t-1} performs particularly well when applied to the median discretionary accruals for all three categories of Book/Market, Sales Growth, and E/P Ratio.

Table 8 Panel E shows the discretionary accruals for remaining sub-samples involving Size, and Operating Cash Flow. In this analysis, performance-matching on the basis of Life Cycle Rank_t dominates the other methods in the sub-samples of Operating Cash Flow, producing the lowest mean (- 0.0638 and + 0.0484) and median (- 0.0459 and + 0.0484) discretionary accruals in both the upper and lower quartiles. One reason that performance matching on Life Cycle Rank_t outperforms the other methods in the sub-samples of Sales Growth and Operating Cash Flow is likely because these measures are used as inputs in the composite Life Cycle Rank_t. These results provide evidence that in

³² $Book/Market_{j,t} = (data\#60) / (data\#199 * data\#25)$. $Sales\ Growth_{j,t} = \Delta data\#12 / \text{lag total assets}$. $EP\ Ratio_{j,t} = data\#53 / data\#199$. $Size_{j,t} = data\#199 * data\#25$. $Operating\ Cash\ Flow_{j,t}$, as calculated from the balance sheet $((data\#18 - (\Delta data\#4 - \Delta data\#5 - \Delta data\#1 + \Delta data\#34 - data\#14)) / \text{lag total assets})$.

³³ It is important to note that although the Jones and Modified-Jones accruals model residuals generate residuals close to zero in the full samples, empirical studies are likely to examine residuals from sub-samples in order to draw conclusions about a firm's accounting quality. Within the quartiles of the Partial Sample, performance-matching methods are superior to the Jones and modified-Jones models in generating residuals closer to zero.

the Full Sample as well as specific sub-samples (of Sales Growth and Operating Cash Flow), performance-matching on the basis of Life Cycle Rank_t is more effective than ROA_t and ROA_{t-1} at reducing systematic predictability of discretionary accruals.

6.1.2 Control for Performance By Incorporating ROA in Accruals Regressions

Next, I conduct another empirical test suggested by K LW, which involves including a firm's return on assets (ROA) directly in the accruals regression. I conduct this robustness test in order to determine whether a firm's ROA and its life cycle stages capture distinct, or overlapping, variable when included directly in accruals expectation models. I perform this test on the sample of 89,817 observations, which were used to test H1, H2, and H3, in order to provide comparability with the previous results. I construct an ROA quintile variable ROA_{t-1}, which is defined as lag value of (data #18/ average total assets). I use ROA_{t-1} instead of ROA_t, in order to mitigate any spurious correlation that may result from including using an earnings variable (data #18), which contains accruals, as the independent variable and WCAccruals_t as the dependent variable. I assign the highest values of ROA_{t-1} to the first quintile (ROA_{t-1} Quintile1) and continue this ranking method for the remaining four quintiles (ROA_{t-1} Quintile2, ROA_{t-1} Quintile3, ROA_{t-1} Quintile4, and ROA_{t-1} Quintile5). These ROA Quintile variables are indicator variables taking on a value of 1 if a firm-year observation falls into that quintile and 0 otherwise.

Table 8 Panel F presents the results of the robustness test including ROA quintiles for Hypothesis 2. Since ROA is argued to capture the same information as the life cycle stages, then the predicted signs for both variables are identical. In the second column of Table 8 Panel F, the variable ROA_{t-1} Quintile1 is positive and significant, with a

coefficient of + 0.015, which is significantly positive as predicted. The variable ROA_{t-1} Quintile5 is negative and significant, with a coefficient of - 0.017, as predicted. Notice that the coefficients of - 0.017 ROA_{t-1} Quintile5 is slightly larger in magnitude than the + 0.015 on ROA_{t-1} Quintile1. Under the accounting property of asymmetrically timely gain and loss recognition, one would expect the coefficient on the bad news variables (ROA_{t-1} Quintile5) to be larger in magnitude than the coefficient on the good news variables (ROA_{t-1} Quintile1).

When both sets of variables ROA_{t-1} Quintiles and life cycle stages are included in the accruals regression, as is shown in the last column of Table 8 Panel F, my empirical life cycle variables still exhibit significant explanatory power. In the joint regression, the coefficient on Rapid Growth is + 0.028 and significantly positive at the 1% level, which is similar to the corresponding results of + 0.027 when the ROA quintiles are not included. In the joint regression, the coefficient and robust t-statistic on Late Decline are - 0.002 and - 3.05, which is still significant but less than half of the coefficient of - 0.004 and t-statistic of -6.15 on Late Decline when ROA is not included in the regression. Although my empirical life cycle stage variables retain their significance in a joint regression, the inclusion of ROA quintiles reduces the explanatory power of the indicator variables for the Decline stage.

6.2 Alternative Definition of Life Cycle Stages From Anthony and Ramesh (1992)

I construct an empirical life cycle variable in order to capture a firm's managerial operating decisions. In a previous study, Anthony and Ramesh (1992) develop their own empirical life cycle variable in order to test differences in investor reaction to unexpected earnings over a firm's life cycle. In order to determine whether my empirical life cycle

measure captures a different aspect of a firm's operations than that used by Anthony and Ramesh (1992), I compare the results both life cycle variables in robustness tests of Hypothesis 2.

Anthony and Ramesh (1992) use four variables to define their life cycle stages.³⁴ The first variable is capital expenditures, which is defined as $\text{data\#128}/(\text{market value of equity} + \text{book value of debt})$. Higher capital expenditures are associated with growing firms, while lower capital expenditures are associated with declining firms. The second variable used is sales growth, defined as $((\text{data\#12} - \text{lagdata\#12}) / \text{lagdata\#12}) * 100$. Positive sales growth is associated with growing firms, while negative sales growth is associated with declining firms. The third variable is dividends, which is defined as $\text{data\#21} / \text{data\#18}$. The fourth variable is firm age, which Anthony and Ramesh (1992) obtain from Moody's manuals; I choose to re-define firm age so that it is consistent with my classification. I create five indicator variables (AR Rapid Growth, AR Slow Growth, AR Maturity, AR Early Decline, and AR Late Decline), which are equal to 1 for firm-year observations in the respective stage and 0 otherwise.

The Anthony and Ramesh (1992) life cycle classifications offer an alternative to my empirical classification of life cycle stages. Table 9 Panel A shows that the correlation between Anthony and Ramesh's life cycle variable and my empirical life cycle variable is 40%, which is significant at the 1% level. The high level of correlation suggests that, a priori, the two measures may capture similar aspects of a firm's

³⁴ Anthony and Ramesh (1992) categories their observations into three broad life cycle stages: growth, maturity, and stagnation. Since Anthony and Ramesh's "stagnation" stage is analogous to my empirical "decline" stage, I will refer to this last stage as "decline" for the rest of the text. Additionally, Anthony and Ramesh (1992) identify three stages, whereas I use five stages for my empirical classification. For ease of comparability, I will divide Anthony and Ramesh's stages into five stages, which ensures that any observed differences in the significance of the two life cycle variables is not driven by differences in the number of categories (i.e. three groups versus five groups).

underlying economic activities. Since the two measures are argued to serve as alternatives, the predicted coefficients are identical for both measures.

The predicted coefficients on the growth stage variables are significantly positive, while the predicted coefficients on the decline stage variables are significantly negative. In Table 9 Panel B, the two measures for life cycle perform as predicted with significantly positive coefficients for the growth variables (Rapid Growth, Slow Growth, AR Rapid Growth, and AR Slow Growth). Surprisingly, the coefficient on Anthony and Ramesh's variables AR Early Decline and AR Late Decline are *positive*, which is the opposite sign predicted. In contrast, the coefficients on my empirical variables Early Decline and Late Decline are significantly negative, as predicted. The results are similar when both life cycle stage classifications are included in the accruals regressions, which occurs in the last column in Panel B. The results presented in Table 9 suggest two things: First, the two life cycle variables capture different aspects of the firm and are two distinct variables. Second, it is unclear what the Anthony and Ramesh (1992) life cycle variable captures for declining firms, since the observed coefficients are different than the predictions.

6.3 Incorporating Market to Book in Accruals Regressions

The ratio of the market value of a firm's equity to the book value of a firm's equity (Market to Book or M/B) is often used as a proxy for the growth potential of a firm. A firm's market to book ratio might also capture some operational characteristics proxied by my empirical life cycle variable. Therefore, it is an empirical question whether a firm's market to book ratio (M/B) and my empirical life cycle stage variable capture separate, or overlapping, aspects of a firm's operating decisions when included

directly in accruals expectation models. I conduct a robustness test of Hypothesis 2 involving indicator variables for five quintiles of M/B. I define a firm's M/B as $(\text{data\#199} * \text{data\# 25}) / \text{data\# 60}$. I assign the highest values of M/B to the first quintile (M/B Quintile1) and continue the ranking for the remaining four quintiles (M/B Quintile2, M/B Quintile3, M/B Quintile4, and M/B Quintile5). Each of these M/B indicator variables takes on a value of 1 if the firm-year falls in that quintile and 0 otherwise.

Table 10 shows the results of the robustness test including M/B quintiles. Since M/B is argue to capture the same economic decisions as my empirical life cycle variables, the predicted coefficients are identical for both variables. If firms with high M/B quintiles are also those that are rapidly growing, then the predicted coefficient on M/B Quintile1 is significantly positive. Surprisingly, the empirical tests show that M/B Quintile1 has a coefficient of - 0.002, which is negative and not consistent with the prediction. Although the coefficients on the remaining M/B Quintile variables are as predicted, the results are not consistent with market to book (M/B Quintiles) capturing the same economic variable as a firm's life cycle rank. Furthermore, the last column of Table 10 shows that when the M/B Quintile variables and life cycle stage variables are both included in the accruals regressions, the life cycle variables retain their significance and exhibit consistent results, whereas the M/B Quintiles do not.

6.4 Incorporating $1 / (\text{Average Total Assets})$ in Accruals Regressions

Kothari, Leone, and Wasley (2005), or K LW, include the inverse of lag total assets directly in the accruals regression in order to control for heteroscedasticity and to alleviate problems caused by an omitted size variable. I include the variable $1 / (\text{Average}$

Total Assets)³⁵ in my empirical tests and report the results in Table 11. Including of this additional variable does not change my results, as the coefficient on Rapid Growth is + 0.006, which is significantly positive at the 1% level, while the coefficients on Early Decline of - 0.002 and Late Decline of - 0.004 are both significantly negative at the 1% level.

6.5 Using Balance Sheet Definitions to Calculate Working Capital Accruals and Cash Flow From Operations

Previous accrual studies use the cash flow statement to construct their measures of working capital accruals and cash flows from operations (Dechow and Dichev, 2002; Ball and Shivakumar, 2005). The use of the cash flow statement to calculate accruals filters out certain corporate events that-- under the balance sheet method to calculate accruals-- are likely to lead the researcher to erroneously infer that earnings management exists when there is none (Collins and Hribar, 2002). However, some critics argue that the use of the cash flow statement to calculate accruals does not recognize write-off transactions, which *are* recognized when the balance sheet is used to calculate accruals. I conduct robustness tests for H1, H2, and H3 to show whether my results hold under the balance sheet definition of accruals.

I show the results of tests of H1 and H2 under the balance sheet definition of working capital accruals in Table 12. For H1, the coefficients on Rapid Growth and Slow Growth are significantly positive, as predicted, while the coefficients on Early Decline and Late Decline are significantly negative, as predicted. However, the results of H2 are somewhat surprising. The last column of Table 12 shows that the coefficients on

³⁵ I use the denominator Average Total Assets because all of the accruals regressions variables are scaled by Average Total Assets. In Kothari, Leone, and Wasley (2005), the accruals regressions variables are scaled by lag total assets.

the growth variables are not significantly different than that of the mature variable. However, what is remarkable is that the coefficients on Early Decline and Late Decline are significantly negative at - 0.004 and - 0.005 respectively, which is a much *larger* coefficient than the + 0.001 on Early Growth or the + 0.000 on Slow Growth; this result *is consistent* with the accounting property of asymmetrically timely gain and loss recognition, which would predict a larger coefficient on the decline variables, which proxy for bad news, than that on the coefficient on the growth variables, which proxy for good news. These coefficients are consistent with firms recording write-off transactions during times of operational decline. This result supports the arguments made by critics that the use of the cash flow statement to calculate working capital accruals *does not* recognize write-off transactions.

6.6 Using Change in Cost of Goods Sold in the Definition of Life Cycle Stages

Managers are likely to adjust a firm's production process based on a variety of factors, including current period revenue shocks, product growth trajectory, and changes in overall purchasing behavior. Period specific adjustments to the production process are more likely to affect a firm's *change* in cost of goods sold, as opposed to the *level* of cost of goods sold. I conduct a robustness test for H2 in which I use *change* in cost of goods sold ($\Delta \text{data\#41} / \text{average total assets}$), instead of the *level* of cost of goods sold, in the definition and categorization of life cycle stages. The results of this robustness test are presented in Table 13. Recall that when the original life cycle classification stages (which used the *level* of cost of goods sold) are included in the accruals regressions, the adjusted r-square is 27.8%, which is shown in Table 13 column 2. When the alternate life cycle classifications (which use the *change* in cost of goods sold) are subsequently

included in the accruals regressions, then the adjusted r-square increases slightly to 28.0%, as shown in Table 13 column 3. These results suggest that the *change* in cost of goods sold is more strongly associated with a firm's accruals decisions than the yearly *level* of cost of goods sold.

6.7 Using "Simplified" Profile of Cash Flows to Summarize Life Cycle Classifications

Since my empirical life cycle classification involves several variables and multiple ranks, it is not clear which, if any, of the operating variables is dominant in capturing managerial operating decisions. I propose an alternative empirical measure to capture or summarize these life cycle classifications. This alternative empirical measure involves using a "simplified" profile of cash flow involving a firm's cash flow from financing. Specifically, if a firm's cash flow from financing activities is the dominant activity, then the firm is likely raising capital for growth purposes; in all other cases, the firm is likely experiencing slow or negative growth. My empirical measure SimpleProfile is equal to one if a firm's cash flow from financing (CFF) is (1) *greater than* its cash flow from operations (CFO) and (2) *greater than* its cash flow from investing (CFI); in all other cases, SimpleProfile is equal to zero.

Table 14 shows the results of including the SimpleProfile indicator variable in accruals expectation models. Table 14 Panel A shows the results of including the variable SimpleProfile_cf, which involves variable definitions calculated from the cash flow statement, while Table 14 Panel B involves SimpleProfile_bs, in which variable definitions are calculated from the balance sheet. Since SimpleProfile is equal to 1 for growth firms and equal to 0 for all other firms, then the prediction is that SimpleProfile is

positive. However, the SimpleProfile variable is limited in that it categorizes firms as either “growing” or “not growing”.

The first and second column in Panel A of Table 14 shows the previous empirical results. The adjusted r-square for the accruals regression is 27.7%, and once the life cycle stage variables are included in the regression, the adjusted r-square increases to 27.8%. However, when the SimpleProfile_cf variable is included in the accruals regression, the adjusted r-square increases to 28.3%. Furthermore, when the variable SimpleProfile_cf is interacted with cash flow from operations (CFO), in order to allow for a non-linear relation between accruals and cash flows, the adjusted r-square increases to 28.9%. The results in Table 14 Panel B also show that SimpleProfile_bs outperforms the life cycle variables in the accruals regressions. Including SimpleProfile_bs in the accruals regression increases the adjusted r-square to 28.0%, while including SimpleProfile_bs*CFO in the accruals regression results in an adjusted r-square of 28.5%. These results indicate that the SimpleProfile indicator variable is able to capture a manager’s working capital accruals decisions.

6.8 Accruals Associations of Regression Model Within Each Life Cycle Stage

I conduct a robustness test of H3 by applying the McNichols (2002) accruals expectation model on firm-year observations within each life cycle stage and comparing the adjusted r-squares of each stage. The results of these tests are shown in Table 15 Panel A and Panel B. The 87,819 firm-years are distributed among the five life cycle stages of Rapid Growth (12,650 firm-years), Slow Growth (15,938 firm-years), Maturity (17,994 firm-years), Early Decline (19,925 firm-years), and Late Decline (21,312 firm-years). When the McNichols (2002) accruals regression is performed on the Rapid

Growth firm-years, the adjusted r-square is 29.6%, as shown in Table 15 Panel A. When the identical regression is performed on firm-years in other stages of the life cycle, then the adjusted r-square is lower and exhibits an inconsistent pattern. For the McNichols (2002) accruals regression, the adjusted r-square is 25.4% in the Slow Growth stage, and the adjusted r-square decreases to 22.9% in the Maturity stage; surprisingly, the adjusted r-square for the accruals regression in the Early Decline stage is 25.3% and then decreases to 23.0%. The vast difference in adjusted r-squares suggests that the accruals expectation model exhibits the best fit when applied to Rapid Growth firm-year observations, which provides evidence in support of H3(a).

I conduct another robustness test of H3 on firm-year observations within each life cycle stage, using the balance sheet definition of working capital accruals. The results are presented in Table 15 Panel B, and the adjusted r-squares of the accruals regression exhibit a non-linear pattern over the firm life cycle. When the accruals regression is performed on the Rapid Growth firm-years, the adjusted r-square is 33.1%, as shown in Table 15 Panel B. The adjusted r-square for the accruals regression decreases (to 29.5% for firm-years in the Slow Growth stage and 25.6% for firm-years in the Maturity stage) and then increases (to 27.3% for firm-years in the Early Decline stage and 33.7% for firm-years in the Late Decline stage).

These results are consistent with H3(a) but are not consistent with H3(b). One reason that the results in Table 15 Panel B are not similar to the results in Table 15 Panel A are probably due to the differences in working capital accruals calculated from the cash flow statement versus the balance sheet. Working capital accruals calculated from the balance sheet include specific types of write-off transactions that are *not included* in

working capital accruals calculated from the cash flow statement. Since firm-years in the Late Decline stage of the life cycle are more likely to record more write-offs, these could potentially affect the adjusted r-squares of the accruals regressions.

7. The Effect of Life Cycle Fundamentals on Prior Studies of “Accruals Quality”

7.1 Factor Analysis

In addition to the empirical classification of firm life cycle stages, I conduct a principal component factor analysis (in Tables 16 and 17) in order to create an additional measure of a firm’s life cycle. I conduct a factor analysis in order to extract a quantitative and continuous variable from the set of a firm’s operating variables. The extracted Factor is potentially a richer variable than Life Cycle Rank, which can only take on values ranging from 1 to 100. Prior empirical studies of a firm’s investment activities have also used a factor analysis. Gaver and Gaver (1993) use a factor analysis to obtain a single factor that captures a firm’s investment opportunities. Baber, Janakiraman, and Kang (1996) also conduct a factor analysis that builds upon the methods in Gaver and Gaver (1993) in order to further refine a measure of a firm’s investment opportunity set.

First, I conduct the factor analysis and report the results in Table 16. The factor analysis is applied to the set of original operating variables (Capex, Δ Rev, CGS, Age, Cash Profile CFO_bs, Cash Profile CFF_bs), which were used to classify a firm’s life cycle stage in Table 2, and two additional operating variables Volatility (CFO_bs), and Volatility (Δ Rev). Volatility (CFO_bs) and Volatility (Δ Rev) are not included in the previous life cycle classifications in Table 2, due to the difficulty in specifying the functional form of these variables over the firm life cycle. However, these variables are

included in the factor analysis, which does not require a priori assumptions about the functional form of the variables. The number of factors to extract from a factor analysis is a subjective decision.³⁶ Since the objective of this study is to identify a single, easily applicable variable that captures managerial operating decisions over a firm's life cycle, I extract one factor from the factor analysis.

Next, I evaluate whether the extracted factor ($Factor_{j,t}$) is a reasonable proxy for a firm's life cycle stage by evaluating the Pearson correlations between Factor and each of the eight operating variables (in Table 17). A correlation greater than 0.30 in magnitude, between an extracted factor and its underlying variables, is considered economically significant. The extracted variable $Factor_{j,t}$ exhibit correlations greater than 0.30 for five variables ($Age_{j,t}$, $CFO_bs_{j,t}$, $CFF_bs_{j,t}$, $Volatility(CFO_bs)_{j,t}$, $Volatility(\Delta Rev)_{j,t}$) out of the total eight variables; additionally, the *sign* of the correlation for these five operating variables are consistent with $Factor_{j,t}$ capturing a firm's life cycle. I use the variable firm age ($Age_{j,t}$) as a benchmark because increasing values of firm age are associated with maturing firms. The variable Factor exhibits a significant negative correlation with firm age (- 0.310), which suggests that *higher* values of the variable Factor are a proxy for younger, growing firms. The extracted Factor also exhibits a significantly negative correlation with cash flow from operations $CFO_bs_{j,t}$ (- 0.740), which is consistent with growth firms using available cash to invest in working capital, thereby resulting in negative CFO. Additionally, Factor exhibits a significant positive correlation with cash flow from financing $CFF_bs_{j,t}$ (+ 0.564), which is consistent with growth firms borrowing cash from their shareholders. The Factor further exhibits a significant positive

³⁶ Kaiser (1960) develops a set of criteria that involves extracting the number of factors with eigenvalues that are greater than 1.

correlation with variables that capture volatility (+ 0.673 correlation with $Volatility(CFO_bs)_{j,t}$ and + 0.371 correlation with $Volatility(\Delta Rev)_{j,t}$); these correlations are also consistent with growth firms exhibiting highly volatile operations.

For the remaining three operating variables, I expect $Factor_{j,t}$ to be positively correlated with $Capex_{j,t}$ (because higher values of Factor are associated with growth firm, which have high capital expenditures), positively correlated with $\Delta Rev_{j,t}$ (because higher values of Factor capture growth and large positive changes in revenues), and positively related to $CGS_{j,t}$ (because higher values of Factor are likely to be associated with high production costs during growth periods). Contrary to the predictions, $Factor_{j,t}$ exhibits a negative correlation with $Capex_{j,t}$ (of - 0.160) and a negative correlation with changes in revenues $\Delta Rev_{j,t}$ (of - 0.160). These correlations are considered statistically significant, but they are not considered economically significant within the factor analysis. $Factor_{j,t}$ exhibits a positive correlation with $CGS_{j,t}$, as predicted, but this is not statistically significant.

Overall, the Pearson correlations indicate that $Factor_{j,t}$ is a reasonable proxy for a firm's life cycle. The signs of all significant correlations between $Factor_{j,t}$ and the underlying operating variables are consistent with *higher* values of $Factor_{j,t}$ capturing the activities of growth firms and *lower* values of $Factor_{j,t}$ capturing the activities of decline firms.

7.2 The Effect of Life Cycle Fundamentals on the Relation Between Accruals Quality and Auditor Tenure

This section illustrates how inferences in empirical studies can change after controlling for a firm's life cycle fundamentals. When choosing which empirical study to

apply the life cycle variable to, there were several considerations. First, the replicated empirical study should specify a regression in which accruals are the dependent variable, which is crucial because the hypotheses about a firm's life cycle apply to widely-used accruals expectation models. Second, the replicated empirical study should identify a variable of interest that potentially captures the firm life cycle. Third, the replicated study should focus on large magnitudes of accruals, both positive and negative; this is imperative because firms that are in the rapid growth or late decline stage of the life cycle are likely to exhibit large magnitude abnormal accruals.

Based on the stated criteria, I replicate the study conducted by Myers, Myers, and Omer (2003), hereafter referred to as MMO. I replicate MMO for several reasons. First, MMO use a non-traditional accruals expectation model, which provides an alternate means to examine the relation between accruals and life cycle fundamentals. Second, MMO's variable of interest Tenure is partially related to a firm's age. Since firm age is a commonly used proxy for a firm's life cycle fundamentals, it is likely that Tenure and Factor are correlated. These features of MMO provided an interesting setting in which to examine (1) what type of inferences one might draw about accruals variation and (2) whether the inferences would change after controlling for a firm's life cycle fundamentals. Determining whether Tenure and Factor capture the same underlying variable is a relatively straightforward task. MMO use the specification in equation (6) to show that their variable Tenure is significantly related to the magnitude of working capital accruals. If Tenure is a distinct variable that explains variation in the magnitude of working capital accruals, then the significant coefficient on Tenure should be unchanged once Factor is included in the regression.

The third reason that I replicate MMO is that the regression focuses on large magnitude accruals by using the *absolute value* of working capital accruals ($AbsWCAccruals_{j,t}$) as the dependent variable instead of working capital accruals. This provides an ideal setting in which to test whether controlling for the large magnitude accruals of growth and decline firms over the life cycle affects inferences.

I use the following accruals regression from MMO:

$$AbsWCAccruals_{j,t} = b_0 + b_1Tenure_{j,t} + b_2Age_{j,t} + b_3Size_{j,t} + b_4IndustryGrowth_{j,t} + b_5CashFlow_{j,t} + b_6AuditorType_{j,t} + e_{j,t} \quad (7)$$

All variables for the auditor tenure regressions are calculated according to the methods used in Myers, Myers, and Omer (2003). The absolute value of working capital accruals ($AbsWCAccruals_{j,t}$) is calculated as $(\Delta data\#4 - \Delta data\#5 - \Delta data\#1 - \Delta data\#34) / \text{average total assets}$. Auditor tenure ($Tenure_{j,t}$) is based on data#149, with audit tenures ranging from 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-15, and 16 or greater years assigned to tenure deciles from 1 to 10, respectively. Firm age ($Age_{j,t}$) is measured as the number of years the firm has an asset listing on Compustat since 1980. Firm size ($Size_{j,t}$) is the $\log(\text{data \#6})$ for this regression only. The variable industry growth in sales ($Industry\ Growth_{j,t}$) is calculated as the average sales for the firm's industry_t / average sales for the firm's industry_{t-1}. Cash flow ($Cash\ Flow_{j,t}$) is calculated as $(\text{data \#308}) / \text{average total assets}$. Auditor type ($Auditor\ Type_{j,t}$) is an indicator variable equal to 1 if the auditor is a big 5 auditor and 0 otherwise. A firm's change in revenues ($\Delta Rev_{j,t}$) is $\Delta data\#12 / \text{average total assets}$. A firm's property, plant, and equipment ($PPE_{j,t}$) is calculated as $\text{data\#8} / \text{average total assets}$.

I detail my replication process of the MMO study in Appendix 5. I start the replication process by deriving a sample for the replicated tests. I am able to calculate the variables Age, Accruals, ΔRev , PPE, current accruals (WCAccruals), Industry Growth, and Size according to the methods disclosed in MMO. However, the source of the auditor tenure variable is not explicitly detailed in MMO, so I use Compustat data item #149 in order to obtain the auditor firm (which also includes audit opinion) to code the variable Tenure. I use data #308 to calculate the variable Cash Flow.

MMO omit observations for firms that undergo mergers and acquisitions by using “footnote” codes appearing in Compustat, as suggested by Collins and Hribar (2002). I similarly follow the method outlined in Collins and Hribar (2002) to eliminate observations involving three types of events. I retain firm-years that are not involved in a merger or acquisition (i.e., retain firm-years where Compustat footnote AFTNT1 is *missing*), firm-years that do not have discontinued operations (i.e., retain firm-years where Compustat data #66 is equal to 0), and firm-years that do not have a foreign currency translation adjustment (i.e., retain firm-years where Compustat data #150 is *missing*). After conducting additional steps in the sample selection process, the final sample consists of 37,117 firm-year observations. The size of the final sample is very close to the 41,250 reported by MMO.

Table 17 shows the replication of one of the tests in MMO. I show how the inferences in MMO are likely to change when the regression incorporates either my empirical classification of the life cycle stages (*Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*) or the extracted factor from the factor analysis (*Factor_{j,t}*). Table 17 shows that in prior tests, longer auditor tenure (Tenure) is

significantly negatively related to working capital accruals (AbsWC accruals) with a coefficient of $-.00142$ and a p-value of $.0001$.³⁷ I replicate this result with a coefficient of $-.00062$ (robust p-value of $.039$). However, once I include the life cycle stages of Rapid Growth, Slow Growth, Maturity, Early Decline, and Late Decline, the previously significant coefficient on Tenure now become insignificant. Tenure now has an insignificant coefficient of $-.00046$ (robust p-value = $.124$). Additionally, when I include the Factor (from the factor analysis) in the regression, the previously significant coefficient on Tenure now becomes insignificant (coefficient of $-.00019$ and robust p-value = $.601$). Additionally, Factor has a significant coefficient of $.05107$ (robust p-value $< .000$).

The main result in Table 17 is that when both Tenure and life cycle variables are included in the accruals regression in MMO, Tenure becomes insignificant while the life cycle variables (Rapid Growth, Slow Growth, and Late Decline) and Factor are significant. Based on the original specification in MMO, one would likely conclude from the significantly negative relation between AbsWC accruals and Tenure that longer auditor tenure results in higher quality accruals. However, I provide evidence that this observed relation is driven by a firm's life cycle fundamentals. This example illustrates that by failing to control for a firm's life cycle fundamentals, empirical studies can potentially misclassify this source of accruals variation as systematic differences in a firm's accounting quality.

³⁷ See Myers, Myers, and Omer (2003, p. 789), Equation 1 for the regressions and Table 2 for the results. Myers, Myers, and Omer (2003) use a two-tailed p-value. However, the relation between auditor tenure and magnitude of working capital accruals is predicted to be significantly negative. This suggests that a one-tailed p-value should be used.

8. Conclusion

I examine how accruals evolve in response to managers' real operating decisions over the firm's life cycle. Variation in operating decisions over a firm's life cycle is likely to have a first-order effect on a firm's accruals properties. However, this source of accruals variation has not been recognized in previous empirical accruals research. My results suggest that a firm's "normal" accruals properties are, at one extreme, not being captured by widely-used accruals expectations models and, at another extreme, potentially misclassified as "abnormal" or discretionary accruals. A firm's "normal" accruals properties are likely much richer and more complex than those identified using current empirical methods. Future research might explore the effect of other types of managerial operating decisions and their resulting effect on accruals properties. This will further improve our ability to accurately identify, partition, and analyze a firm's "normal" and "abnormal" accruals.

Appendix 1

Textbook Examples of Firms in Different Stages of Their Life Cycle

Stickney and Weil (2006) p. 158:

“Amazon.com [for the year 2000] depicts typical cash flows of a **new, rapidly growing firm**. It operated at a net loss for the year and its operations consumed cash—it generated negative cash flow from operations. The firm also made capital expenditures on additional property, plant, and equipment to maintain its growth...”

“Discount Auto Parts [for the year 1999] depicts typical cash flows for a firm in the **rapid growth phase, but somewhat more seasoned** than Amazon.com. It posted a positive net income for the year and generated positive cash flow from operations. This cash flow from operations still fell short of the amounts it needed to finance acquisitions of property, plant, and equipment...”

“Anheuser-Busch [for the year 2000] depicts a cash flow pattern typical of a **mature firm**. It reports positive net income and positive cash flow from operations. Cash flow from operations exceeds the amounts the firm needs to finance investments in new property, plant, and equipment...”

“The cash flows for Levitz Furniture [for the year ≈ 1997] are for a period just prior to its filing for bankruptcy and therefore in the **last stage of the decline phase**. It operated at a net loss and generated negative cash flow from operations. The investing section indicates the cash inflows from selling property, plant, and equipment. Given its poor financial condition, Levitz Furniture had to rely on short-term financing. Lenders required the firm to repay financing within one year and replace it with new financing.”

Stickney and Brown (1999) p. 72-74:

“Netscape commenced operations in Year 4 and is in the **rapid growth phase of its life cycle**...Sales grew rapidly between Year 4 and Year 5, but Netscape still operated at a loss... Continued growth in sales in Year 6 [1996] then led to positive net income and cash flow from operations. Although accounts receivable grew rapidly during Year 6, Netscape stretched its creditors and received additional advances from customers...”

“Exhibit 2.4 presents a statement of cash flows for Wal-Mart Stores, a **rapidly growing** discount store, warehouse club, and grocery store chain... Cash flow from operations is less than working capital from operations in all years [1990-1995], except Year 9 [1996], because of the need to acquire merchandise for higher future sales... Note that Wal-Mart’s sales growth slowed considerably beginning in Year 8 [1995] and Year 9 [1996]. It decreased its capital expenditures and its inventory buildup and used excess cash flow to repay short-term borrowing.”

Appendix 2

Life Cycle Stage Classifications: Textbook Versus Empirical

<u>Company Name</u>	<u>Gvkey</u>	<u>Year</u>	<u>Textbook Classification</u>	<u>Empirical Classification</u>	
			<u>Stickney & Weil (2006)</u>	<u>Life Cycle Stage</u>	<u>Life Cycle Rank</u>
Amazon.Com Inc	64768	2000	"rapidly growing firm"	Late Growth	31
Discount Auto Parts Inc	25670	1999	"seasoned"	Early Decline	66
Anheuser-Busch Cos Inc	1663	2000	"mature"	Early Decline	68
Levitz Furniture Inc -Vtg	12474	1997	"last stage of decline"	Late Decline	100

Gvkey: "GVKEY" code from Compustat that identifies each firm. *Year*: "YEARA" code from Compustat that identifies each fiscal year.

Life Cycle Stages: Each firm-year observation is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$. The individual ranks of $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$ are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required* for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation. Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*.

Appendix 3

Variable Definitions Used in Robustness Tests

Life Cycle Stages: Each of 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$, which takes on discrete rank of 1, 50, or 100 based on whether cash flow from operations > 0 (rank = 50), cash flow from operations < 0 and cash flow from financing > 0 (rank = 1), or cash flow from operations < 0 and cash flow from financing < 0 (rank = 100). The individual ranks of $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$ are equally weighted to form a combined overall life cycle rank ($Life\ Cycle\ Rank_{j,t}$) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required* for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation. Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*.

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. $Average\ Total\ Assets_{j,t} = (data\#6 + lagdata\#6) / 2$. Working capital accruals ($WCAccruals_{j,t}$) = $-(data\#302 + data\#303 + data\#304 + data\#305 + data\#307) / average\ total\ assets$. Any missing values of these inputs are coded as 0. Cash flow from operations ($CFO_cf_{j,t}$) = $(data\#308) / average\ total\ assets$, as calculated from the cash flow statement. $CFO_cf_{j,t-1}$ and $CFO_cf_{j,t+1}$ = Lag and lead values of truncated $CFO_cf_{j,t}$ (truncated the top and bottom 1%). Changes in Revenues ($\Delta Rev_{j,t}$) = $\Delta data\#12 / average\ total\ assets$. Gross Property, Plant, and Equipment ($PPE_{j,t}$) = $data\#7 / average\ total\ assets$.

Appendix 4 **Robustness Test: Pattern of Accruals Over the Firm Life Cycle** **Using Alternate Definition of Accruals in Accruals Regressions**

$$\begin{aligned} \text{WC} \text{Accruals_Data217}_{j,t} = & b_0 + b_1 \text{RapidGrowth}_{j,t} + b_2 \text{SlowGrowth}_{j,t} + b_3 \text{Maturity}_{j,t} \text{ (omitted)} \\ & + b_4 \text{EarlyDecline}_{j,t} + b_5 \text{LateDecline}_{j,t} \\ & + a_1 \text{CFO_cf}_{j,t} + a_2 \text{CFO_cf}_{j,t-1} + a_3 \text{CFO_cf}_{j,t+1} + a_4 \Delta \text{Rev}_{j,t} + a_5 \text{PPE}_{j,t} + e_{j,t} \end{aligned}$$

	Pred. Sign	Hypothesis 1		Hypothesis 2			
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.019	(3.04)**	0.007	(1.21)	0.008	(1.45)
<i>Rapid Growth_{j,t}</i>	+	0.026	(16.96)**			-0.011	(6.87)
<i>Slow Growth_{j,t}</i>	+	0.008	(6.37)**			-0.004	(3.14)
<i>Maturity_{j,t}</i> [^]							
<i>Early Decline_{j,t}</i>	-	-0.009	(7.74)**			0.000	(0.16)
<i>Late Decline_{j,t}</i>	-	-0.018	(15.30)**			0.001	(0.47)
CFO_cf _{j,t}				-0.296	(38.55)**	-0.301	(38.85)**
CFO_cf _{j,t-1}				0.099	(50.49)**	0.107	(43.67)**
CFO_cf _{j,t+1}				0.214	(34.06)**	0.215	(34.18)**
ΔRev _{j,t}				0.171	(28.04)**	0.172	(28.06)**
PPE _{j,t}				-0.003	(1.96)	-0.001	(1.04)
N= firm-years		87,819		87,819		87,819	
Adj. R ²		4.056%		15.268%		15.334%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*. Indicator variables take on a value of 1 to denote each life cycle stage of *Rapid Growth_{j,t}* (rank 1-20), *Slow Growth_{j,t}* (rank 21-40), *Early Decline_{j,t}* (rank 61-80), and *Late Decline_{j,t}* (rank 81-100), and a value of 0 otherwise. [^]The indicator variable for *Maturity_{j,t}* (rank 41-60) is used as a benchmark and not included in the regression.

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005). *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. **Working capital accruals have been modified to include data#217 (WC***Accruals Data217_{j,t}***) = - (data#302+ data#303+ data#304 +data#305+ data#307+ data#217)/ average total assets.** Any missing values of these inputs are coded as 0. Cash flow from operations (*CFO_cf_{j,t}*)= (data#308)/ average total assets, as calculated from the cash flow statement. *CFO_cf_{j,t-1}* and *CFO_cf_{j,t+1}*= Lag and lead values of truncated *CFO_cf_{j,t}* (truncated the top and bottom 1%). Changes in Revenues (*ΔRev_{j,t}*) = Δdata#12/ average total assets. Gross Property, Plant, and Equipment (*PPE_{j,t}*) = data#7/ average total assets.

Appendix 5
Sample Selection Procedures Used in Table 13
Based on the Methods from Myers, Myers, and Omer (2003)

Firm-years from Compustat for 1960-2004	741,380	
Firm-years with non-missing values for data#6 (total assets)	298,393	
From the 298,393 observations, the following variables were calculated: <i>Age</i> , <i>Tenure</i> (based on data#149), firm-audit combinations where <i>Tenure</i> \geq five years, and firms with at least six years of accruals data.	298,393	
From the 298,393 observations, lag and lead operations were performed to calculate accruals variables, which resulted in 298,393 observations.	298,393	
From the 298,393 observations, the following variables were calculated: <i>Accruals</i> , ΔRev , <i>PPE</i> , (see Myers, Myers, and Omer, 2003, p. 784), industries with eight or more firms, Current Accruals (<i>WCAccruals</i>), <i>Cash Flow</i> , <i>Industry Growth</i> , <i>Size</i> (see Myers, Myers, and Omer, 2003, p. 789), and <i>Tenure</i> (a decile variable based on data#149).	298,393	
Firm-years used to code <i>Tenure</i> and <i>Auditor Type</i> . (Of the 298,393 observations, only 140,062 have non-missing values of data#149.)	298,393	
Firm-years with non-missing values for <i>Cash Flow</i> (data#308/ average total assets)	130,748	
Firm-years with non-missing values of <i>Age</i> , non-missing values of <i>Tenure</i> , at least six years of accruals data, industries with eight or more firms, and firm-audit combinations where tenure \geq five years.	84,430	
Firm-years where fiscal year \geq 1988	83,623	
Firm-years where fiscal year \leq 2000	69,027	
Firm-years that were <u>not</u> involved in a merger or acquisition, as mentioned in Collins and Hribar (2002). Retained observations where AFTNT1 is missing.	50,075	
Firm-years that do <u>not</u> have discontinued operations, as mentioned in Collins and Hribar (2002). Retained observations where data#66 = 0.	49,022	
Firm-years that do <u>not</u> have a foreign currency translation adjustment. Retained observations where data#150 is missing.	40,277	
Firm-years remaining after winsorizing the top and bottom .5% of <i>WCAccruals</i> , ΔRev , <i>PPE</i> .	39,015	
Firm-years with non-missing values of <i>WCAccruals</i> , ΔRev , <i>PPE</i> .	38,422	
Firm-years remaining after winsorizing the top and bottom .5% of <i>Tenure</i> , <i>Age</i> , <i>Size</i> , and <i>Industry Growth</i> .	37,903	
Firm-years with non-missing values of life cycle rank.	37,117	See Table 18

All data is from Compustat.

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Table 1- Panel A
Sample Selection Procedures

Firm-years from Compustat for 1960-2004	741,380	
Firm-years with non-missing values for data#6 (total assets)	298,393	
Firm-years with average total assets greater than \$1 million	266,204	
Firm-years that were assigned a life cycle rank	266,204	See Table 2
Firm-years with non-missing values for cash flow from operations (data#308/ average total assets)	126,534	
Firm-years remaining after deleting the 1st and 99th percentiles of working capital accruals $(-(\text{data\#302} + \text{data\#303} + \text{data\#304} + \text{data\#305} + \text{data\#307}) / \text{average total assets})$, cash flow from operations (data#308/ average total assets), changes in revenues $(\Delta \text{data\#12} / \text{average total assets})$, and property, plant, and equipment (data#7/ average total assets)	117,996	
Firm-years used to obtain lag and lead values of cash flow from operations (data#308/ average total assets)	117,996	
Firm-years with non-missing values of cash flow from operations, lag and lead values of cash flow from operations, changes in revenues, and property, plant, and equipment	87,819	See Tables 3, 4, and 5
Firms with eight or more annual observations	4,968	See Tables 6 and 7

Table 1- Panel B
Sample Selection Procedures: Illustration

1960	2004
Firm-Years With Life Cycle Ranks: 266,204 (see Table 2)	
1987	2004
Firm-Years Used in Accruals Regressions: 87,819 (see Table 3)	

All data is from Compustat.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$, which takes on discrete rank of 1, 50, or 100 based on whether cash flow from operations > 0 (rank = 50), cash flow from operations < 0 and cash flow from financing > 0 (rank = 1), or cash flow from operations < 0 and cash flow from financing < 0 (rank = 100). The individual ranks of $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$ are equally weighted to form a combined overall life cycle rank ($Life\ Cycle\ Rank_{j,t}$) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required* for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation. Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*.

Table 2
Assignment of Firm Life Cycle Stages Based on Operating Variables
for 266,204 Firm-Year Observations

	Ranks Within Each Industry			%
	1, 2, 3...	...49, 50, 51...	...98, 99, 100	
<i>Capex</i>	High	Medium	Low	20%
ΔRev	Positive	\approx Zero	Negative	20%
<i>CGS</i>	High	Medium	Low	20%
<i>Age</i>	Low	Medium	High	20%
<i>Cash Profile</i>	CFO_bs < 0 and	CFO_bs > 0	CFO_bs < 0 and	20%
	CFF_bs > 0		CFF_bs < 0	
Life Cycle Rank	1, 2, 3...	...49, 50, 51...	...98, 99, 100	100%

	Assignment of Life Cycle "Stages"				
	1-20	21-40	41-60	61-80	81-100
Life Cycle Rank					
Assigned Stage	Rapid Growth	Slow Growth	Maturity	Early Decline	Late Decline

Operating Variable Definitions: Capital expenditures ($Capex_{j,t}$) = data#128/ average total assets. Changes in revenues ($\Delta Rev_{j,t}$) = Δ data#12/ average total assets. Cost of goods sold ($CGS_{j,t}$) = data#41/ average total assets. Firm age ($Age_{j,t}$) = firm age as measured by the number of years the firm is first listed on either Compustat or CRSP. Cash flow profile ($Cash Profile_{j,t}$) involves a comparison of the firm-year cash flow from operations (CFO_bs), as calculated from the balance sheet ((data#18- (Δ data#4- Δ data#5- Δ data#1+ Δ data#34- data#14))/ average total assets) to the firm-year cash flow from financing (CFF_bs), as calculated from the balance sheet (Δ data#9+ Δ data#34+ (Δ data#60- data#20)+ Δ data#10))/ average total assets) and based on the methods in the appendix of Livnat and Zarowin (1990).

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash Profile_{j,t}$, which takes on discrete rank of 1, 50, or 100 based on whether cash flow from operations > 0 (rank = 50), cash flow from operations < 0 and cash flow from financing > 0 (rank = 1), or cash flow from operations < 0 and cash flow from financing < 0 (rank = 100). The individual ranks of $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash Profile_{j,t}$ are equally weighted to form a combined overall life cycle rank ($Life Cycle Rank_{j,t}$) ranging from 1-100 within each Fama and French (1997) industry group. There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation. Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*.

Table 3- Panels A and B
Descriptive Statistics and Pearson Correlations for 87,819 Firm-Year Observations

Panel A: Descriptive Statistics

<u>Operating Variables</u>	Mean	Standard Deviation	Lower Quartile	Median	Upper Quartile
<i>Capex</i>	0.063	0.087	0.016	0.040	0.079
<i>ΔRev</i>	0.089	0.283	-0.016	0.049	0.186
<i>CGS</i>	0.748	0.710	0.260	0.575	1.014
<i>Age (in years)</i>	15.7	14.7	5.0	10.0	22.0
<i>CFO_bs</i>	0.008	0.212	-0.032	0.055	0.116
<i>CFF_bs</i>	0.099	0.481	-0.039	0.012	0.122
<u>Accruals Regression Variables</u>					
<i>WCAccruals</i>	0.011	0.079	-0.020	0.005	0.040
<i>CFO_cf</i>	0.033	0.166	-0.005	0.063	0.118
<i>ΔRev</i>	0.089	0.283	-0.016	0.049	0.186
<i>PPE</i>	0.543	0.421	0.199	0.452	0.826
<i>Average Total Assets (in millions)</i>	2933.1	20159.3	30.2	146.9	833.2

Panel B: Pearson Correlations

	<i>WCAccruals</i>	<i>CFO_cf</i>	<i>Capex</i>	<i>ΔRev</i>	<i>CGS</i>	<i>Age</i>	<i>CFO_bs</i>
<i>CFO_cf</i>	-0.19*						
<i>Capex</i>	0.02*	0.12*					
<i>ΔRev</i>	0.29*	0.10*	0.13*				
<i>CGS</i>	0.06*	0.10*	0.01	0.29*			
<i>Age (in years)</i>	-0.04*	0.18*	-0.05*	-0.11*	0.03*		
<i>CFO_bs</i>	-0.07*	0.82*	0.09*	0.06*	0.10*	0.19*	
<i>CFF_bs</i>	0.06*	-0.30*	0.10*	0.13*	-0.06*	-0.13*	-0.33*

** significant at 1%.

Operating Variable Definitions: Capital expenditures ($Capex_{j,t}$) = data#128/ average total assets. Changes in revenues ($\Delta Rev_{j,t}$) = $\Delta data\#12$ / average total assets. Cost of goods sold ($CGS_{j,t}$) = data#41/ average total assets. Firm age ($Age_{j,t}$) = firm age as measured by the number of years the firm is first listed on either Compustat or CRSP. Cash flow profile (*Cash Profile_{j,t}*) involves a comparison of the firm-year cash flow from operations (CFO_bs), as calculated from the balance sheet ((data#18- (Δdata#4- Δdata#5- Δdata#1+ Δdata#34- data#14))/ average total assets) to the firm-year cash flow from financing (CFF_bs), as calculated from the balance sheet (Δdata#9+ Δdata#34+ (Δdata#60- data#20)+ Δdata#10))/ average total assets) and based on the methods in the appendix of Livnat and Zarowin (1990).

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. Working capital accruals ($WCAccruals_{j,t}$) = - (data#302+ data#303+ data#304 +data#305+ data#307)/ average total assets. Any missing values of these inputs are coded as 0. Cash flow from operations ($CFO_cf_{j,t}$) = (data#308)/ average total assets, as calculated from the cash flow statement. $CFO_cf_{j,t-1}$ and $CFO_cf_{j,t+1}$ = Lag and lead values of truncated $CFO_cf_{j,t}$ (truncated the top and bottom 1%). Changes in Revenues ($\Delta Rev_{j,t}$) = $\Delta data\#12$ / average total assets. Gross Property, Plant, and Equipment ($PPE_{j,t}$) = data#7/ average total assets.

Table 3- Panel C
Assigned Life Cycle Stages For
Transition of Firm from Year t to Year t+1

Sample: **87,819** Firm-year observations used in Accruals Regressions
(9,311) Subtract firm-year observations with missing values for year t+1
78,508 Firm-year observations with year t and year t+1

Year t	N		Year t+1				
			Rapid Growth	Slow Growth	Maturity	Early Decline	Late Decline
Rapid Growth	11,636	100%	46%	25%	15%	9%	5%
Slow Growth	14,416	100%	17%	33%	25%	15%	9%
Maturity	15,999	100%	8%	20%	32%	26%	15%
Early Decline	17,628	100%	4%	10%	20%	38%	28%
Late Decline	18,829	100%	2%	5%	10%	23%	61%
	<u>78,508</u>						

All data is from Compustat.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$, which takes on discrete rank of 1, 50, or 100 based on whether cash flow from operations > 0 (rank = 50), cash flow from operations < 0 and cash flow from financing > 0 (rank = 1), or cash flow from operations < 0 and cash flow from financing < 0 (rank = 100). The individual ranks of $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$ are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation. Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*.

Table 4
Pattern of Accruals Over the Firm Life Cycle

Regression Model

$$WCAccruals_{j,t} = b_0 + b_1RapidGrowth_{j,t} + b_2SlowGrowth_{j,t} + b_3Maturity_{j,t} \text{ (omitted)} + b_4EarlyDecline_{j,t} + b_5LateDecline_{j,t} + a_1CFO_cf_{j,t} + a_2CFO_cf_{j,t-1} + a_3CFO_cf_{j,t+1} + a_4\Delta Rev_{j,t} + a_5PPE_{j,t} + e_{j,t}$$

	Pred. Sign	Hypothesis 1		Hypothesis 2			
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.023	(4.66)**	0.026	(5.94)**	0.027	(6.18)**
<i>Rapid Growth_{j,t}</i>	+	0.037	(36.36)**			0.005	(5.47)**
<i>Slow Growth_{j,t}</i>	+	0.010	(12.87)**			0.001	(1.65)
<i>Maturity_{j,t}</i> [^]							
<i>Early Decline_{j,t}</i>	-	-0.008	(11.25)**			-0.002	(2.66)**
<i>Late Decline_{j,t}</i>	-	-0.015	(21.18)**			-0.004	(6.15)**
CFO_ <i>cf_{j,t}</i>				-0.333	(70.76)**	-0.330	(69.86)**
CFO_ <i>cf_{j,t-1}</i>				0.087	(65.85)**	0.081	(50.02)**
CFO_ <i>cf_{j,t+1}</i>				0.166	(48.75)**	0.166	(48.59)**
$\Delta Rev_{j,t}$				0.143	(39.38)**	0.142	(39.35)**
PPE _{j,t}				-0.010	(13.68)**	-0.012	(15.07)**
N= firm-years		87,819		87,819		87,819	
Adj. R ²		6.9%		27.7%		27.8%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, $\Delta Rev_{j,t}$, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, $\Delta Rev_{j,t}$, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*. Indicator variables take on a value of 1 to denote each life cycle stage of *Rapid Growth_{j,t}* (rank 1-20), *Slow Growth_{j,t}* (rank 21-40), *Early Decline_{j,t}* (rank 61-80), and *Late Decline_{j,t}* (rank 81-100), and a value of 0 otherwise. [^]The indicator variable for *Maturity_{j,t}* (rank 41-60) is used as a benchmark and not included in the regression.

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. Working capital accruals (*WCAccruals_{j,t}*) = - (data#302+ data#303+ data#304 +data#305+ data#307)/ average total assets. Any missing values of these inputs are coded as 0. Cash flow from operations (*CFO_cf_{j,t}*) = (data#308)/ average total assets, as calculated from the cash flow statement. *CFO_cf_{j,t-1}* and *CFO_cf_{j,t+1}* = Lag and lead values of truncated *CFO_cf_{j,t}* (truncated the top and bottom 1%). Changes in Revenues ($\Delta Rev_{j,t}$) = Δ data#12/ average total assets. Gross Property, Plant, and Equipment (*PPE_{j,t}*) = data#7/ average total assets.

Table 5
Average “Abnormal” Accruals Within Each Life Cycle Stage

Life Cycle Stages	Rank	N	Pred. Sign	Hypothesis 2			
				Average Firm-Year \hat{e} from Pooled Cross-Sectional Regressions By Industry and Year			
				Model 1	Model 2	Model 3	Model 4
Rapid Growth _{i,t}	1-20	12,650	+	0.003	0.005	0.029	0.027
Slow Growth _{i,t}	21-40	15,938	+	0.001	0.001	0.009	0.008
Maturity _{i,t}	41-60	17,994		0.001	0.001	0.000	0.000
Early Decline _{i,t}	61-80	19,925	-	-0.001	-0.001	-0.008	-0.008
Late Decline _{i,t}	81-100	21,312	-	-0.003	-0.003	-0.016	-0.015
		87,819					

$\hat{e}_{j,t}$ is calculated from pooled cross-sectional accruals regressions by industry and by year for each of the 87,819 firm-year observations. The following accruals expectation models are used:

$$\begin{aligned}
 \text{Model 1: } WC\text{Accruals}_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 2: } WC\text{Accruals}_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 3: } WC\text{Accruals}_{j,t} &= b_0 + b_1CFO_cf_{j,t} + e_{j,t} \\
 \text{Model 4: } WC\text{Accruals}_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + e_{j,t}
 \end{aligned}$$

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$. The individual ranks of $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, and $Cash\ Profile_{j,t}$ are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*. Indicator variables take on a value of 1 to denote each life cycle stage of *Rapid Growth_{j,t}* (rank 1-20), *Slow Growth_{j,t}* (rank 21-40), *Early Decline_{j,t}* (rank 61-80), and *Late Decline_{j,t}* (rank 81-100), and a value of 0 otherwise. The indicator variable for *Maturity_{j,t}* (rank 41-60) is used as a benchmark and not included in the regression.

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. Working capital accruals (*WC*Accruals_{j,t}) = - (data#302+ data#303+ data#304 +data#305+ data#307)/ average total assets. Any missing values of these inputs are coded as 0. Cash flow from operations (*CFO*_cf_{j,t}) = (data#308)/ average total assets, as calculated from the cash flow statement. *CFO*_cf_{j,t-1} and *CFO*_cf_{j,t+1} = Lag and lead values of truncated *CFO*_cf_{j,t} (truncated the top and bottom 1%). Changes in Revenues ($\Delta Rev_{j,t}$) = Δ data#12/ average total assets. Gross Property, Plant, and Equipment (*PPE*_{j,t}) = data#7/ average total assets.

Table 6
Descriptive Statistics
Average Accruals Associations Within Each Life Cycle Stage

<u>Life Cycle Stages</u>	<u>Rank</u>	<u>N</u>	<u>Pred. Direction</u>	Hypothesis 3			
				Average Firm-Specific Adj R ²			
				<u>Model 1</u>	<u>Model 2</u>	<u>Model 3</u>	<u>Model 4</u>
Rapid Growth	1-20	156	Higher	0.595	0.506	0.436	0.529
Slow Growth	21-40	869	Higher	0.593	0.517	0.386	0.473
Maturity	41-60	1,725	Benchmark	0.524	0.443	0.287	0.394
Early Decline	61-80	1,658	Lower	0.526	0.434	0.281	0.396
Late Decline	81-100	560	Lower	0.498	0.393	0.263	0.381
		<u>4,968</u>					

Adj R²_j is calculated from 4,968 firm-specific accruals regressions. The following accruals expectation models are used:

$$\begin{aligned}
 \text{Model 1: } WC_{accruals_{j,t}} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 2: } WC_{accruals_{j,t}} &= b_0 + b_1CFO_cf_{j,t} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 3: } WC_{accruals_{j,t}} &= b_0 + b_1CFO_cf_{j,t} + e_{j,t} \\
 \text{Model 4: } WC_{accruals_{j,t}} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + e_{j,t}
 \end{aligned}$$

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*. *Note:* For the firm-specific analysis, each firm's average life cycle rank over all of its fiscal years is used.

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. Working capital accruals (*WC_{accruals_{j,t}}*) = - (data#302+ data#303+ data#304 +data#305+ data#307)/ average total assets. Any missing values of these inputs are coded as 0. Cash flow from operations (*CFO_{cf_{j,t}}*) = (data#308)/ average total assets, as calculated from the cash flow statement. *CFO_{cf_{j,t-1}}* and *CFO_{cf_{j,t+1}}* = Lag and lead values of truncated *CFO_{cf_{j,t}}* (truncated the top and bottom 1%). Changes in Revenues (*ΔRev_{j,t}*) = Δdata#12/ average total assets. Gross Property, Plant, and Equipment (*PPE_{j,t}*) = data#7/ average total assets.

Table 7
Decline in Accruals Associations Over the Firm Life Cycle

Regression Model

$$\text{Adj } R^2_j = b_0 + b_1 \text{RapidGrowth}_j + b_2 \text{SlowGrowth}_j + b_3 \text{Maturity}_j \text{ (omitted)} + b_4 \text{EarlyDecline}_j + b_5 \text{LateDecline}_j + e_j$$

Hypothesis 3									
	Pred. Sign	Model 1		Model 2		Model 3		Model 4	
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.605	(8.69)**	0.511	(6.62)**	0.365	(4.47)**	0.476	(5.30)**
Rapid Growth _j	+	0.073	(1.86)	0.069	(1.95)	0.118	(3.86)**	0.109	(3.31)**
Slow Growth _j	+	0.065	(4.04)**	0.071	(4.85)**	0.085	(6.21)**	0.065	(4.47)**
Maturity _j [^]									
Early Decline _j	-	-0.008	(0.65)	-0.021	(1.76)	-0.013	(1.21)	-0.004	(0.37)
Late Decline _j	-	-0.045	(2.40)*	-0.067	(3.86)**	-0.048	(3.19)**	-0.039	(2.36)*
N= firms		4,968		4,968		4,968		4,968	
Adj. R ²		5.7%		9.6%		12.8%		8.5%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Adj R²_j is calculated from 4,968 firm-specific accruals regressions. The following accruals expectation models are used:

$$\text{Model 1: } \text{WCAccruals}_{j,t} = b_0 + b_1 \text{CFO_cf}_{j,t} + b_2 \text{CFO_cf}_{j,t-1} + b_3 \text{CFO_cf}_{j,t+1} + b_4 \Delta \text{Rev}_{j,t} + b_5 \text{PPE}_{j,t} + e_{j,t}$$

$$\text{Model 2: } \text{WCAccruals}_{j,t} = b_0 + b_1 \text{CFO_cf}_{j,t} + b_4 \Delta \text{Rev}_{j,t} + b_5 \text{PPE}_{j,t} + e_{j,t}$$

$$\text{Model 3: } \text{WCAccruals}_{j,t} = b_0 + b_1 \text{CFO_cf}_{j,t} + e_{j,t}$$

$$\text{Model 4: } \text{WCAccruals}_{j,t} = b_0 + b_1 \text{CFO_cf}_{j,t} + b_2 \text{CFO_cf}_{j,t-1} + b_3 \text{CFO_cf}_{j,t+1} + e_{j,t}$$

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*. *Note:* For the firm-specific analysis, each firm's average life cycle rank over all of its fiscal years is used.

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. Working capital accruals (*WCAccruals_{j,t}*) = - (data#302+ data#303+ data#304 +data#305+ data#307)/ average total assets. Any missing values of these inputs are coded as 0. Cash flow from operations (*CFO_cf_{j,t}*) = (data#308)/ average total assets, as calculated from the cash flow statement. *CFO_cf_{j,t-1}* and *CFO_cf_{j,t+1}* = Lag and lead values of truncated *CFO_cf_{j,t}* (truncated the top and bottom 1%). Changes in Revenues (*ΔRev_{j,t}*) = Δdata#12/ average total assets. Gross Property, Plant, and Equipment (*PPE_{j,t}*) = data#7/ average total assets.

Table 8- Panel A
Robustness Test: Control for Performance With Matched Discretionary Accruals
Sample Selection Procedures: Full Sample and Partial Sample

Firm-years from Compustat for 1960-2004	741,380	
Firm-years with non-missing values for data#6 (total assets)	298,393	
Firm-years with average total assets greater than \$1 million	266,204	
Firm-years that were assigned a life cycle rank	266,204	See Table 2
 Robustness Test Requirement from Kothari, Leone, and Wasley (2005), or KLW:		
Firm-years with non-missing values for accrual regressions from KLW: total accruals $((\Delta \text{data\#4} - \Delta \text{data\#5} - \Delta \text{data\#1} + \Delta \text{data\#34} - \text{data\#14}) / \text{lag total assets})$, $1/\text{lagdata\#6}$, changes in revenues $(\Delta \text{data\#12} / \text{lag total assets})$, modified changes in revenues $((\Delta \text{data\#12} - \Delta \text{data\#2}) / \text{lag total assets})$, and gross property, plant, and equipment $(\text{data\#7} / \text{lag total assets})$.	266,204	
Firm-years with residuals (discretionary accruals) from accruals regressions from KLW. These accruals regressions include the Jones and modified-Jones models.	241,937	
Firm-years where a "performance match" residual can be obtained based on a firm's ROA, lag ROA, and life cycle rank.	235,530	Full Sample used in Table 8
Robustness Test Requirement: Firm-years for 1962-1999, as used in KLW	197,235	
Firm-years with non-missing values of any accrual inputs, as used in KLW	166,086	
Firm-years remaining after winsorizing the 1st and 99th percentiles of total accruals, $1/\text{lagdata\#6}$, changes in revenues, modified changes in revenues, and gross property, plant, and equipment.	154,908	
Firm-years with non-missing values of Book / Market $(\text{data\#60} / (\text{data\#199} * \text{data\#25}))$, Sales Growth $(\Delta \text{data\#12} / \text{lag total assets})$, E/P Ratio $(\text{data\#18} / \text{data\#199})$, Size $(\text{data\#199} * \text{data\#25})$, and Operating Cash Flow $((\text{data\#18} - (\Delta \text{data\#4} - \Delta \text{data\#5} - \Delta \text{data\#1} + \Delta \text{data\#34} - \text{data\#14})) / \text{lag total assets})$.	138,452	
Firm-years with at least 10 observations for each industry in each year (1,579 unique firms).	137,291	
Firm-years with $ \text{total accruals} / \text{lag total assets} \leq 1$, as used in KLW p.176.	137,291	Partial Sample Used in Table 8

Table 8- Panels B and C
Robustness Test: Control for Performance With Matched Discretionary Accruals
Descriptive Statistics

Panel B: Full Sample 235,539 Observations

	Mean	Standard Deviation	Lower Quartile	Median	Upper Quartile
Jones model	-0.0037	2.6167	-0.0556	0.0004	0.0531
Modified-Jones model	-0.0043	2.0178	-0.0543	0.0003	0.0520
Performance-matched Jones model ROA _{t-1}	0.0040	3.9355	-0.0788	0.0000	0.0803
Performance-matched Jones model ROA _t	0.0058	3.9693	-0.0783	0.0000	0.0794
Performance-matched Jones model Life Cycle	0.0036	3.7442	-0.0767	0.0003	0.0793
Performance-matched modified-Jones model ROA _{t-1}	0.0051	3.2907	-0.0779	0.0000	0.0796
Performance-matched modified-Jones model ROA _t	0.0047	3.3628	-0.0771	0.0000	0.0787
Performance-matched modified-Jones model Life Cycle	0.0028	2.9428	-0.0757	0.0004	0.0786

Panel C: Partial Sample 137,291 Observations

	Mean	Standard Deviation	Lower Quartile	Median	Upper Quartile
Jones model	0.0001	0.2735	-0.0568	-0.0002	0.0538
Modified-Jones model	-0.0003	0.2465	-0.0568	-0.0010	0.0522
Performance-matched Jones model ROA _{t-1}	0.0019	0.5091	-0.0823	0.0000	0.0842
Performance-matched Jones model ROA _t	0.0036	0.4981	-0.0820	0.0000	0.0840
Performance-matched Jones model Life Cycle	0.0042	0.4638	-0.0808	0.0007	0.0844
Performance-matched modified-Jones model ROA _{t-1}	0.0022	0.4884	-0.0816	0.0000	0.0841
Performance-matched modified-Jones model ROA _t	0.0038	0.4688	-0.0809	0.0000	0.0838
Performance-matched modified-Jones model Life Cycle	0.0040	0.4473	-0.0801	0.0010	0.0840

Bold numbers indicate either (1) the discretionary accrual that is closest to zero or (2) the lowest standard deviation. The shaded numbers indicate, among the performance-matched approaches only, either (1) the discretionary accrual that is closest to zero or (2) the lowest standard deviation. This table is based upon the methods used in Kothari, Leone, and Wasley (2005), or K LW, Table 1 Panel A. Discretionary accruals are calculated from pooled cross-sectional accruals regressions by industry and by year for each of the 235,539 firm-year observations. The following accruals expectation models are used, based on K LW equation (7):

$$\begin{aligned} \text{Jones Model: TotalAccruals}_{j,t} &= b_0 + b_1(1/\text{lagtotalassets}_{j,t}) + b_2\Delta\text{Rev}_{j,t} + b_3\text{PPE}_{j,t} + e_{j,t} \\ \text{Modified-Jones Model: TotalAccruals}_{j,t} &= b_0 + b_1(1/\text{lagtotalassets}_{j,t}) + b_2(\Delta\text{Rev}_{j,t} - \Delta\text{Accounts Receivable}_{j,t}) + b_3\text{PPE}_{j,t} + e_{j,t} \end{aligned}$$

Accruals Regression Variable Definitions from K LW: Lag Total Assets_{j,t} = lagdata#6. Total accruals (TotalAccruals_{j,t}) = (Δdata#4- Δdata#5- Δdata#1+ Δdata#34- data#14)/ lag total assets. Any missing values of these inputs are coded as 0. 1 / (lag total assets) = 1 / (lagdata#6). Changes in Revenues (ΔRev_{j,t}) = Δdata#12/ lag total assets. Modified changes in Revenues (ΔRev_{j,t} - ΔAccounts Receivable_{j,t}) = (Δdata#12 - Δdata#2) / lag total assets. Gross Property, Plant, and Equipment (PPE_{j,t}) = data#7/ lag total assets. Control for Performance from K LW: Each firm-year observation's return on assets (ROA) is used as a control for performance. ROA_t = (data #18/ lag total assets). ROA_{t-1} = lag value ROA_t.

Table 8- Panel D
Robustness Test: Control for Performance With Matched Discretionary Accruals
Descriptive Statistics Within Sub- Samples

Mean/Median Discretionary Accruals	Book / Market		Sales Growth		E/P Ratio	
	High	Low	High	Low	High	Low
Jones model	-0.0136	0.0012	0.0092	-0.0046	0.0105	-0.0381
	-0.0047	-0.0020	-0.0004	-0.0017	0.0046	-0.0234
Modified-Jones model	-0.0175	0.0047	0.0238	-0.0255	0.0124	-0.0442
	-0.0076	-0.0005	0.0092	-0.0143	0.0046	-0.0296
Performance-matched Jones model ROA _{t-1}	-0.0068	0.0011	0.0075	0.0032	0.0053	-0.0185
	0.0000	-0.0027	0.0000	0.0000	0.0000	-0.0102
Performance-matched Jones model ROA _t	-0.0032	0.0134	0.0104	0.0098	-0.0009	-0.0037
	0.0000	0.0007	0.0000	0.0040	0.0000	-0.0007
Performance-matched Jones model Life Cycle	-0.0079	0.0019	0.0026	0.0009	0.0155	-0.0339
	-0.0032	-0.0019	-0.0039	-0.0004	0.0051	-0.0244
Performance-matched modified-Jones model ROA _{t-1}	-0.0101	0.0055	0.0215	-0.0145	0.0052	-0.0227
	0.0000	0.0002	0.0083	-0.0085	0.0000	-0.0140
Performance-matched modified-Jones model ROA _t	-0.0035	0.0153	0.0230	-0.0070	-0.0026	-0.0032
	0.0000	0.0015	0.0063	-0.0039	-0.0006	-0.0009
Performance-matched modified-Jones model Life Cycle	-0.0082	0.0036	0.0058	-0.0089	0.0183	-0.0375
	-0.0040	0.0000	0.0006	-0.0061	0.0068	-0.0279
N = firm-years	32,123	34,750	36,199	32,312	34,708	29,320

Mean/Median discretionary accruals are indicated by normal/*italic* fonts. **Bold** numbers indicate either (1) the discretionary accrual that is closest to zero or (2) the lowest standard deviation. This table is based upon the methods used in Kothari, Leone, and Wasley (2005), or K LW, Table 1 Panel B, which involves categorizing the full sample of 235,539 firm-year observations into quartiles based on one of five variables: Book/Market, Sales Growth, E/P Ratio, Size, and Operating Cash Flow. $Book/Market_{i,t} = (data\#60)/(data\#199 * data\#25)$. $Sales\ Growth_{i,t} = \Delta data\#12 / lag\ total\ assets$. $EP\ Ratio_{i,t} = data\#53 / data\#199$. See Table 9 Panel D for the remaining definitions.

Table 8- Panel E
Robustness Test: Control for Performance With Matched Discretionary Accruals
Descriptive Statistics Within Sub- Samples

Mean/ <i>Median</i> Discretionary Accruals	<u>Size</u>		<u>Operating Cash Flow</u>	
	<u>High</u>	<u>Low</u>	<u>High</u>	<u>Low</u>
Jones model	0.0055 <i>0.0024</i>	-0.0234 <i>-0.0130</i>	-0.0729 <i>-0.0494</i>	0.0773 <i>0.0553</i>
Modified-Jones model	0.0074 <i>0.0020</i>	-0.0241 <i>-0.0142</i>	-0.0698 <i>-0.0489</i>	0.0738 <i>0.0539</i>
Performance-matched Jones model ROA _{t-1}	-0.0020 <i>-0.0009</i>	-0.0107 <i>-0.0027</i>	-0.0802 <i>-0.0560</i>	0.0963 <i>0.0688</i>
Performance-matched Jones model ROA _t	-0.0006 <i>-0.0014</i>	-0.0076 <i>-0.0032</i>	-0.0812 <i>-0.0585</i>	0.1104 <i>0.0793</i>
Performance-matched Jones model Life Cycle	0.0104 <i>0.0028</i>	-0.0196 <i>-0.0110</i>	-0.0660 <i>-0.0465</i>	0.0714 <i>0.0504</i>
Performance-matched modified-Jones model ROA _{t-1}	0.0004 0.0000	-0.0111 <i>-0.0030</i>	-0.0774 <i>-0.0560</i>	0.0920 <i>0.0701</i>
Performance-matched modified-Jones model ROA _t	0.0007 <i>-0.0022</i>	-0.0065 <i>-0.0021</i>	-0.0813 <i>-0.0602</i>	0.1094 <i>0.0834</i>
Performance-matched modified-Jones model Life Cycle	0.0141 <i>0.0042</i>	-0.0187 <i>-0.0114</i>	-0.0638 <i>-0.0459</i>	0.0652 <i>0.0484</i>
N = firm-years	32,391	35,522	35,688	30,157

Mean/*Median* discretionary accruals are indicated by normal/*italic* fonts. **Bold** numbers indicate either (1) the discretionary accrual that is closest to zero or (2) the lowest standard deviation. This table is based upon the methods used in Kothari, Leone, and Wasley (2005), or K LW, Table 1 Panel B, which involves categorizing the full sample of 235,539 firm-year observations into quartiles based on one of five variables: Book/Market, Sales Growth, E/P Ratio, Size, and Operating Cash Flow. $Book/Market_{j,t} = (data\#60) / (data\#199 * data\#25)$. $Sales\ Growth_{j,t} = \Delta data\#12 / \text{lag total assets}$. $EP\ Ratio_{j,t} = data\#53 / data\#199$. $Size_{j,t} = data\#199 * data\#25$. $Operating\ Cash\ Flow_{j,t}$, as calculated from the balance sheet $((data\#18 - (\Delta data\#4 - \Delta data\#5 - \Delta data\#1 + \Delta data\#34 - data\#14)) / \text{lag total assets})$. Results are reported for the upper quartile and lower quartiles only. Discretionary accruals are calculated from pooled cross-sectional accruals regressions by industry and by year for each of the 235,539 firm-year observations. The following accruals expectation models are used, based on K LW equation (7):

$$\begin{aligned} \text{Jones Model: } TotalAccruals_{j,t} &= b_0 + b_1(1/\text{lagtotalassets}_{j,t}) + b_2\Delta Rev_{j,t} + b_3PPE_{j,t} + e_{j,t} \\ \text{Modified-Jones Model: } TotalAccruals_{j,t} &= b_0 + b_1(1/\text{lagtotalassets}_{j,t}) + b_2(\Delta Rev_{j,t} - \Delta Accounts \\ &\quad Receivable_{j,t} + b_3PPE_{j,t} + e_{j,t} \end{aligned}$$

Table 8- Panel F
Robustness Test: Control for Performance With ROA
Incorporating ROA_{t-1} Quintiles in Accruals Regressions

Regression Model

$$\begin{aligned} \text{WCAccruals}_{j,t} = & b_0 + b_1 \text{RapidGrowth}_{j,t} + b_2 \text{SlowGrowth}_{j,t} + b_3 \text{Maturity}_{j,t} \text{ (omitted)} + b_4 \text{EarlyDecline}_{j,t} \\ & + b_5 \text{LateDecline}_{j,t} + a_1 \text{CFO_cf}_{j,t} + a_2 \text{CFO_cf}_{j,t-1} + a_3 \text{CFO_cf}_{j,t+1} + a_4 \Delta \text{Rev}_{j,t} + a_5 \text{PPE}_{j,t} \\ & + B_1 \text{ROA}_{t-1} \text{ Quintiles}_{j,t} + e_{j,t} \end{aligned}$$

	Pred. Sign	Hypothesis 2		Robustness Test: Including ROA _{t-1}			
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.027	(6.18)**	0.027	(6.40)**	0.028	(6.50)**
<i>Rapid Growth</i> _{j,t}	+	0.005	(5.47)**			0.004	(4.48)**
<i>Slow Growth</i> _{j,t}	+	0.001	(1.65)			0.001	(0.78)
<i>Maturity</i> _{j,t} [^]							
<i>Early Decline</i> _{j,t}	-	-0.002	(2.66)**			-0.001	(1.47)
<i>Late Decline</i> _{j,t}	-	-0.004	(6.15)**			-0.002	(3.05)**
CFO_cf _{j,t}		-0.330	(69.86)**	-0.339	(71.79)**	-0.337	(71.00)**
CFO_cf _{j,t-1}		0.081	(50.02)**	0.137	(38.83)**	0.137	(38.78)**
CFO_cf _{j,t+1}		0.166	(48.59)**	0.138	(38.05)**	0.138	(38.03)**
ΔRev _{j,t}		0.142	(39.35)**	0.082	(62.09)**	0.078	(48.58)**
PPE _{j,t}		-0.012	(15.07)**	-0.008	(11.12)**	-0.009	(11.87)**
<i>ROA_{t-1} Quintile1</i>	+			0.015	(21.77)**	0.015	(21.03)**
<i>ROA_{t-1} Quintile2</i>	+			0.006	(9.27)**	0.005	(9.01)**
<i>ROA_{t-1} Quintile3</i>							
<i>ROA_{t-1} Quintile4</i>	-			-0.008	(13.37)**	-0.008	(13.22)**
<i>ROA_{t-1} Quintile5</i>	-			-0.017	(21.55)**	-0.017	(21.69)**
N= firm-years		87,819		87,819		87,819	
Adj. R ²		27.8%		29.1%		29.1%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Robustness Test Including ROA Quintiles to Control for Performance Matching: Each of the 266,204 firm-year observations is assigned into one of five quintiles based on lag values of return on assets (lag value of (data #18/ average total assets)). Indicator variables take on a value of 1 to denote each ROA quintile of *ROA_{t-1} Quintile1_{j,t}* (for highest return on assets), *ROA_{t-1} Quintile2_{j,t}*, *ROA_{t-1} Quintile3_{j,t}*, *ROA_{t-1} Quintile4_{j,t}*, *ROA_{t-1} Quintile5_{j,t}* (for lowest return on assets), and a value of 0 otherwise. [^]The indicator variable for *ROA_{t-1} Quintile3_{j,t}* is used as a benchmark and not included in the regression. Definitions for *Life Cycle Stages* and *Accruals Regression Variable Definitions* are in Appendix C.

Table 9- Panel A
Robustness Test: Pattern of Accruals Over the Firm Life Cycle
Correlation Between Alternate Life Cycle Classifications

Panel A: Correlation Between Life Cycle Rank and Alternate Life Cycle Classifications from Anthony and Ramesh (1992)

	Anthony and Ramesh ("AR") Life Cycle Rank
<i>Life Cycle Rank</i>	0.40**

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Robustness Test for Alternate Life Cycle Classifications from Anthony and Ramesh (1992): Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions according to the methods in Anthony and Ramesh (1992). Indicator variables take on a value of 1 to denote each life cycle stage of *AR Rapid Growth_{j,t}* (rank 1-20), *AR Slow Growth_{j,t}* (rank 21-40), *AR Early Decline_{j,t}* (rank 61-80), and *AR Late Decline_{j,t}* (rank 81-100), and a value of 0 otherwise. [^]The indicator variable for *AR Maturity_{j,t}* (rank 41-60) is used as a benchmark and not included in the regression.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required* for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation. Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*.

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. Working capital accruals (*WCAccruals_{j,t}*) = - (data#302+ data#303+ data#304 +data#305+ data#307)/ average total assets. Any missing values of these inputs are coded as 0. Cash flow from operations (*CFO_cf_{j,t}*) = (data#308)/ average total assets, as calculated from the cash flow statement. *CFO_cf_{j,t-1}* and *CFO_cf_{j,t+1}* = Lag and lead values of truncated *CFO_cf_{j,t}* (truncated the top and bottom 1%). Changes in Revenues (*ΔRev_{j,t}*) = Δdata#12/ average total assets. Gross Property, Plant, and Equipment (*PPE_{j,t}*) = data#7/ average total assets.

Table 9- Panel B
Robustness Test: Pattern of Accruals Over the Firm Life Cycle
Using Alternate Life Cycle Classifications in Accruals Regressions

Regression Model

$$\text{WCAccruals}_{j,t} = b_0 + b_1 \text{RapidGrowth}_{j,t} + b_2 \text{SlowGrowth}_{j,t} + b_3 \text{Maturity}_{j,t} \text{ (omitted)} + b_4 \text{EarlyDecline}_{j,t} + b_5 \text{LateDecline}_{j,t} + a_1 \text{CFO_cf}_{j,t} + a_2 \text{CFO_cf}_{j,t-1} + a_3 \text{CFO_cf}_{j,t+1} + a_4 \Delta \text{Rev}_{j,t} + a_5 \text{PPE}_{j,t} + B_1 \text{AR Stages}_{j,t} + e_{j,t}$$

	Pred. Sign	Hypothesis 2		Robustness Test: Including AR (1992) Life Cycle Stages			
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.027	(6.18)**	0.024	(5.53)**	0.025	(5.86)**
<i>Rapid Growth</i> _{j,t}	+	0.005	(5.47)**			0.005	(5.18)**
<i>Slow Growth</i> _{j,t}	+	0.001	(1.65)			0.001	(1.61)
<i>Maturity</i> _{j,t} ^							
<i>Early Decline</i> _{j,t}	-	-0.002	(2.66)**			-0.002	(2.69)**
<i>Late Decline</i> _{j,t}	-	-0.004	(6.15)**			-0.004	(6.31)**
CFO_cf _{j,t}		-0.330	(69.86)**	-0.332	(70.69)**	-0.330	(69.88)**
CFO_cf _{j,t-1}		0.081	(50.02)**	0.166	(48.73)**	0.166	(48.43)**
CFO_cf _{j,t+1}		0.166	(48.59)**	0.143	(39.38)**	0.142	(39.28)**
ΔRev _{j,t}		0.142	(39.35)**	0.086	(62.88)**	0.081	(49.62)**
PPE _{j,t}		-0.012	(15.07)**	-0.010	(13.57)**	-0.012	(15.17)**
<i>AR Rapid Growth</i> _{j,t}	+			0.005	(5.81)**	0.003	(3.73)**
<i>AR Slow Growth</i> _{j,t}	+			0.001	(0.85)	0.000	(0.05)
<i>AR Maturity</i> _{j,t} ^							
<i>AR Early Decline</i> _{j,t}	-			0.002	(2.43)*	0.002	(2.50)*
<i>AR Late Decline</i> _{j,t}	-			0.002	(3.31)**	0.003	(4.80)**
N= firm-years		87,819		87,819		87,819	
Adj. R ²		27.8%		27.7%		27.8%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Robustness Test for Alternate Life Cycle Classifications from Anthony and Ramesh (1992): Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions according to the methods in Anthony and Ramesh (1992). Indicator variables take on a value of 1 to denote each life cycle stage of *AR Rapid Growth*_{j,t} (rank 1-20), *AR Slow Growth*_{j,t} (rank 21-40), *AR Early Decline*_{j,t} (rank 61-80), and *AR Late Decline*_{j,t} (rank 81-100), and a value of 0 otherwise. ^The indicator variable for *AR Maturity*_{j,t} (rank 41-60) is used as a benchmark and not included in the regression. Definitions for *Life Cycle Stages* and *Accruals Regression Variable Definitions* are in Appendix C.

Table 10
Robustness Test: Pattern of Accruals Over the Firm Life Cycle
Incorporating Market to Book Quintiles in Accruals Regressions

Regression Model

$$\begin{aligned} \text{WCAccruals}_{j,t} = & b_0 + b_1 \text{RapidGrowth}_{j,t} + b_2 \text{SlowGrowth}_{j,t} + b_3 \text{Maturity}_{j,t} \text{ (omitted)} + b_4 \text{EarlyDecline}_{j,t} \\ & + b_5 \text{LateDecline}_{j,t} + a_1 \text{CFO_cf}_{j,t} + a_2 \text{CFO_cf}_{j,t-1} + a_3 \text{CFO_cf}_{j,t+1} + a_4 \Delta \text{Rev}_{j,t} + a_5 \text{PPE}_{j,t} \\ & + B_1 \text{M/B Quintiles}_{j,t} + e_{j,t} \end{aligned}$$

	Pred. Sign	Hypothesis 2		Robustness Test: Including Market/Book (M/B)			
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.027	(6.18)**	0.028	(6.47)**	0.029	(6.62)**
<i>Rapid Growth</i> _{j,t}	+	0.005	(5.47)**			0.006	(6.03)**
<i>Slow Growth</i> _{j,t}	+	0.001	(1.65)			0.001	(1.69)
<i>Maturity</i> _{j,t} [^]							
<i>Early Decline</i> _{j,t}	-	-0.002	(2.66)**			-0.002	(2.37)*
<i>Late Decline</i> _{j,t}	-	-0.004	(6.15)**			-0.003	(4.47)**
CFO_cf _{j,t}		-0.330	(69.86)**	-0.335	(71.51)**	-0.332	(70.61)**
CFO_cf _{j,t-1}		0.081	(50.02)**	0.164	(48.18)**	0.163	(48.02)**
CFO_cf _{j,t+1}		0.166	(48.59)**	0.143	(39.56)**	0.143	(39.53)**
ΔRev _{j,t}		0.142	(39.35)**	0.084	(62.06)**	0.078	(47.96)**
PPE _{j,t}		-0.012	(15.07)**	-0.011	(13.88)**	-0.012	(15.02)**
<i>M/B Quintile1</i>	+			-0.002	(2.48)*	-0.002	(3.19)**
<i>M/B Quintile2</i>	+			0.004	(6.04)**	0.003	(5.51)**
<i>M/B Quintile3</i>							
<i>M/B Quintile4</i>	-			-0.002	(3.63)**	-0.002	(3.68)**
<i>M/B Quintile5</i>	-			-0.015	(19.51)**	-0.015	(19.54)**
N= firm-years		87,819		87,819		87,819	
Adj. R ²		27.8%		28.2%		28.3%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Robustness Test Including Market to Book (M/B) Quintiles: Each of the 266,204 firm-year observations is assigned into one of five quintiles based on the ratio of the firm's market value of equity to its book value of equity ((data#199*data#25)/ data#60). Indicator variables take on a value of 1 to denote each M/B quintile of *M/B Quintile1_{j,t}*, (for highest market value relative to book value), *M/B Quintile2_{j,t}*, *M/B Quintile3_{j,t}*, *M/B Quintile4_{j,t}*, *M/B Quintile5_{j,t}*, (for lowest market value relative to book value), and a value of 0 otherwise. [^]The indicator variable for *M/B Quintile3_{j,t}* is used as a benchmark and not included in the regression. Definitions for *Life Cycle Stages* and *Accruals Regression Variable Definitions* are in Appendix C.

Table 11
Robustness Test: Pattern of Accruals Over the Firm Life Cycle
Including 1 / (Average Total Assets) in Accruals Regressions

Regression Model

$$WCAccruals_{j,t} = b_0 + b_1RapidGrowth_{j,t} + b_2SlowGrowth_{j,t} + b_3Maturity_{j,t} \text{ (omitted)} + b_4EarlyDecline_{j,t} + b_5LateDecline_{j,t} + a_1CFO_cf_{j,t} + a_2CFO_cf_{j,t-1} + a_3CFO_cf_{j,t+1} + a_4\Delta Rev_{j,t} + a_5PPE_{j,t} + B_1(1 / \text{Average Total Assets})_{j,t} + e_{j,t}$$

	Pred. Sign	Hypothesis 2		Robustness Test: Including 1 / Average Total Assets			
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.027	(6.18)**	0.027	(6.19)**	0.028	(6.40)**
<i>Rapid Growth_{j,t}</i>	+	0.005	(5.47)**			0.006	(5.92)**
<i>Slow Growth_{j,t}</i>	+	0.001	(1.65)			0.001	(1.77)
<i>Maturity_{j,t}</i> [^]							
<i>Early Decline_{j,t}</i>	-	-0.002	(2.66)**			-0.002	(2.69)**
<i>Late Decline_{j,t}</i>	-	-0.004	(6.15)**			-0.004	(5.85)**
CFO_ <i>cf_{j,t}</i>		-0.330	(69.86)**	-0.334	(71.08)**	-0.332	(70.19)**
CFO_ <i>cf_{j,t-1}</i>		0.081	(50.02)**	0.163	(47.91)**	0.163	(47.73)**
CFO_ <i>cf_{j,t+1}</i>		0.166	(48.59)**	0.141	(38.85)**	0.141	(38.82)**
$\Delta Rev_{j,t}$		0.142	(39.35)**	0.087	(65.85)**	0.081	(49.91)**
PPE _{j,t}		-0.012	(15.07)**	-0.010	(12.97)**	-0.011	(14.36)**
<i>1 / (Average Total Assets)</i>	+			-0.032	(7.75)**	-0.032	(7.86)**
N= firm-years		87,819		87,819		87,819	
Adj. R ²		27.8%		27.8%		27.9%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*.

Accruals Regression Variable Definitions: Accruals are calculated using data from the Compustat Statement of Cash flow following the methods used in Dechow and Dichev (2002), McNichols (2002), and Ball and Shivakumar (2005), which decreases firm-year observations from 266,204 to 87,819. *Average Total Assets_{j,t}* = (data#6+ lagdata#6)/ 2. Working capital accruals (*WCAccruals_{j,t}*) = - (data#302+ data#303+ data#304 +data#305+ data#307)/ average total assets. Any missing values of these inputs are coded as 0. Cash flow from operations (*CFO_cf_{j,t}*) = (data#308)/ average total assets, as calculated from the cash flow statement. *CFO_cf_{j,t-1}* and *CFO_cf_{j,t+1}* = Lag and lead values of truncated *CFO_cf_{j,t}* (truncated the top and bottom 1%). Changes in Revenues (*ΔRev_{j,t}*) = Δdata#12/ average total assets. Gross Property, Plant, and Equipment (*PPE_{j,t}*) = data#7/ average total assets.

Table 12
Robustness Test: Pattern of Accruals Over the Firm Life Cycle
Using Balance Sheet Definitions to Calculate WCAccruals and CFO

Regression Model

$$WCAccruals_bs_{j,t} = b_0 + b_1RapidGrowth_{j,t} + b_2SlowGrowth_{j,t} + b_3Maturity_{j,t} \text{ (omitted)} + b_4EarlyDecline_{j,t} + b_5LateDecline_{j,t} + a_1CFO_bs_{j,t} + a_2CFO_bs_{j,t-1} + a_3CFO_bs_{j,t+1} + a_4\Delta Rev_{j,t} + a_5PPE_{j,t} + e_{j,t}$$

	Pred. Sign	Hypothesis 1		Hypothesis 2			
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.012	(1.99)*	0.011	(2.34)*	0.014	(2.88)**
<i>Rapid Growth_{j,t}</i>	+	0.048	(36.73)**			0.001	(0.72)
<i>Slow Growth_{j,t}</i>	+	0.014	(13.40)**			0.000	(0.01)
<i>Maturity_{j,t}</i> [^]							
<i>Early Decline_{j,t}</i>	-	-0.014	(14.67)**			-0.004	(4.66)**
<i>Late Decline_{j,t}</i>	-	-0.023	(23.14)**			-0.005	(5.98)**
CFO_ <i>bs_{j,t}</i>				-0.317	(58.76)**	-0.316	(57.85)**
CFO_ <i>bs_{j,t-1}</i>				0.144	(41.11)**	0.144	(41.07)**
CFO_ <i>bs_{j,t+1}</i>				0.130	(38.42)**	0.130	(38.40)**
$\Delta Rev_{j,t}$				0.111	(66.31)**	0.106	(51.00)**
PPE _{j,t}				-0.004	(3.91)**	-0.005	(5.05)**
N= firm-years		87,819		87,819		87,819	
Adj. R ²		27.8%		32.3%		32.3%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Robustness Test for Working Capital Accruals and Cash Flow from Operations, as calculated from the balance sheet: $WCAccruals_bs_{j,t} = (\Delta data\#4 - \Delta data\#5 - \Delta data\#1 + \Delta data\#34) / \text{average total assets}$. $CFO_bs_{j,t} = ((data\#18 - (\Delta data\#4 - \Delta data\#5 - \Delta data\#1 + \Delta data\#34 - data\#14)) / \text{average total assets})$.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, $\Delta Rev_{j,t}$, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, $\Delta Rev_{j,t}$, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*. Indicator variables take on a value of 1 to denote each life cycle stage of *Rapid Growth_{j,t}* (rank 1-20), *Slow Growth_{j,t}* (rank 21-40), *Early Decline_{j,t}* (rank 61-80), and *Late Decline_{j,t}* (rank 81-100), and a value of 0 otherwise. [^]The indicator variable for *Maturity_{j,t}* (rank 41-60) is used as a benchmark and not included in the regression.

Table 13
Robustness Test: Pattern of Accruals Over the Firm Life Cycle
Using Change in Cost of Goods Sold in Life Cycle Classification

Regression Model

$$\begin{aligned} \text{WCAccruals}_{j,t} = & b_0 + b_1 \text{RapidGrowth}_{j,t} + b_2 \text{SlowGrowth}_{j,t} + b_3 \text{Maturity}_{j,t} \text{ (omitted)} + b_4 \text{EarlyDecline}_{j,t} \\ & + b_5 \text{LateDecline}_{j,t} + a_1 \text{CFO_cf}_{j,t} + a_2 \text{CFO_cf}_{j,t-1} + a_3 \text{CFO_cf}_{j,t+1} + a_4 \Delta \text{Rev}_{j,t} + a_5 \text{PPE}_{j,t} \\ & + B_1 \text{Stages_ACGS}_{j,t} + e_{j,t} \end{aligned}$$

	Pred. Sign	Hypothesis 2		Robustness Test: Using Δ CGS in Life Cycle Classification			
		Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant		0.026	(5.94)**	0.027	(6.18)**	0.027	(6.23)**
<i>Rapid Growth</i> _{j,t}	+			0.005	(5.47)**		
<i>Slow Growth</i> _{j,t}	+			0.001	(1.65)		
<i>Maturity</i> _{j,t} [^]							
<i>Early Decline</i> _{j,t}	-			-0.002	(2.66)**		
<i>Late Decline</i> _{j,t}	-			-0.004	(6.15)**		
CFO_cf _{j,t}		-0.333	(70.76)**	-0.330	(69.86)**	-0.329	(70.15)**
CFO_cf _{j,t-1}		0.087	(65.85)**	0.081	(50.02)**	0.169	(49.66)**
CFO_cf _{j,t+1}		0.166	(48.75)**	0.166	(48.59)**	0.142	(39.37)**
Δ Rev _{j,t}		0.143	(39.38)**	0.142	(39.35)**	0.083	(61.12)**
PPE _{j,t}		-0.010	(13.68)**	-0.012	(15.07)**	-0.013	(16.72)**
<i>Rapid Growth</i> Δ CGS _{j,t}	+					0.008	(9.54)**
<i>Slow Growth</i> Δ CGS _{j,t}	+					0.003	(3.62)**
<i>Maturity</i> Δ CGS _{j,t} [^]							
<i>Early Decline</i> Δ CGS _{j,t}	-					-0.002	(2.34)*
<i>Late Decline</i> Δ CGS _{j,t}	-					-0.006	(9.37)**
N= firm-years		87,819		87,819		87,819	
Adj. R ²		27.7%		27.8%		28.0%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex*_{j,t}, *ΔRev*_{j,t}, *CGS*_{j,t}, *Age*_{j,t}, and *Cash Profile*_{j,t}. The individual ranks of *Capex*_{j,t}, *ΔRev*_{j,t}, *CGS*_{j,t}, *Age*_{j,t}, and *Cash Profile*_{j,t} are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank*_{j,t}) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth*_{j,t}, *Slow Growth*_{j,t}, *Maturity*_{j,t}, *Early Decline*_{j,t}, and *Late Decline*_{j,t}. Indicator variables take on a value of 1 to denote each life cycle stage of *Rapid Growth*_{j,t} (rank 1-20), *Slow Growth*_{j,t} (rank 21-40), *Early Decline*_{j,t} (rank 61-80), and *Late Decline*_{j,t} (rank 81-100), and a value of 0 otherwise. [^]The indicator variable for *Maturity*_{j,t} (rank 41-60) is used as a benchmark and not included in the regression.

Robustness Test Using ΔCGS in Life Cycle Classification: Instead of using $CGS_{j,t}$, the variable $\Delta CGS_{j,t}$ is used in the life cycle classification, as indicated by the life cycle stage indicator variables of *Rapid Growth* $\Delta CGS_{j,t}$, *Slow Growth* $\Delta CGS_{j,t}$, *Maturity* $\Delta CGS_{j,t}$, *Early Decline* $\Delta CGS_{j,t}$, and *Late Decline* $\Delta CGS_{j,t}$.

Table 14 Panel A
Robustness Test: Pattern of Accruals Over the Firm Life Cycle
Using a Simplified Profile of Cash Flows Variable

Regression Model

$$\begin{aligned} \text{WCAccruals}_{j,t} = & b_0 + b_1 \text{RapidGrowth}_{j,t} + b_2 \text{SlowGrowth}_{j,t} + b_3 \text{Maturity}_{j,t} \text{ (omitted)} + b_4 \text{EarlyDecline}_{j,t} \\ & + b_5 \text{LateDecline}_{j,t} + a_1 \text{CFO_cf}_{j,t} + a_2 \text{CFO_cf}_{j,t-1} + a_3 \text{CFO_cf}_{j,t+1} + a_4 \Delta \text{Rev}_{j,t} + a_5 \text{PPE}_{j,t} \\ & + B_1 \text{SimpleProfile_cf}_{j,t} + e_{j,t} \end{aligned}$$

	Hypothesis 2		Robustness Test: SimpleProfile_cf Variable					
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant	0.026	(5.94)**	0.027	(6.18)**	0.02	(4.61)**	0.022	(5.11)**
<i>Rapid Growth_{j,t}</i>			0.005	(5.47)**				
<i>Slow Growth_{j,t}</i>			0.001	(1.65)				
<i>Maturity_{j,t}</i> [^]								
<i>Early Decline_{j,t}</i>			-0.002	(2.66)**				
<i>Late Decline_{j,t}</i>			-0.004	(6.15)**				
CFO_cf _{j,t}	-0.333	(70.76)**	-0.330	(69.86)**	-0.312	(63.76)**	-0.359	(68.29)**
CFO_cf _{j,t-1}	0.087	(65.85)**	0.081	(50.02)**	0.166	(48.91)**	0.160	(47.37)**
CFO_cf _{j,t+1}	0.166	(48.75)**	0.166	(48.59)**	0.142	(39.54)**	0.141	(40.04)**
ΔRev _{j,t}	0.143	(39.38)**	0.142	(39.35)**	0.084	(62.25)**	0.085	(63.49)**
PPE _{j,t}	-0.010	(13.68)**	-0.012	(15.07)**	-0.010	(12.74)**	-0.007	(9.50)**
<i>SimpleProfile_cf_{j,t}</i>					0.015	(24.37)**	0.014	(20.59)**
<i>SimpleProfile_cf_{j,t}•CFO_cf_{j,t}</i>							0.087	(15.95)**
N= firm-years	87,819		87,819		87,819		87,819	
Adj. R ²	27.7%		27.8%		28.3%		28.9%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*. Indicator variables take on a value of 1 to denote each life cycle stage of *Rapid Growth_{j,t}* (rank 1-20), *Slow Growth_{j,t}* (rank 21-40), *Early Decline_{j,t}* (rank 61-80), and *Late Decline_{j,t}* (rank 81-100), and a value of 0 otherwise. [^]The indicator variable for *Maturity_{j,t}* (rank 41-60) is used as a benchmark and not included in the regression.

Robustness Test Using Simple Profile Variable as Summary of Life Cycle Classification: *SimpleProfile_{j,t}* = 1 if CFF > CFO and CFF > CFI, and equal to 0 otherwise. *SimpleProfile_cf_{j,t}* indicates that cash flow variables are calculated from the cash flow statement, while *SimpleProfile_bs_{j,t}* indicates that cash flow variables are calculated from the balance sheet.

Table 14 Panel B
Robustness Test: Pattern of Accruals Over the Firm Life Cycle
Using a Simplified Profile of Cash Flows Variable

Regression Model

$$\text{WCAccruals}_{j,t} = b_0 + b_1 \text{RapidGrowth}_{j,t} + b_2 \text{SlowGrowth}_{j,t} + b_3 \text{Maturity}_{j,t} \text{ (omitted)} + b_4 \text{EarlyDecline}_{j,t} + b_5 \text{LateDecline}_{j,t} + a_1 \text{CFO_cf}_{j,t} + a_2 \text{CFO_cf}_{j,t-1} + a_3 \text{CFO_cf}_{j,t+1} + a_4 \Delta \text{Rev}_{j,t} + a_5 \text{PPE}_{j,t} + B_1 \text{SimpleProfile_bs}_{j,t} + e_{j,t}$$

	Hypothesis 2		Robustness Test: SimpleProfile_bs Variable					
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant	0.026	(5.94)**	0.027	(6.18)**	0.02	(4.71)**	0.023	(5.20)**
<i>Rapid Growth</i> _{j,t}			0.005	(5.47)**				
<i>Slow Growth</i> _{j,t}			0.001	(1.65)				
<i>Maturity</i> _{j,t} [^]								
<i>Early Decline</i> _{j,t}			-0.002	(2.66)**				
<i>Late Decline</i> _{j,t}			-0.004	(6.15)**				
CFO_cf _{j,t}	-0.333	(70.76)**	-0.330	(69.86)**	-0.318	(65.34)**	-0.361	(59.78)**
CFO_cf _{j,t-1}	0.087	(65.85)**	0.081	(50.02)**	0.165	(48.74)**	0.162	(47.68)**
CFO_cf _{j,t+1}	0.166	(48.75)**	0.166	(48.59)**	0.143	(39.83)**	0.142	(39.55)**
ΔRev _{j,t}	0.143	(39.38)**	0.142	(39.35)**	0.083	(61.01)**	0.085	(61.98)**
PPE _{j,t}	-0.010	(13.68)**	-0.012	(15.07)**	-0.010	(13.14)**	-0.008	(10.40)**
<i>SimpleProfile_bs</i> _{j,t}					0.012	(20.09)**	0.009	(12.51)**
<i>SimpleProfile_bs</i> _{j,t} * CFO_cf _{j,t}							0.069	(11.74)**
N= firm-years	87,819		87,819		87,819		87,819	
Adj. R ²	27.7%		27.8%		28.0%		28.5%	

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Life Cycle Stages: Each of the 266,204 firm-year observations is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex*_{j,t}, *ΔRev*_{j,t}, *CGS*_{j,t}, *Age*_{j,t}, and *Cash Profile*_{j,t}. The individual ranks of *Capex*_{j,t}, *ΔRev*_{j,t}, *CGS*_{j,t}, *Age*_{j,t}, and *Cash Profile*_{j,t} are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank*_{j,t}) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation.* Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth*_{j,t}, *Slow Growth*_{j,t}, *Maturity*_{j,t}, *Early Decline*_{j,t}, and *Late Decline*_{j,t}. Indicator variables take on a value of 1 to denote each life cycle stage of *Rapid Growth*_{j,t} (rank 1-20), *Slow Growth*_{j,t} (rank 21-40), *Early Decline*_{j,t} (rank 61-80), and *Late Decline*_{j,t} (rank 81-100), and a value of 0 otherwise. [^]The indicator variable for *Maturity*_{j,t} (rank 41-60) is used as a benchmark and not included in the regression.

Robustness Test Using Simple Profile Variable as Summary of Life Cycle Classification: *SimpleProfile*_{j,t} = 1 if CFF > CFO and CFF > CFI, and equal to 0 otherwise. *SimpleProfile_cf*_{j,t} indicates that cash flow variables are calculated from the cash flow statement, while *SimpleProfile_bs*_{j,t} indicates that cash flow variables are calculated from the balance sheet.

Table 15- Panel A
Robustness Test: Accruals Associations of Regression Model
Within Each Life Cycle Stage
Using Cash Flow Definitions Calculate WCAccruals and CFO

Regression Model

$$WCAccruals_{j,t} = b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t}$$

Within Each Life Cycle Stage

Hypothesis 3

Total	Rapid Growth		Slow Growth		Maturity		Early Decline		Late Decline	
	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.	Coeff.	t-stat.
Constant	0.057	(4.71)**	0.018	(1.60)	0.029	(3.91)**	0.017	(2.10)*	0.024	(2.34)*
CFO_cf _{j,t}	-0.334	(31.59)**	-0.330	(31.59)**	-0.313	(26.13)**	-0.335	(34.96)**	-0.319	(31.53)**
CFO_cf _{j,t-1}	0.053	(15.65)**	0.072	(17.01)**	0.094	(21.24)**	0.099	(24.24)**	0.079	(24.28)**
CFO_cf _{j,t+1}	0.165	(21.28)**	0.161	(20.91)**	0.162	(20.96)**	0.168	(22.89)**	0.165	(22.06)**
ΔRev _{j,t}	0.153	(16.87)**	0.156	(19.16)**	0.136	(15.29)**	0.146	(19.60)**	0.120	(17.17)**
PPE _{j,t}	-0.034	(12.25)**	-0.015	(7.67)**	-0.009	(5.20)**	-0.005	(3.65)**	-0.007	(5.03)**
N= firm-years	12,650		15,938		17,994		19,925		21,312	
Adj. R ²	29.6%		25.4%		22.9%		25.3%		23.0%	

Prediction for Adj. R² H3a: Higher

Benchmark

H3b: Lower

* significant at 5%. ** significant at 1%. Robust t statistics (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Life Cycle Stages: Each firm-year observation is assigned a rank (ranging from 1-100 within each Fama and French (1997) industry group) along several firm-year dimensions: *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}*. The individual ranks of *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, and *Cash Profile_{j,t}* are equally weighted to form a combined overall life cycle rank (*Life Cycle Rank_{j,t}*) ranging from 1-100 within each Fama and French (1997) industry group. *There is no minimum number of years required* for a firm-year to remain in the sample, as all operating variables are calculated for each firm-year observation. Firm-year observations with life cycle ranks of 1-20, 21-40, 41-60, 61-80, and 81-100 are assigned to the life cycle stages of *Rapid Growth_{j,t}*, *Slow Growth_{j,t}*, *Maturity_{j,t}*, *Early Decline_{j,t}*, and *Late Decline_{j,t}*. Indicator variables take on a value of 1 to denote each life cycle stage of *Rapid Growth_{j,t}* (rank 1-20), *Slow Growth_{j,t}* (rank 21-40), *Early Decline_{j,t}* (rank 41-60), and *Late Decline_{j,t}* (rank 61-80), and a value of 0 otherwise. The indicator variable for *Maturity_{j,t}* (rank 41-60) is used as a benchmark and not included in the regression.

Table 16
Extracted “Factor” From Factor Analysis of Operating Variables

Factor Analysis: A principal component factor analysis is used to illustrate how incorporating a firm’s life cycle fundamentals affects tests of a firm’s “accruals quality”. A common factor, referred to as *Factor*, is extracted for each firm-year observation from the set operating variables of $Capex_{j,t}$, $\Delta Rev_{j,t}$, $CGS_{j,t}$, $Age_{j,t}$, CFO_bs , CFF_bs , $Volatility_{j,t}(CFO_bs)$, and $Volatility_{j,t}(\Delta Rev)$. The operating variables $Volatility_{j,t}(CFO_bs)$ and $Volatility_{j,t}(\Delta Rev)$ are bolded and used in the factor analysis, which does not require a priori assumptions about the functional form of the variables. $Volatility_{j,t}(CFO_bs)$ and $Volatility_{j,t}(\Delta Rev)$ were not included in the previous life cycle classifications, due to the difficulty in specifying the functional form of these variables over the firm life cycle. This table shows the Pearson correlations between the extracted *Factor* and the set of operating variables.

Operating Variables	Pearson Correlations	
	Extracted "Factor" from Factor Analysis	
<i>Capex</i>	-0.160	**
<i>ΔRev</i>	-0.160	**
<i>CGS</i>	0.009	
<i>Age</i>	-0.310	**
<i>CFO_bs</i>	-0.740	**
<i>CFF_bs</i>	0.564	**
<i>Volatility (CFO_bs)</i>	0.673	**
<i>Volatility (ΔRev)</i>	0.371	**

** significant at 1%.

Operating Variable Definitions: Capital expenditures ($Capex_{j,t}$) = data#128/ average total assets. Changes in revenues ($\Delta Rev_{j,t}$) = $\Delta data\#12$ / average total assets. Cost of goods sold ($CGS_{j,t}$) = data#41/ average total assets. Firm age ($Age_{j,t}$) = firm age as measured by the number of years the firm is first listed on either Compustat or CRSP. Cash flow profile (*Cash Profile_{j,t}*) involves a comparison of the firm-year cash flow from operations (CFO_bs), as calculated from the balance sheet ((data#18- (Δdata#4- Δdata#5- Δdata#1+ Δdata#34- data#14))/ average total assets) to the firm-year cash flow from financing (CFF_bs), as calculated from the balance sheet (Δdata#9+ Δdata#34+ (Δdata#60- data#20)+ Δdata#10)/ average total assets) and based on the methods in the appendix of Livnat and Zarowin (1990).

Additional Operating Variable Definitions: $Volatility_{j,t}(CFO_bs)$ = volatility of the firm’s five most recent values of cash flow from operations ((data#18- (Δdata#4- Δdata#5- Δdata#1+ Δdata#34- data#14))/ average total assets). $Volatility_{j,t}(\Delta Rev)$ = volatility of the firm’s five most recent values of changes in revenues (Δdata#12/ average total assets).

Table 17
The Effect of Controlling for Life Cycle Fundamentals in Tests of
Accruals Quality and Auditor Tenure

Regression Model
from Myers, Myers, and Omer (2003), or MMO

$$\text{AbsWCAccruals}_{j,t} = b_0 + b_1 \text{Tenure}_{j,t} + b_2 \text{Age}_{j,t} + b_3 \text{Size}_{j,t} + b_4 \text{IndustryGrowth}_{j,t} + b_5 \text{CashFlow}_{j,t} + b_6 \text{AuditorType}_{j,t} + e_{j,t}$$

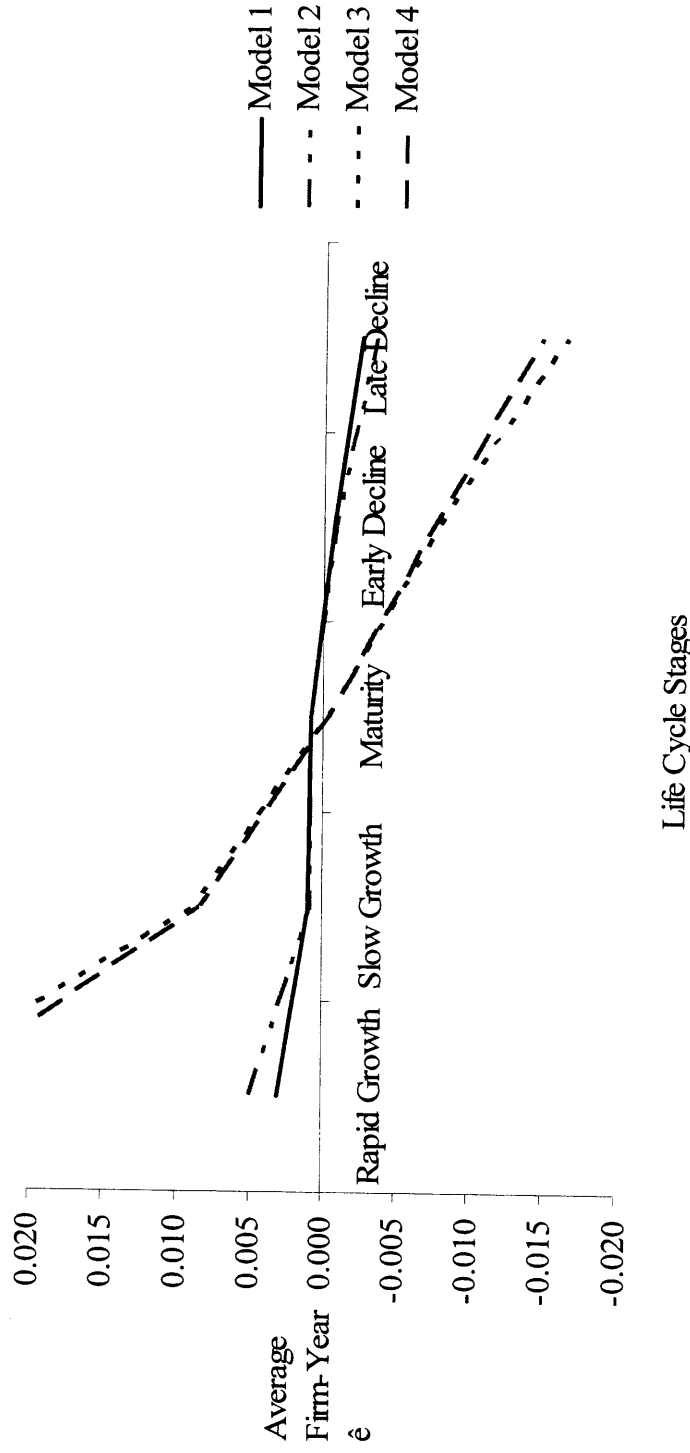
	MMO (2003)		Replication					
	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value	Coeff.	p-value
Constant	0.25324	(0.0001)	0.13974	(0.000)**	0.12618	(0.000)**	0.10519	(0.000)**
Tenure	-0.00142	(0.0004)	-0.00062	(0.039)*	-0.00046	(0.124)	-0.00019	(0.601)
Age	-0.00393	(0.0001)	-0.00106	(0.000)**	-0.00068	(0.001)**	0.00020	(0.625)
Size	-0.01032	(0.0001)	-0.00927	(0.000)**	-0.00882	(0.000)**	-0.00558	(0.000)**
IndustryGrowth	0.00432	(0.5807)	-0.00201	(0.7890)	-0.00237	(0.752)	-0.00034	(0.961)
CashFlow	-0.18027	(0.0001)	-0.07433	(0.000)**	-0.07263	(0.000)**	0.01896	(0.291)
AuditorType	0.01283	(0.0039)	-0.01091	(0.000)**	-0.01122	(0.000)**	-0.01026	(0.001)**
<i>Rapid Growth_i</i>					0.03362	(0.000)**		
<i>Slow Growth_i</i>					0.00707	(0.015)*		
<i>Maturity_i[^]</i>								
<i>Early Decline_i</i>					-0.00321	(0.274)		
<i>Late Decline_i</i>					0.00556	(0.086)		
Factor							0.04318	(0.000)**
N=firm-years	41,250		37,117		37,117		37,117	
Adj R ²			5.1%		5.8%		7.7%	

* significant at 5%. ** significant at 1%. Robust p values (in parentheses) use a Huber-White correction for general heteroscedasticity in the standard errors. Dummy variables for Fama and French (1997) industry groupings and fiscal year are included.

Auditor Tenure Variable Definitions: All variables for the auditor tenure regressions are calculated according to the methods used in Myers, Myers, and Omer (2003). *AbsWCAccruals_{j,t}* = Absolute value of ($\Delta \text{data\#4} - \Delta \text{data\#5} - \Delta \text{data\#1} - \Delta \text{data\#34}$) / average total assets. *Tenure_{j,t}* = Tenure is based on data#149. Audit tenures ranging from 1-2, 3-4, 5-6, 7-8, 9-10, 11-12, 13-15, and 16 or greater are assigned tenure deciles from 1 to 10, respectively. *Age_{j,t}* = firm age in years, measured as the number of years the firm has an asset listing on Compustat since 1980. *Size_{j,t}* = $\log(\text{data\#6})$ for this regression only. *Industry Growth_{j,t}* = Average sales for the firm's industry_t / average sales for the firm's industry_{t-1}. *Cash Flow_{j,t}* = (data\#308) / average total assets. *Auditor Type_{j,t}* = indicator variable equal to 1 if the auditor is a big 5 auditor and 0 otherwise. *ΔRev_{j,t}* = $\Delta \text{data\#12}$ / average total assets. *PPE_{j,t}* = data\#8 / average total assets.

Factor Analysis: A principal component factor analysis is used to illustrate how incorporating a firm's life cycle fundamentals affects tests of a firm's "accruals quality". A common factor, referred to as *Factor*, is extracted for each firm-year observation from the set operating variables of *Capex_{j,t}*, *ΔRev_{j,t}*, *CGS_{j,t}*, *Age_{j,t}*, *CFO_{bs}*, *CFF_{bs}*, *Volatility_{j,t}(CFO_{bs})*, and *Volatility_{j,t}(ΔRev)*. The operating variables *Volatility_{j,t}(CFO_{bs})* and *Volatility_{j,t}(ΔRev)* are bolded and used in the factor analysis, which does not require a priori assumptions about the functional form of the variables. *Volatility_{j,t}(CFO_{bs})* and *Volatility_{j,t}(ΔRev)* were not included in the previous life cycle classifications, due to the difficulty in specifying the functional form of these variables over the firm life cycle.

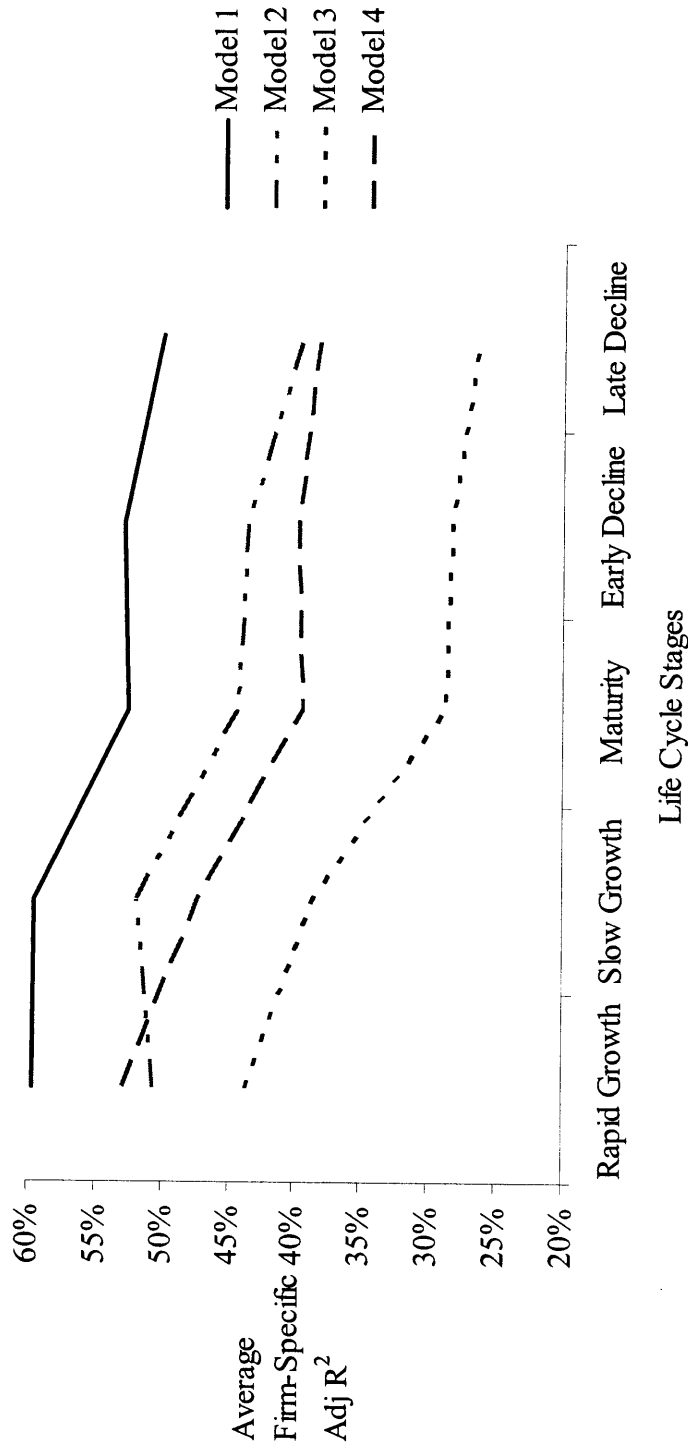
Figure 1
Pattern of Average Firm-Year Abnormal Accruals (\hat{e})
From Pooled Cross-Sectional Regressions By Industry and Year



\hat{e}_{it} is calculated from pooled cross-sectional accruals regressions by industry and by year for each of the 87,819 firm-year observations. The following accruals expectation models are used:

$$\begin{aligned}
 \text{Model 1: } WCAccruals_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 2: } WCAccruals_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 3: } WCAccruals_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 4: } WCAccruals_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t}
 \end{aligned}$$

Figure 2
Declining Average Firm-Specific Adj R^2



$Adj R_j^2$ is calculated from 4,968 firm-specific accruals regressions. The following accruals expectation models are used:

$$\begin{aligned}
 \text{Model 1: } WCAccruals_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 2: } WCAccruals_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 3: } WCAccruals_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_4\Delta Rev_{j,t} + b_5PPE_{j,t} + e_{j,t} \\
 \text{Model 4: } WCAccruals_{j,t} &= b_0 + b_1CFO_cf_{j,t} + b_2CFO_cf_{j,t-1} + b_3CFO_cf_{j,t+1} + e_{j,t}
 \end{aligned}$$