THE TOTAL ASSET GROWTH ANOMALY: IS IT INCREMENTAL TO THE NET OPERATING ASSET GROWTH ANOMALY?

BY

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DISSERTATION

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ABSTRACT

I find that the total asset (TA) growth anomaly (Cooper et al. 2008) is a noisy manifestation of the net operating asset (NOA) growth anomaly documented earlier in the accounting literature. To better understand the underlying causes of the growth anomalies, I decompose TA growth into NOA growth and two additional components. Out of the three components, the TA growth anomaly appears to be driven only by the market's misunderstanding of NOA growth's negative implications for future profitability. The two additional components fail to predict future abnormal returns and, in fact, substantially *dilute* the predictability of NOA growth. This study suggests that it is not sufficient to decompose asset growth only by asset types or liability types in order to capture the differential implications of asset growth components. It is important for us to further decompose asset growth by financing sources within a given type of assets. This decomposition allows us to consider the interaction between asset types and liability types and to bridge the "left" side and the "right" side of balance sheet in financial statement analysis.

Keywords: growth anomalies; total asset growth; net operating asset growth; market mispricing

Data Availability: All data are from public sources

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I. INTRODUCTION

An expanding body of literature explores a "growth effect" on future abnormal returns. The underlying empirical regularity is that asset growth (e.g., acquisitions; capital investment; debt and equity offerings) tends to be anomalously followed by periods of negative abnormal returns.[1] In a seminal paper, Cooper et al. (2008) introduce total asset (TA) growth strategy as a new growth anomaly and argue that TA growth is the strongest determinant of future negative returns relative to all previously documented growth components. This new anomaly has received great attention, spawning a new line of research that seeks to explain its anomalous returns. These studies are divided between offering behavioral or risk-based explanations for the anomaly (e.g., Chen and Zhang 2009; Chan et al. 2008). However, none of these studies can completely explain the abnormal negative returns of TA growth, and the cause of the TA growth anomaly remains puzzling. In addition, Cooper et al.'s (2008) research inspired a sequence of studies to examine whether this "new" anomaly exists in global financial markets, such as the Pacific-Basin region and Australia (e.g., Chen, Yao and Yu 2010; Gray and Johnson 2010).

Prior to the research of Cooper et al. (2008), Fairfield et al. (2003) introduced a growth anomaly using growth in net operating assets (NOA). Fairfield et al. (2003) argue that NOA growth captures the effect of diminishing marginal returns from investment growth (Stigler 1963), thus negatively effecting future profitability. They show that the market fails to understand the negative implications of NOA growth for future profitability in a timely fashion. Abnormal negative returns are earned in subsequent periods when the market learns of the negative implications. While both the TA and the NOA growth anomalies have been investigated

[1] Examples include Asquith 1983, Spiess and Affleck-Graves 1999, Richardson and Sloan 2003, and Titman et al. 2004.

separately in great depth, no study has systemically examined the relation between these two phenomena. In this paper, I investigate whether the TA growth anomaly, a new influential anomaly, , provides incremental predictive power for future negative returns over and above the NOA growth anomaly documented in earlier accounting literature.

If the TA growth anomaly is highly related to NOA growth, the explanation established for the NOA growth anomaly will be helpful in identifying the underlying causes of the TA growth anomaly and contribute to the current on-going debate about behavioral versus risk-based explanations. Reconciling these two anomalies will also simplify future research pertaining to the two growth anomalies.

Based on regression and portfolio analyses, I find that Cooper et al.'s (2008) TA growth anomaly is completely subsumed by the NOA growth anomaly. I find that no abnormal returns for TA growth after controlling for NOA growth. In contrast, the predictive power of NOA growth in future negative returns remains the same (-8 to -13 percent) across all TA growth partitions. The results are robust to using both equal-weighted (EW) and value-weighted (VW) portfolio returns. To investigate the subsumption of Cooper et al.'s (2008) TA growth anomaly and better understand its causes, I decompose TA growth into three subparts: 1) growth in operating assets financed by debt and equity (i.e., NOA growth); 2) growth in operating assets financed by operating liabilities (hereafter, OA_{OL}); and 3) growth in cash and marketable securities (hereafter, CASH).

Cooper et al. (2008) motivate the TAgrowth strategy as the strongest growth anomaly by observing that prior studies on growth anomalies use individual components of a firms' investment or financing activities, ignoring the potential synergistic benefits of combining those growth components. They believe that the TA growth, as a sum of all asset components, can synergistically benefit from the predictability of all subcomponents of growth, better forecasting the cross-section of returns. In my decomposition, TA growth is a sum of the NOA growth and the additional two components. According to the Cooper et al. (2008) concept of synergy, the TA growth would provide incremental predictive power in future negative returns beyond NOA growth. The result that the TA growth anomaly is subsumed by the NOA growth anomaly suggests that the two additional components (i.e. growth in CASH and OA_{OL}) do not provide incremental power in predicting future negative returns over NOA growth and, in fact, *dilute* the predictability of NOA growth.

The empirical results support this explanation. The two additional components, in fact, *dilute* the abnormal negative returns of the NOA growth strategy by 28 (29.7) percent and reduce the *t*-statistics by 36 (38) percent for EW (VW) portfolios. Out of the three subcomponents of TA growth, NOA growth is the *only* driver of TA growth's future negative returns. In summary, the newly influential TA growth anomaly found in the finance literature appears to be a noisy manifestation of the NOA growth anomaly documented earlier in the accounting literature.

Given no study has yet completely explained the abnormal returns of the TA growth anomaly, an important implication of the finding that the TA growth anomaly is subsumed by NOA growth anomaly is to test whether the explanation established for the NOA growth anomaly can also apply to the TA growth strategy. I, thus, investigate the effects of TA growth and its three subcomponents on firms' future profitability and the market's understanding of these effects. I find that NOA growth has strong negative implications for future profitability. This finding is consistent with prior literature (Fairfield et al. 2003; Richardson et al. 2005). More importantly, the other two components do not depress future profitability. Rather, they have positive implications for future performance. The results from the Mishkin (1983) test suggest that the market does not differentiate among the three growth components in their implications for future profitability. The market, in general, perceives that asset growth components have non-negative implications for future profitability. The inability of the market to incorporate the negative implications of NOA growth leads to abnormal negative returns in subsequent periods. However, the market is able to correctly incorporate the non-negative implications of the two additional components of TA growth into price. As a result, the two additional components fail to predict future abnormal returns and, in fact, *dilute* the predictability of the major forecasting driver—NOA growth. In sum, out of the three subcomponents, the abnormal negative returns of the TA growth anomaly are driven only by the market's misunderstanding of the negative implications associated with NOA growth for future profitability. This paper, thus, corroborates Fairfield et al.'s (2003) finding that stock prices fail to reflect the negative implications of NOA growth and extend their study by showing that the market can correctly price the non-negative implications of growth in CASH and OA_{OL}.

This finding suggests that it is not sufficient to decompose asset growth only by asset types or liability types to capture the differential implications of asset growth components.[2] It is necessary to further decompose asset growth by financing sources within a given type of assets. For instance, within operating assets, growth in operating assets can be financed by debt and equity (NOA growth), and growth in operating assets can also be financed by operating liabilities (OA_{OL}). The differential implications of the two components suggest that it is important for us

[2] Cooper et al. (2008) and other studies decompose total assets by either asset types (e.g., cash, current asset, and PPE) or liability types (e.g., operating liabilities, debt, and equity). However, the interaction between asset types and liability types was ignored.

to decompose asset growth considering the interaction between asset types and liability types and bridging the “left” side and the “right” side of balance sheet in financial statement analysis.

Finally, I demonstrate the economic significance of using the correct growth anomaly proxy by showing that TA and NOA growth have differential robustness to arbitrage risk. Given Cooper et al.’s contention that TA growth is the strongest growth anomaly, Lam and Wei (2010) and Lipson et al. (2009) use TA growth as the “growth effect” measure and find that the abnormal returns following TA growth are not robust to arbitrage risk. They, thus, contend that the “growth effect” can be explained by arbitrage risk. I replicate their studies using NOA growth and TA growth. While the TA growth anomaly generates no abnormal returns in the lowest arbitrage risk portfolio, the NOA growth strategy still leads to statistically significant negative returns when arbitrage risk is absent/low. This result demonstrates that using the correct growth anomaly measure leads to a different result.

This study contributes to the current literature on growth anomalies in four ways. First, given that no prior study is able to completely explain the abnormal negative returns of TA growth, I demonstrate that the abnormal returns are attributable to the market’s misunderstanding of the negative implications of TA growth for future ROA. Second, I document that not all growth components in TA growth have negative implications for future ROA. However, the stock market does not differentiate among the three growth components and perceives NOA growth as a good signal for future profitability as well. Third, this study demonstrates the importance of jointly considering both sides of the balance sheet for clearing inferences about future performance. Last, this study provides researchers with prescriptions regarding both explaining the “growth effect” and controlling for it. The results show that NOA growth is the correct proxy of the “growth effect”. As demonstrated by the differential results with respect to arbitrage risk discussed earlier, researchers are likely better off using NOA growth rather than TA growth when controlling for the "growth effect."

The remainder of the paper proceeds according to the following format. In Section II, I review related literatures and describe the decomposition of TA growth. Section III describes the data, along with variable definitions and presents empirical results. Section IV provides concluding remarks.

II. BACKGROUND

This section first provides a review of the TA and NOA growth anomalies. Next, I illustrate the relevance of this study in relation to the long line of studies that compare anomalies. Finally, I discuss the decomposition of TA growth into NOA growth and the additional components.

The TA and NOA Growth Anomalies

Prior research has documented that an increase in firms' investment has predictive power for future negative returns. Titman et al. (2004) find evidence of negative returns following large increases in capital expenditures, while Spies and Affleck-Graves (1999) find that debt offerings, like equity offerings (Ibbotson 1975; Loughran and Ritter 1995), predict future negative returns. Cooper et al. (2008) contribute to this line of research by providing a new and comprehensive measure of the "growth effect." They argue that TA growth is the strongest determinant of future returns, with a *t*-statistic twice the size of that obtained by other growth variables previously documented in the literature.

This new anomaly measure has spawned a new line of research to explain its abnormal returns. For risk-based explanations, Chen and Zhang (2009) apply q-theory and construct an investment factor to explain the anomalous returns. While the investment factor successfully explains other anomalies, such as the momentum anomaly and the financial distress anomaly, the TA growth anomaly remains robust to the investment factor.

In a working paper, Chan et al. (2008) also attempt to investigate and distinguish possible mispricing explanations: the long-run underperformance of acquirers after mergers; investors' extrapolation of past growth; over-expansion by managers due to agency costs; and underperformance following equity market timing by managers. Chan et al. (2008) find that the adverse consequences of asset expansion are aggravated in cases where past profitability is low, or corporate governance is weak. This provides moderate evidence in support of the agency cost hypothesis. However, none of these studies is able to completely explain the abnormal negative returns of TA growth; the cause of the TA growth anomaly remains puzzling.

Prior to the research of Cooper et al. (2008), Fairfield et al. (2003) argue that NOA growth captures the effect of diminishing marginal returns from investment growth (Stigler 1963) and reflects the nature of accounting conservatism. It leads NOA growth to have negative implications on one-year-ahead ROA. These two, however, are not the only reasons hypothesized for the negative implications that NOA growth has for future profitability. Richardson et al. (2005, 2006) argue that accounting distortion (e.g., accrual and earnings reversal) can also lead to decreased future profitability following NOA growth.[3] While debate continues as to the reasons for NOA growth's negative implications, as far as this study is concerned, a consensus has emerged that NOA growth has negative implications on future ROA.

The Implications of Growth in OA_{OL} and Cash for Future ROA

There are economic rationales for the two additional components (i.e. OA_{OL} and CASH) have different implications for future profitability as opposed to NOA growth. There are mixed opinions in the literature regarding the implications of growth in OA_{OL} for future ROA. When suppliers allow delayed payments for goods already delivered, an increase in operating assets will be financed operating liabilities. Growth in OA_{OL} is, thus, equal to the amount of growth in

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[3] Note that the NOA growth anomaly focuses on the extreme deciles.

operating liabilities. Chan et al. (2006) argue that an increase in operating liabilities can be associated with future negative returns because companies, that are experiencing poor sales, lack cash and have difficulty in making their payments, will have an increase their account payables. For instance, Chan et al. (2006, Page 1043) state:

> "A firm that faces difficulties in generating sales or is overproducing will experience a buildup of inventories. Similarly, poor sales or credit difficulties may lead to a rise in payable."

However, it may be a little naïve to assume suppliers will allow huge sales on account when the firm is unable to make sales. Suppliers are not in the business of lending. They are willing to allow sales on account when they expect that their clients can pay them back. Informational advantages and frequent monitoring roles that suppliers have compared to debt creditors (Biais and Gollier 1997) allow suppliers to have unique insights into the financial and operational health of their client firms. Therefore, it is difficult for poor-sales firms to have more payables. In other words, troubled firms have difficulty in financing their operating assets through operating liabilities.[4] In fact, Long et al. (1994) show that an increase in operating liabilities can serve a warranty from suppliers for product quality, and Richardson et al. (2005) argue that increase in OA_{OL} is a surge in demand or healthy growth attested by suppliers. These reasons suggest that growth in OA_{OL} is different from NOA growth. It should have non-negative implications for future performance.

Similar to growth in OA_{OL}, there are reasons to expect that high cash growth is not associated with decreased future profitability incremental to NOA growth. If a large increase in

[4] Note that the growth anomalies are strongest in the extreme deciles. At margin, some suppliers might still supply their troubled clients temporarily. On average, it is not very likely that troubled firms can increase huge amount of accounts payable.

incoming cash flows is driven by sales growth or growth in cash collected from accounting receivables, high cash growth firms should not be associated with decreased profitability. In addition, there is evidence showing that building up cash reserves (precautionary saving) benefits firms by helping them bypass the transaction cost associated with raising external capital and prevent unexpected value-decreasing disruptions (Keynes 1936; Palazzo 2010; Opler et al. 1998). In a direct test on cash growth (as opposed to excess cash), Chan et al. (2008) find that cash growth firms are not more inclined to engage in future capital expenditure or business acquisitions, which indicates that cash growth firms are not likely to be associated with the value-decreasing expansions suggested by the free cash flow hypothesis (Jensen 1986).

Finally, under the accounting distortion perspective suggested by Richardson et al. (2005; 2006), cash and marketable securities are in the category with less accounting discretion compared to other assets , and they are, thus, less likely to contribute to next-period earnings reversal. In summary, there are reasons to believe that out of three subcomponents of TA growth, NOA growth is the only subcomponent that has negative implications for future profitability. However, as mentioned earlier, these reasons are not exhaustive. Given the focus of this study is to examine the relation between the two anomalies, an exhaustive examination of alternative reasons on the implications of growth components for future profitability is beyond the scope of the study and is interesting for a future study.

Literature Comparing Anomalies

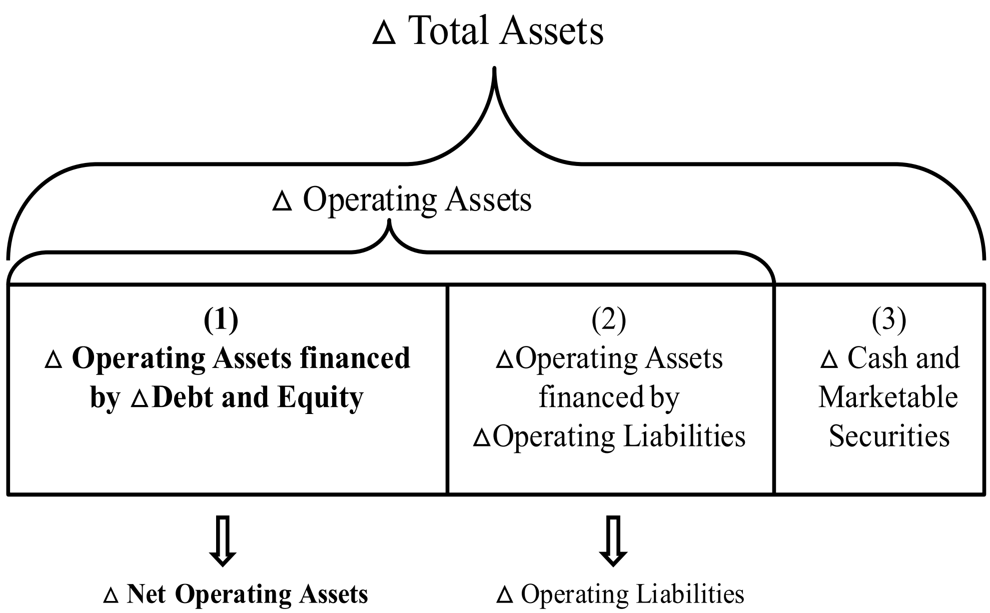
This study is related to a long line of anomaly studies that seek to identify similarities and differences in various documented anomalies and uses the methodologies employed in these studies (e.g., Collin and Hribar 2000; Desai et al. 2004; Cheng et al. 2006; Chordia and

Shivakumar 2006). Collin and Hribar (2000) investigate a possible relation between accrual anomaly and post-earnings announcement drift. They conclude that the two anomalies are distinct from each other through two-way sorting portfolio analyses and the Mishkin test. In a similar fashion, Chordia and Shivakumar (2006) find that price momentum is subsumed by post-earnings announcement drift (i.e., earnings momentum) and argue that price momentum is driven by the systematic component of earnings momentum. As for the TA and NOA growth anomalies, while these two phenomena have been investigated separately in great depth, no study has systemically examined the relation between the two, despite both belonging to the family of growth in accounting numbers.

Empirical analyses of whether one anomaly can subsume another are not always clear-cut. For instance, Desai et al. (2004) compare the value-glamour and the accrual anomalies, showing that the value-glamour (CFO/P) anomaly subsumes the accrual anomaly in annual windows. Cheng et al. (2006), however, show that the two anomalies present different abnormal returns patterns in shorter windows around earnings announcements. In short-windows, missing risk factors create less concern as opposed to annual windows (Brown and Warner 1980; 1985; Kothari 2001). Thus, Cheng et al. (2006) conclude that the two anomalies may differ.

Thus, from a methodological point of view, it is necessary to investigate whether the subsumption of TA growth by NOA growth in long windows also extends to short windows. Furthermore, it is meaningful to test whether the superior predictive power of NOA growth in relation to TA growth is due to NOA growth being more exposed to existing risk factors (e.g., beta, SML, HML and MOM). As an aside, it is pertinent that, prior to this study, the NOA growth anomaly has not yet been tested in short windows.

Figure 1: Decomposition of Total Asset Growth



Decomposition of TA Growth

Total assets can be decomposed as:

$$TA = OA + CASH \quad (1)$$

Where TA, OA and CASH represent Total Assets, Operating Assets[5], and Cash and Marketable Securities[6], respectively.

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[5] The definitions of operating assets in Fairfield et al. (2003) and Hirshleifer et al. (2004) are identical except that Fairfield et al. (2003) exclude long-term investments from operating assets. The results are robust to both measures. (See Table 4). Cooper et al. (2008) use Hirshleifer et al.'s (2004) definition of NOA but control for NOA level (NOA_t/TA_t) rather than NOA growth.

[6] CASH is consistent with the definition of financial assets in Feltham and Ohlson (1995). In their valuation model, they define financial assets as the assets that are both related to financial activities and marked to market such as cash and marketable securities. Long-term financial assets, however, are likely to be recorded under equity method or historical value instead of market value.

Consistent with related literature (Hirshleifer et al. 2004; Richardson et al. 2005; Fairfield et al. 2003), operating assets can be further divided into operating assets financed by operating liabilities (OA_{OL}) and operating assets financed by debt and equity (i.e., NOA).

Adding and subtracting OA_{OL} from equation (1), I get

$$TA = (OA - OA_{OL}) + OA_{OL} + CASH = NOA + OA_{OL} + CASH \qquad (2)$$

NOA is the part of operating assets financed by debt and equity. When suppliers allow sales on account, an increase in operating assets will be accompanied by an increase in operating liabilities. Hence, OA_{OL} is equal to the amount of operating liabilities.

Taking first difference of equation (2) between year t and year t-1, I have

$$\Delta TA = \Delta NOA + \Delta OA_{OL} + \Delta CASH \qquad (3)$$

Therefore, TA growth decomposes into NOA growth, growth in OA_{OL} and growth in CASH.

III. DATA AND RESULTS

Consistent with Cooper et al. (2008), I use all NYSE, AMEX and NASDAQ non-financial firms (i.e., excluding firms with four-digit SIC codes between 6000 and 6999) listed on the CRSP monthly stock returns files and the Compustat annual industrial files. My sample spans the period from 1968 to 2008. In addition, I restrict the sample to firms with year-end price greater than \$5.[7] This requirement eliminates very small firms, which have been shown to have high transaction cost and illiquidity, making trading strategies unrealizable (Fama 1998; Fama and French 2008). After I eliminated firm-years without adequate data to compute any financial statement variables or returns, the sample contains 99,194 firm-years.

Definition of Variables

The main variable of concern, the annual firm asset growth rate (TAgrowth) is calculated using the year-on-year percentage change in total assets (Compustat item numbers are included in parentheses). Following Cooper et al. (2008), a firm must have non-zero and non-missing total assets in both year *t* and *t-1* to compute this measure

$$TAgrowth_t = \frac{TA_t(Data6) - TA_{t-1}(Data6)}{TA_{t-1}(Data6)} \tag{4}$$

Net operating asset (NOA) growth is calculated as the difference between operating asset growth and operating liability growth, scaled by lagged total asset, as

$$NOAgrowth_t = \frac{(OA_t - OA_{t-1}) - (OL_t - OL_{t-1})}{TA_{t-1}(Data6)} \tag{5}$$

[7] The sample used Cooper et al. (2008) is from 1968 to 2003. The results in this study are robust to Cooper et al.'s (2008) sample period and non-elimination of the very small firms.

Consistent with Cooper et al. (2008) and Hirshleifer et al. (2004), operating assets are calculated as the residual of total assets after subtracting cash and marketable securities, as follows;

$$OA_t = TA_t(Data6) - CASH_t(Data1) \quad (6)$$

Operating liabilities are the residual amount from total assets after subtracting financial liabilities and equity.

$$\begin{aligned} OL_t = {} & TA_t(Data6) - Short\text{-}term\ Debt_t(Data34) - Long\text{-}term\ Debt_t(Data9) \\ & - Minority\ Interest_t(Data38) - Preferred\ Stock_t(Data130) \\ & - Common\ Equity_t(Data60) \end{aligned} \quad (7)$$

In addition, growth in cash and marketable securities is calculated as the difference in cash and marketable securities (Data 1) between year t and t-1, scaled by lagged total assets:

$$CASHgrowth_t = \frac{CASH_t(Data1) - CASH_{t-1}(Data1)}{TA_{t-1}(Data6)} \quad (8)$$

Abnormal returns are calculated from two windows. $Abret_{t+1}$ is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same market-capitalization-matched decile. The return accumulation period covers twelve-months, beginning four months after the end of the fiscal year, to ensure complete dissemination of accounting information in financial statements of the previous year. Similar to Sloan (1996) and Cheng et al. (2006), $Ret3_{t+1}$ is announcement returns calculated as the twelve-day size-adjusted return, consisting of the four three-day (-1,0,1) periods surrounding quarterly earnings announcements in year *t+1*.

Table 1 reports the abnormal returns of both NOA growth and TA growth strategies. The *t*-statistics are thus computed over 41 observations, corresponding to the years 1968 to 2008. The lowest decile of TA growth earns an EW (VW) abnormal return of 2.2 (2.03) percent, while the top decile earns an average EW (VW) abnormal return of -8.5 (-5.4) percent. In contrast, firms in the bottom decile of NOA growth earn an EW (VW) abnormal return of 4.59 (3.24) percent and those in the top decile earn an EW (VW) abnormal return of -10.32 (-7.16) percent. These results are similar to those reported by Cooper et al. (2008), Fairfield et al. (2003) and Richardson et al. (2005). Besides the successful replication of the TA and NOA growth anomalies, it is interesting to note that the average hedge returns of the NOA growth strategy are 40 percent greater (with greater *t*-statistics, as well) than those of the TA growth strategy in both equal-weighted and value-weighted portfolios. In other words, the two additional components dilute the abnormal negative returns of the NOA growth strategy by 28 (29.7) percent and reduce the *t*-statistics by 36 (38) percent for EW (VW) portfolios.

Table 1 also reports the time-series average of yearly cross-sectional median of growth rates. Panel A shows that, moving from the bottom decile of TA growth to the top decile, the TA growth rate increases by 1.49,the NOA growth rate increases by 0.67,the cash growth rate increases by 0.5 and the operating liability growth rate increases by 0.21. Panel B suggests that, from the bottom decile of NOA growth to the top decile, the TA growth rate increases by 1.04, the NOA growth rate increases by 0.77, the cash growth rate increases by 0.03 (statistically insignificant) and operating liability growth rate increases by 0.11.

Sorting on TA growth leads to a higher top-to-bottom spread in cash growth rate and operating liability growth rate than sorting on NOA growth. This finding suggests that, in the top (bottom) decile of TA growth, high (low) TA growth is driven by either high (low) NOA growth or high (low) growth in cash and operating liabilities. In addition, the decile of TA growth have a lower top-to-bottom spread in NOA growth rate, and the decile of NOA growth have a lower top-to-bottom spread in TA growth.

If TA growth is the primary driver of future returns, the magnitude of hedge returns should mirror the magnitude of the top-to-bottom spread in TA growth. However, the fact that the magnitude of hedge returns mirrors the spread in NOA growth rather than TA growth suggests that NOA growth may be the major forecasting variable of future negative returns.

In Panel A of Table 2, I test the robustness of TA growth to a set of control variables that include the book-to-market ratio, six-month lagged returns, 36-month lagged returns, abnormal capital investment and sales growth rates (Debont and Thaler 1985; Fama and French 1992; Jagadeesh et al. 1993; Titman et al. 2004; Lakonishok et al. 1994). I perform Fama and MacBeth (1973) cross-sectional regression of one-year ahead abnormal returns on TA growth and the other firm characteristics for forty-one years in the sample. Following standard practice, all return forecasting variables are ranked annually by deciles and are scaled to take a value between -0.5 and 0.5. Thus, the coefficients on forecasting variables can be interpreted as the incremental abnormal returns of a zero-investment strategy in the respective variables. Tests of statistical significance of the coefficients are based on the standard errors calculated from the distribution of individual yearly coefficients. This test overcomes bias due to cross-sectional dependence in error terms (Bernard 1987).

The results are similar to those of Cooper et al. (2008), and not surprisingly, most of coefficients on the control variables are significant. The TA growth is not subsumed by the other important determinants of the cross-section. In fact, the TA growth's *t*-statistics range from -5.4 to -6.14, appearing to be the strongest determinant relative to all other determinants. This result confirms the strong negative and economically significant relation between TA growth and one-year-ahead abnormal returns from the one-way sorts of Table 1.

Panel B of Table 2 compares NOA growth with the same control variables. NOA growth also appears to be robust to all of the other importance determinants of the cross-sectional returns. More importantly, NOA growth has higher abnormal returns with stronger *t*-statistics in each regression than TA growth, when comparing Panel A with Panel B.

It is interesting to note that abnormal capital investment (Titman et al. 2004) is robust to TA growth but is subsumed by NOA growth. Together with Table 1, these results suggest that NOA growth alone has stronger predictability in future abnormal returns than TA growth.

Cooper et al. (2008) attempt to control the level of NOA, rather than NOA growth, in their analysis. The NOA level (NOA_t/AT_t) is defined as NOA_t scaled by total assets of the current year.[8] Regression 3 of Panel A in Table 2 shows that the TA growth anomaly is robust to the NOA level, consistent with the results of Cooper et al. (2008). If NOA_{t-1} is the market expectation of NOA_t at announcement dates, NOA growth (NOA_t- NOA_{t-1}) can be viewed as a proxy for an *unexpected* NOA component of NOA_t.[9] Papanastasopoulos et al. (2010) suggest that an *unexpected* NOA component actually drives future negative returns. Therefore, NOA growth, as new information that has not been priced, is more likely associated with *unexpected* returns than the NOA level.

Comparing the TA Growth Anomaly with the NOA Growth Anomaly

So far, the NOA growth strategy and the TA growth anomaly have been examined

[8] The NOA level (NOA_t/AT_t) is different from Hirshleifer et al. (2004)'s NOA_t/AT_{t-1}. Hirshleifer et al. (2004)'s NOA_t/AT_{t-1} can be considered as a NOA *growth* measure when NOA_t/AT_{t-1} is decomposed into

$$\frac{NOA_t}{AT_{t-1}} = \frac{NOA_t - NOA_{t-1}}{AT_{t-1}} + \frac{NOA_{t-1}}{AT_{t-1}} = NOAgrowth_t + 1 - \frac{OL_{t-1}}{AT_{t-1}} - \frac{Cash_{t-1}}{AT_{t-1}}$$

[9] Bernard and Thomas (1989) define unexpected earnings components in a similar way.

independently. In the following analyses, I investigate whether the NOA growth anomaly subsumes the TA growth anomaly. I will sequentially report results from two-way portfolio analyses, regression analyses, shorter-window return analyses, and non-overlap hedge analyses.

In Table 2, the regression approach gives advantages in multivariate analyses and simplifies the interpretation of results. As discussed in Section II, the studies comparing two anomalies employ a common approach complementary to a cross-sectional regression, running a cell-based portfolio analysis on abnormal returns of interest variables. To implement the two-way sorting analyses, I sort stocks independently on TA and NOA growth at a time and then focus on the intersections resulting from these independent sorts. This procedure assigns the stocks to twenty-five cells, as shown in Table 3. This table contains the EW (VW) size-adjusted returns of NOA growth-TA growth portfolio combinations. By reading across the rows in Table 3, one can observe abnormal returns to NOA growth portfolios, holding TA growth constant. Similarly, in each column, one can assess the abnormal returns to the TA strategy holding NOA growth constant. Similar to the returns reported in Table 1, the returns and the corresponding *t*-statistics are based on a time-series of 41 annual observations.

Recall that Table 1 shows that basic NOA growth and TA growth hedges earn EW (VW) abnormal returns of -14.91(-10.40) percent and -10.7(-7.42) percent, respectively. It is also important to note that the hedge returns are not necessarily the difference between the lowest quintile and the highest quintile in this control-hedge setting. Because of the positive correlation between NOA and TA growth shown in Table 1, the independent two-way sorting results in no observations in some intersections of extreme quintiles (e.g., lowest (highest) TA growth and highest (lowest) NOA growth quintiles) in *some* years. Therefore, in these years, the hedge returns are calculated from the intersections of the second lowest (highest) quintile. When Desai et al. (2004) compare the accrual anomaly with the value-glamour anomaly, the same case appears in their Table 5 and Table 6. Under the two-way sorting portfolio tests reported in Table 3, the NOA growth strategy still earns large negative abnormal returns ranging from -8 percent to -13 percent across TA growth rows, while the TA growth strategy does not survive in any of NOA growth columns. Therefore, in two-way sorting portfolio analyses, Cooper et al.'s (2008)'s TA growth anomaly is completely subsumed by the NOA growth anomaly.

The Predictability of the Additional Two Subcomponents in Future Abnormal Returns

Table 3 has shown that the TA growth anomaly is subsumed by the NOA growth anomaly. Table 4 shows the incremental predictability of the TA growth's two additional components (i.e., growth in CASH and OA_{OL}) for future negative returns over NOA growth. The Fama-Macbeth (1973) regression approach involves projecting size-adjusted abnormal returns on different growth components (i.e., growth in CASH, OA_{OL}, TA and NOA). All growth components are ranked annually by deciles and are scaled to take a value between -0.5 and 0.5. Thus, the coefficients on growth components can be interpreted as the abnormal return to a zero-investment strategy in the respective variable.

The regression analysis in Panel A of Table 4 confirms the results (in Panel A of Table 1) that TA growth alone can predict significant negative future returns (*t*-statistic= -4.47). When TA growth is decomposed into growth in operating assets and CASH growth (regression two in Panel A of Table 4), CASH growth has no incremental return predictability over growth in operating assets (*t*-statistic= 0.86) when controlling growth in operating assets. Therefore, when operating asset growth and TA growth are considered together in the regression (regression three in Panel A of table 4), the incremental return to TA growth become insignificant (*t*-statistics=

0.11) while the incremental returns to an operating asset strategy are large (-11.04 percent) and significant (*t*-statistics=-6.24). It suggests that the TA growth strategy is likely subsumed by the operating asset growth strategy because CASH growth has no incremental return predictability.

In Panel B of Table 4, operating assets are decomposed into NOA and OA_{OL}. I show that OA_{OL} growth is a redundant component of operating asset growth in predicting future negative returns (*t*-statistic= 1.62). When operating asset growth and NOA growth are considered together in the regression, the incremental return to operating asset growth becomes insignificant (*t*-statistics=1.32) while the incremental returns to an NOA strategy continue to be large (-16.06 percent) and significant (*t*-statistics=-7.38). It suggests that the abnormal returns associated with operating assets growth are likely attributable to NOA growth because growth in OA_{OL} is a redundant component of operating assets.

Panel C of Table 4 combines the evidence of Panel A and Panel B and shows that growth in CASH and OA_{OL}, as the two additional components of TA growth, has no predictability in future negative returns incremental to NOA growth. Therefore, when TA growth and NOA growth are considered together in the regression, the incremental returns to TA growth become insignificant (*t*-statistics=-0.02) while the incremental return to NOA strategy continues to be large (-12.80 percent) and significant (*t*-statistic=-8.97).[10] Consistent with the two-way sorting analyses, the regression analyses confirm that the TA growth anomaly is attributable to the NOA growth anomaly. In addition, the third regression in Panel C of Table 4 shows that the result is robust when using an alternative NOA growth measure.[11]

The Implications of TA growth's subcomponents for Future Profitability

[10] The result is robust when adding the set of comparing variables in Table 2.
[11] Discussed in the data definition section.

Table 4 examines the return predictability of the TA growth's three subcomponents. Table 5 shows the implications of TA growth and its three subcomponents for one-year-ahead ROA, and Table 6 tests whether the abnormal negative returns associated with growth components are attributable to the market's misunderstanding of these implications for future ROA. Following Fairfield et al. (2003), future profitability is defined as one-year-ahead Return on Assets (ROA). ROA is defined as income before extraordinary items divided by the average of the total assets employed at the beginning and the end of the year. Each regression in Table 5 includes lagged ROA (Fairfield et al. 2003) and lagged ROA change (Cao et al. 2010) as previously suggested control variables for future ROA.[12] All growth components are ranked annually by deciles and are scaled to take a value between -0.5 and 0.5.

In Panel C of Table 5, TA growth alone has significant negative effects on future ROA (*t*-statistic=-6.28) after controlling previously suggested determinants of one-year-ahead ROA. TA growth is decomposed into growth in NOA, OA_{OL} and CASH in regression two of Panel C of Table 5. Consistent with prior literature (e.g., Fairfield et al. 2003; Richardson et al. 2005), NOA growth has strong negative implications on future profitability (*t*-statistic =-11.01). However, Table 5 shows that growth in CASH (*t*-statistic=0.75) and OA_{OL} (*t*-statistic=7.41) do not have negative effects on one-year-ahead ROA. Therefore, when NOA growth and TA growth are considered together in the regression (regression three in Panel C of Table 5), the negative effect of TA growth on future ROA becomes non-negative (*t*-statistic= 3.14) while the incremental effect of NOA growth on future ROA remains significantly negative (*t*-statistic=-12.32). It suggests that the negative effect of TA growth on future ROA is driven by only one of TA's

[12] Results are very similar when dropping lagged ROA change.

subcomponents - NOA growth. The two additional components (i.e., growth in CASH and OA_{OL}) do not contribute to the negative implication of TA growth for one-year-ahead ROA.

Comparing Table 4 with Table 5, one can see that the abnormal negative returns mirror the negative implications for future ROA. The components with negative implications (i.e., growth in NOA, operating assets and TA) generate negative future returns while components (i.e., growth in CASH and OA_{OL}) with statistically insignificant or positive implications do not predict future negative returns. Moreover, the fact that the negative implications of TA growth are subsumed by NOA growth mirrors the result that the predictability of TA growth in future returns is subsumed by NOA growth. All of the evidence is consistent with Fairfield et al. 's (2003) argument that the abnormal negative returns are due to the market's failure to incorporate the negative implications of growth for future ROA in a timely fashion. The negative returns in subsequent periods were realized when the market gradually responds to the negative implications. This explanation is further corroborated by the fact that the negative implication of TA growth for future ROA is robust to abnormal capital investment (Table 5) mirroring the finding that the predictability of TA growth in future returns is robust to abnormal capital investment shown (Table 2).

Market Understanding of the Implications of TA's subcomponents for Future ROA

Following Fairfield et al. (2003) and Collin and Hribar (2000), this subsection shows that the market underreacts to the negative implications of growth components for future ROA through the Mishkin (1983) test. Mishkin (1983) develops a framework to test whether investors price publicly available information rationally. In the Mishkin Test, two equations (i.e., a forecasting equation and a valuation equation) are simultaneously estimated. Coefficients in the forecasting equation (i.e., forecasting coefficients) are the actual effects of growth components on one-year-ahead ROA, similar to the analyses in Table 5. The coefficients in the valuation equation (i.e., valuation coefficients) are inferred from the market's pricing of the actual effect, and they represent the market's assessment of the actual effects. The Mishkin test provides a statistical comparison between with the actual effect for future ROA (i.e., forecasting coefficients) and the market's assessment of the effect (i.e., valuation coefficients). If the actual effect of a growth component is equal to the market's assessment, then the market is efficient in pricing the effect of the growth component on future ROA. Otherwise, the market fails to incorporate the actual effect of the growth component on future ROA into price in a timely fashion. Abnormal returns are subsequently earned when the market gradually learns about the true effect.

In Panel A of Table 6, the forecasting equation is similar to regression 4 of Table 5 Panel C. The coefficients β_0 and β_1 are the actual effects of TA growth and abnormal capital investment on future ROA, respectively. Consistent with the results in Table 5, the implications of TA growth for future ROA remains significantly negative (β_0=-0.01) after controlling for abnormal capital investment. As discussed earlier, the valuation coefficient β_0^* (=0.05) reflects the market assessment of TA growth's actual effect on future ROA (i.e., β_0). The restriction $\beta_0= \beta_0^*$ yields a likelihood ratio statistic, which has a chi-square distribution. The likelihood ratio statistic for the restriction $\beta_0= \beta_0^*$ is highly significant for both announcement and year-long windows, indicating that the market fails to incorporate the negative implications of TA growth for future ROA. The market perceives TA growth as a good signal for future ROA while TA growth actually has negative implications. Abnormal negative returns are subsequently earned when the market gradually learns about the negative effect of TA growth.

The market also perceives an increase in capital investment as a positive signal for future ROA (β_1^*=0.01) while this increase has negative implications for future profitability (β_1=-0.01). This result corroborates Titman et al.'s (2004) explanation that the abnormal negative returns of abnormal capital investment is due to the market's misunderstanding of the empire-building implications associated with abnormal capital investment.

Panel B of Table 6 shows that, out of the three components of TA growth, stock prices fail to reflect the negative implications of NOA growth but correctly price the non-negative implications of growth in CASH and OA_{OL}. β_0 is the incremental effect of TA growth for future ROA over NOA growth; thus, it represents the actual average effect of the additional two components (i.e., growth in CASH and OA_{OL}) on one-year-ahead ROA. The market assessment β_0^* (=0.04) is close to the actual effect β_0 (=0.05). The likelihood ratio statistic for the restriction $\beta_0= \beta_0^*$ is not significant, indicating that the market correctly prices the non-negative implications of these two components. This result is consistent with Panel A and prior studies (McConnell and Muscarella 1985; Blose and Shieh 1997; Vogt 1997), which show that the market, on average, perceives asset growth (e.g., growth in TA, NOA, CASH, OA_{OL} and capital investment) as a good signal for future profitability. Therefore, the market is more likely to respond correctly to the growth components that have non-negative implications (e.g., growth in CASH and OA_{OL}) as opposed to negative-implication components. As a result, the two additional components fail to predict future negative returns and are noisy components of TA growth. On the other hand, the likelihood ratio statistics on $\beta_1= \beta_1^*$ and $\beta_0 +\beta_1= \beta_0^* +\beta_1^*$ are highly significant, showing that the market fails to incorporate the negative implications of NOA growth. Hence, the abnormal negative returns of the TA growth anomaly are driven by the market's misunderstanding of the negative implications associated with one of TA growth's subcomponents (i.e., NOA growth).

The use of the Mishkin test is not without controversy. Kothari, Sabino and Zach (2005) argue that the test results are sensitive to survivorship biases and truncation errors. More recently, Kraft, Leone and Wasley (2007) argue that the test is not superior to OLS. I remain agnostic about the merits of the Mishkin test and report both the Fama-Macbeth OLS results and the Mishkin test results in Tables 5 and 6, respectively.

The implications For the Arbitrage-Based Explanation

Lam and Wei (2010) and Lipson et al. (2009) use TA growth as the "growth effect" measure and document that the abnormal returns following TA growth are not robust to arbitrage risk. They argue that the "growth effect" can be explained by arbitrage risk. I demonstrate the economic significance of using the correct growth anomaly proxy by showing the differential robustness of TA growth and NOA growth to arbitrage risk In Table 7. Arbitrage risk (IVOL) is defined as the standard deviation of the residuals of a market model regression[13] of firm returns over the 48-month prior to portfolio formation. Panel A of Table 7 shows the robustness of the TA growth anomaly to arbitrage risk. Similar to Lam and Wei (2010) and Lipson et al. (2009), I find that the TA growth anomaly generates no abnormal returns in the lowest arbitrage risk portfolio. However, Panel B of Table 7 shows that the NOA growth strategy still leads to statistically significant negative returns when arbitrage risk is absent/low. This result demonstrates that using the correct growth anomaly measure leads to a different result.

Tests of Risk-Based Explanations

[13] I follow Lam and Wei (2010) and Lipson et al. (2009) using the S&P 500 index to proxy the market index. The results are similar when the proxy is the CRSP equal-weighed or value-weighted market portfolio.

Table 8 and Table 9 demonstrate that the superior predictive power of NOA growth over TA growth in returns is not due to NOA growth being more exposed to risk factors. Cheng et al. (2006) show that while the value-glamour (CFO/P) anomaly subsumes the accrual anomaly in annual windows (Desai et al 2004), the two anomalies present different abnormal returns patterns over shorter windows around earnings announcements. In short windows, missing risk factors are of less concern relative to annual windows (Brown and Warner 1980; 1985; Kothari 2001). Cheng et al. (2006) conclude that the two anomalies may differ from each other. In Table 8, I confirm the annual window result that the NOA growth anomaly completely subsumes the TA growth anomaly in Table 3 and Table 4 using returns around earnings announcements. The TA growth strategy alone generates significant negative returns (*t*-statistic=-3.56) around subsequent earnings announcements. However, when TA growth and NOA growth are considered together in the regression, the incremental short-window returns to TA growth become insignificant (*t*-statistics=0.32) while the incremental short-window return to NOA strategy continues to be large (-1.9 percent) and significant (*t*-statistic=-5.78). It suggests that missing risk factors are not likely to explain the superior predictability of NOA growth over TA growth.

Recall that abnormal capital investment (Titman et al. 2004) is robust to TA growth but is subsumed by NOA growth in the annual windows of Table 2. Table 9 confirms this result on shorter windows around earnings announcements, indicating that NOA growth is a stronger growth anomaly measure that TA growth.

This study is the first to investigate the NOA growth strategy in short-window periods. Because there is less concerns regarding missing risk factors in short-windows relative to annual windows, the strong abnormal returns of NOA growth documented in Table 9 extend Fairfield et al.'s (2008) finding on annual windows and corroborate the mispricing explanation for NOA growth.

Table 9 examines whether NOA growth is more exposed to existing risk factors (e.g., beta, SML, HML and MOM) than TA growth. Panel A shows the average monthly raw returns from equal-weighted portfolios as a reference benchmark for the following panels. Panels B, C, D show the CAPM monthly alphas, Fama-French monthly alphas and Carhart four-factor[14] monthly alphas, respectively. Panel B shows that, under two-way sorting portfolio tests, the NOA growth strategy generates large negative returns while the TA growth strategy returns remain insignificant after controlling beta. It suggests that NOA growth is not more exposed to beta, relative to TA growth. Panel B also suggests that the long-short NOA growth strategy is beta-insensitive in that beta does not change the hedge returns of the NOA growth strategy but only reduces portfolio returns in each of twenty-five cells. Panel C and Panel D suggest similar patterns,[15] except that Panel D shows that the returns from NOA growth strategy are, to some degree, associated with Carhart's (1997) momentum factor. Collectively, the results show that the superior predictive power of NOA growth over TA growth in returns is not due to NOA growth being more exposed to risk factors.

Robust Tests Using Non-Overlap Hedge Analyses

In Table 10, I employ the nonoverlap hedge test suggested by Desai et al. (2004) as a robust test. The nonoverlap hedge strategy eliminates firms in convergent extreme groups and leaves nonoverlap observations in the top and bottom deciles. I form a new portfolio (labeled as "nonoverlap hedge") where I eliminate firm-years in these convergent cells and assess whether

[14] Obtained from Ken French's web page

[15] Panel D and Panel E show that the hedge returns of TA growth strategies not only remain insignificant but also become even *positive* in some columns after controlling the risk factors and NOA growth.

each of the strategies can individually generate abnormal returns. In other words, I decompose firms in the top (bottom) decile of TA growth firms into two groups: a group where high (low) TA growth is driven by high (low) NOA growth and a group where high (low) TA growth is driven by high (low) growth in CASH and OA_{OL}.

Table 10 shows that only the observations for which high (low) TA growth is driven by high (low) NOA growth explain the TA growth anomaly shown by Cooper et al. (2008). The observations where high (low) TA growth is driven by high (low) growth in CASH and OA_{OL} fail to predict future returns (*t*-statistic=-0.82) and, in fact, *dilute* the predictability of NOA growth. Analogously, I form a nonoverlap hedge portfolio for NOA growth by taking a long position on the highest NOA growth after eliminating the highest TA growth firms and a short position on the lowest NOA growth after eliminating the lowest TA growth firms. The non-overlap hedge return from NOA growth after eliminating extreme TA growth firms continues to generate large abnormal returns (-14.08 percent). Therefore, the results from non-overlap hedges confirm the findings in Table 3 and Table 4 that NOA growth is the only driver for TA growth's future negative returns. In summary, the newly influential TA growth anomaly found in the finance literature appears to be a noisy manifestation of the NOA growth anomaly documented in earlier accounting literature.

IV. CONCLUSIONS

Cooper et al. (2008) is a recent influential study on market efficiency. They show that firms with high TA growth tend to have substantial negative abnormal returns in subsequent periods. However, the source of the TA growth's abnormal returns has remained a puzzle. In this study, I show that the TA growth anomaly is totally subsumed by the NOA growth anomaly. The results are robust to short- and long- window returns, value-weighted and equal-weighted portfolios and a battery of risk factors.

This study has important implications for the underlying explanations behind the "growth effect." The results here suggest that different growth components have different implications for future ROA. However, the stock market does not differentiate among the three growth components. Therefore, in order to capture the differential implications, we need an appropriate decomposition of total asset growth. It is not sufficient to decompose asset growth only by asset types or liability types in financial statement analysis. We need to further decompose asset growth by financing sources within a given type of assets (e.g. NOA vs. OA_{OL}). This further decomposition allows us to consider the interaction between asset types and liability types and bridge the "left" side and the "right" side of balance sheet in financial statement analysis.

Cooper et al. (2008) inspired several studies (e.g., Chen, Yao and Yu 2010; Gray and Johnson 2010) that examine whether the TA growth anomaly exists in global financial markets. Additionally, they seek to identify cross-country interactive effects for TA growth's abnormal returns. These studies consider TA growth to be the best growth measure and generalize their findings to a "growth effect." Because TA growth carries two noisy components, the abnormal returns of TA growth will likely interact with noisy cross-country variables. In light of the evidence presented regarding the differential robustness to arbitrage risk between TA and NOA growth, it would be interesting to investigate whether all the results regarding TA growth anomalies remain robust when TA growth is replaced by NOA growth.

Another follow-up study is to examine the implications of supply chain dynamics on the "growth effect". The bargaining power of suppliers and clients varies across industries and individual firms. When clients have more bargaining power, suppliers are likely to finance their clients with less concern about the clients' profitability. For such clients, Growth in OA_{OL} are less likely to be the healthy growth attested by suppliers according the reasons provide in Section II. Therefore, growth in OA_{Ol} is less likely to be associated with positive future ROA. In a similar fashion, when suppliers have strong bargaining power, growth in OL_{OA} is more likely to have positive implications for future ROA.

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TABLES

Table 1

Growth Rates and Abnormal Returns for Portfolios Based on NOA Growth or TA Growth

Panel A : TA Growth Deciles

	Low	2	3	4	5	6	7	8	9	High	H－L
TAgrowth	-0.11	-0.02	0.02	0.06	0.09	0.13	0.19	0.28	0.48	1.37	1.49***
NOAgrowth	-0.06	-0.01	0.02	0.04	0.06	0.09	0.12	0.18	0.29	0.60	0.67***
OAgrowth	-0.09	-0.01	0.02	0.06	0.09	0.12	0.17	0.25	0.40	0.81	0.89***
CASHgrowth	-0.02	-0.00	0.00	0.00	0.00	0.01	0.01	0.02	0.06	0.48	0.50**
OAgrowth_OL	-0.02	-0.00	0.01	0.02	0.03	0.03	0.05	0.06	0.09	0.19	0.21***
Equal-weighted Abret	2.20	2.99	2.98	2.37	2.01	1.87	1.66	-1.18	-4.44	-8.50	-10.70***
	(2.13)	(4.11)	(3.86)	(2.88)	(3.18)	(2.09)	(2.19)	(-2.16)	(-3.13)	(-4.33)	(-5.23)
Value-weighted Abret	2.03	3.08	2.71	1.67	1.88	-0.40	-0.34	-2.26	-2.90	-5.40	-7.43***
	(1.08)	(4.74)	(2.53)	(1.78)	(1.84)	(-0.55)	(-0.28)	(-1.68)	(-1.76)	(-2.62)	(-3.62)

Panel B : NOA Growth Deciles

	Low	2	3	4	5	6	7	8	9	High	H－L
TAgrowth	-0.05	0.00	0.03	0.05	0.08	0.11	0.15	0.22	0.36	0.98	1.04***
NOAgrowth	-0.12	-0.04	0.00	0.03	0.05	0.08	0.12	0.18	0.29	0.66	0.77***
OAgrowth	-0.09	-0.02	0.02	0.05	0.07	0.11	0.15	0.22	0.35	0.81	0.91***
CASHgrowth	0.03	0.02	0.01	0.00	0.00	0.00	-0.00	-0.00	0.00	0.06	0.03
OAgrowth_OL	0.02	0.02	0.02	0.02	0.02	0.02	0.03	0.04	0.06	0.14	0.11***
Equal-weighted Abret	4.59	4.25	3.46	3.56	1.70	1.26	0.09	-2.33	-4.32	-10.32	-14.91***
	(4.61)	(5.44)	(5.62)	(5.30)	(2.41)	(1.75)	(0.10)	(-3.27)	(-3.37)	(-5.56)	(-8.29)
Value-weighted Abret	3.24	3.16	2.11	2.46	0.39	-0.02	-1.57	-1.47	-2.97	-7.16	-10.40***
	(2.40)	(2.63)	(2.01)	(3.22)	(0.69)	(-0.03)	(-0.82)	(-1.30)	(-2.01)	(-3.57)	(-5.87)

$^{***}p<0.01$, $^{**}P<0.05$, $^{*}P<0.10$

TAgrowth is growth in *total assets* (Data6). *CASHgrowth* is growth in *cash and marketable securities* (Data1). *OAgrowth* is growth in *Operating Assets* (*OA*). *OA* ＝*Total Asset* (Data6)－*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*＝*Total Assets* (Data6) －*Short-term Debt* (Data34) －*Long-term Debt* (Data9) －*Minority Interest* (Data38) －*Preferred Stock* (Data130) －*Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*－*OAgrowth_OL*. *Abret* is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same market-capitalization-matched decile.

Table 2

Comparison of Return Predictability of TA Growth, NOA Growth and Other Growth Variables

Panel A: Fama-MacBeth regressions of One-year-ahead Abnormal Returns on TA Growth and Other Variables

	TAgrowth	BM	5YSALESG	RET6	RET36	CI	NOA_Level
Mean	**-7.80*****	8.31***	7.09***	5.50**	1.64		
	(-6.07)	(3.14)	(4.04)	(2.04)	(0.59)		
Mean	**-7.05*****	8.25***	6.74***	5.37*	2.19	-1.95**	
	(-5.41)	(3.11)	(3.81)	(1.98)	(0.77)	(-2.28)	
Mean	**-7.80*****	9.67***	7.61***	5.23*	1.39		-6.07***
	(-6.14)	(3.98)	(4.12)	(1.97)	(0.52)		(-3.60)

Panel B: Fama-MacBeth regressions of One-year-ahead Abnormal Returns on NOA Growth and Other Variables

	NOAgrowth	BM	5YSALESG	RET6	RET36	CI	NOA_Level
Mean	**-11.00*****	8.63***	7.80***	4.64*	1.79		
	(-9.49)	(3.26)	(4.45)	(1.73)	(0.65)		
Mean	**-10.74*****	8.49***	7.78***	4.78*	1.94	-0.06	
	(-8.67)	(3.20)	(4.39)	(1.77)	(0.68)	(-0.07)	
Mean	**-9.77*****	9.49***	7.66***	4.56*	1.46		-3.86**
	(-8.78)	(3.90)	(4.39)	(1.72)	(0.54)		(-2.27)

$^{***}p<0.01$, $^{**}P<0.05$, $^{*}P<0.10$

TAgrowth is growth in *total assets* (Data6). *CASHgrowth* is growth in *cash and marketable securities* (Data1). *OAgrowth* is growth in *operating assets* (*OA*). *OA*=*Total Asset* (Data6) −*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*=*Total Assets* (Data6) −*Short-term Debt* (Data34) −*Long-term Debt* (Data9) −*Minority Interest* (Data38) −*Preferred Stock* (Data130) −*Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*−*OAgrowth_OL*. All growth variables are scaled by lagged total assets except *NOA_Level* which is defined as NOA_t/TA_t. *BM* is book to market ratio at the year-end. *5YSALESG* is a 5-year weighted average rank of growth rate in sales. *RET6* is the 6-month buy-and-hold return ending over October (year *t*) – March (year *t +1*). *RET36* is the 36-month buy and hold return over April (year *t-2*) - March (year *t+1*). *CI* is the measure of abnormal capital investment as defined in Titman et al. (2004). *ROA* is return on assets, defined as *income before extraordinary items* (Data18) divided by the average of the *total assets* (Data6) employed at the beginning and the end of the year. *Abret* is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same market-capitalization-matched decile. *Ret3* is announcement returns calculated as the 12-day size-adjusted return, consisting of the four three-day periods surrounding quarterly earnings announcements in year *t+1*. Fama-Macbath (1973) t-statistics are included in parentheses.

Table 3
Comparison of One-year-ahead Abnormal Returns
for Portfolios Based on NOA Growth and TA Growth

Panel A: Equal-weighted Portfolios

TAgrowth	NOAgrowth					Control Hedge
	Low	1	2	3	High	H−L
Low	4.11	2.38	-1.50	-4.10	-10.14	**-12.86*****
	(5.79)	(3.16)	(-1.77)	(-2.92)	(-2.65)	**(-3.36)**
1	5.73	3.53	1.22	-2.66	-5.83	**-11.56*****
	(4.62)	(5.77)	(1.17)	(-1.82)	(-1.42)	**(-2.80)**
2	7.14	5.81	1.83	-1.09	-7.33	**-14.47*****
	(4.80)	(7.41)	(2.12)	(-0.94)	(-4.63)	**(-5.56)**
3	5.31	4.77	2.10	-0.03	-3.69	**-9.00*****
	(2.80)	(3.51)	(2.04)	(-0.04)	(-2.80)	**(-3.41)**
High	-0.31	1.00	2.53	-2.08	-8.34	**-8.03*****
	(-0.11)	(0.28)	(0.84)	(-1.94)	(-4.75)	**(-3.37)**
H−L	**-4.42**	**-1.38**	**4.03**	**2.01**	**1.86**	*4.83*
Control Hedge	**(-1.61)**	**(-0.39)**	**(1.17)**	**(1.17)**	**(0.74)**	*(1.13)*

Panel B: Value-weighted Portfolios

TAgrowth	NOAgrowth					Control Hedge
	Low	1	2	3	High	H−L
Low	3.31	1.51	0.53	0.85	-5.60	**-6.71****
	(2.98)	(1.53)	(0.23)	(0.28)	(-1.64)	**(-2.05)**
1	2.90	3.59	0.62	-3.44	-8.61	**-11.51*****
	(2.01)	(3.28)	(0.54)	(-1.74)	(-2.33)	**(-3.34)**
2	6.76	1.07	0.54	-2.34	-4.36	**-11.13*****
	(4.22)	(1.22)	(0.99)	(-1.34)	(-1.68)	**(-3.07)**
3	4.60	3.23	-0.98	-1.88	-2.61	**-7.20****
	(1.66)	(1.10)	(-0.64)	(-1.55)	(-2.12)	**(-2.44)**
High	2.75	2.51	0.26	0.06	-5.21	**-7.97****
	(0.71)	(0.51)	(-0.07)	(0.02)	(-3.56)	**(-2.08)**
H−L	**-0.55**	**1.00**	**-0.27**	**-0.79**	**0.77**	*-1.26*
Control Hedge	**(-0.14)**	**(0.19)**	**(-0.08)**	**(-0.24)**	**(0.26)**	*(-0.23)*

***p<0.01, **P<0.05, *P<0.10
TAgrowth is growth in *total assets* (Data6). *CASHgrowth* is growth in *cash and marketable securities* (Data1). *OAgrowth* is growth in *operating assets* (*OA*). *OA*=*Total Asset* (Data6)−*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*=*Total Assets* (Data6) −*Short-term Debt* (Data34) −*Long-term Debt* (Data9) −*Minority Interest* (Data38) −*Preferred Stock* (Data130)−*Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*−*OAgrowth_OL*. All growth variables are scaled by lagged total assets except *NOA_Level* which is defined as NOA_t/TA_t. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same market-capitalization-matched decile.

Table 4

Predictability of Growth in CASH and OA_{OL} for One-year-ahead Abnormal Returns

Panel A: Decomposing Total Asset Growth into Operating Asset Growth and Cash Growth

$Abret_{t+1} = \alpha + \beta_0 TAgrowth_t + \xi_{t+1}$

$Abret_{t+1} = \alpha + \beta_1 OAgrowth_t + \beta_2 CASHgrowth_t + \mu_{t+1}$

	TAgrowth	OAgrowth	CASHgrowth
Mean	**-9.35*****		
	(-4.47)		
Mean		**-10.32*****	1.26
		(-5.89)	(0.86)
Mean	0.28	**-11.04*****	
	(0.11)	**(-6.24)**	

Panel B: Decomposing Operating Asset Growth into NOA Growth and OA_{OL} Growth

$Abret_{t+1} = \alpha + \beta_0 OAgrowth_t + \xi_{t+1}$

$Abret_{t+1} = \alpha + \beta_1 NOAgrowth_t + \beta_2 OAgrowth\_OL_t + \mu_{t+1}$

	OAgrowth	NOAgrowth	OAgrowth_OL
Mean	**-10.65*****		
	(-5.94)		
Mean		**-13.35*****	2.53
		(-9.52)	(1.62)
Mean	3.66	**-16.06*****	
	(1.32)	**(-7.38)**	

Panel C: Decomposing Total Asset Growth into NOA Growth, OA_{OL} Growth and Cash Growth

TAgrowth = NOAgrowth + OAgrowth_OL + CASHgrowth

	TAgrowth	NOAgrowth	OAgrowth_OL	CASHgrowth	NOAgrowth_alt
Mean	**-9.35*****				
	(-4.47)				
Mean		**-13.25*****	2.78**	-0.66	
		(-8.96)	(2.15)	(-0.49)	
Mean	-0.05	**-12.80*****			
	(-0.02)	**(-8.97)**			
Mean	-1.19				**-11.63*****
	(-0.53)				**(-7.75)**

***p<0.01, **P<0.05, *P<0.10

TAgrowth is growth in *total assets* (Data6). *CASHgrowth* is growth in *cash and marketable securities* (Data1). *OAgrowth* is growth in *operating assets* (*OA*). *OA*=*Total Asset* (Data6)−*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*=*Total Assets* (Data6) −*Short-term Debt* (Data34) −*Long-term Debt* (Data9)−*Minority Interest*(Data38)−*Preferred Stock* (Data130)−*Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*−*OAgrowth_OL*. All growth variables are scaled by lagged total assets except *NOA_Level* which is defined as NOA_t / TA_t. .Fama-Macbath (1973) t-statistics are included in parentheses.

Table 5

The Implications of Growth in CASH and OA_{OL} for One-year-ahead ROA

Panel A: Decomposing Total Asset Growth into Operating Asset Growth and Cash Growth

$ROA_{t+1} = \alpha + \beta_0 TAgrowth_t + CONTROLS + \xi_{t+1}$

$ROA_{t+1} = \alpha + \beta_1 OAgrowth_t + \beta_2 CASHgrowth_t + CONTROLS + \mu_{t+1}$

	TAgrowth	OAgrowth	CASHgrowth	ROA_t	$\Delta ROA_{t,t-1}$
Mean	**-0.02*****			0.80***	-0.12***
	(-6.28)			(34.85)	(-5.85)
Mean		**-0.02*****	0.01***	0.80***	-0.12***
		(-7.95)	(5.05)	(35.05)	(-6.40)
Mean	0.01**	**-0.03*****		0.80***	-0.12***
	(2.17)	**(-8.31)**		(34.98)	(-6.25)

Panel B: Decomposing Operating Asset Growth into NOA Growth and OA_{OL} Growth

$ROA_{t+1} = \alpha + \beta_0 OAgrowth_t + CONTROLS + \xi_{t+1}$

$ROA_{t+1} = \alpha + \beta_1 NOAgrowth_t + \beta_2\ OAgrowth\_OL_t + CONTROLS + \mu_{t+1}$

	OAgrowth	NOAgrowth	OAgrowth_OL	ROA_t	$\Delta ROA_{t,t-1}$
Mean	**-0.02*****			0.80***	-0.12***
	(-8.51)			(35.25)	(-6.22)
Mean		**-0.04*****	0.01***	0.81***	-0.13***
		(-12.14)	(7.42)	(35.33)	(-6.95)
Mean	0.02***	**-0.05*****		0.81***	-0.13***
	(5.94)	**(-12.26)**		(35.21)	(-6.84)

Panel C: Decomposing Total Asset Growth into NOA Growth, OA_{OL} Growth and Cash Growth

TAgrowth = NOAgrowth + OAgrowth_OL + CASHgrowth

	TAgrowth	NOAgrowth	OAgrowth_OL	CASHgrowth	CI	ROA_t	$\Delta ROA_{t,t-1}$
Mean	**-0.02*****					0.80***	-0.12***
	(-6.28)					(34.85)	(-5.85)
Mean		**-0.04*****	0.01***	0.00		0.81***	-0.13***
		(-11.01)	(7.41)	(0.75)		(34.98)	(-6.98)
Mean	0.01***	**-0.04*****				0.81***	-0.13***
	(3.14)	**(-12.32)**				(34.95)	(-6.78)
Mean	**-0.01*****				**-0.01*****	0.80***	-0.14***
	(-6.37)				**(-8.17)**	(59.78)	(-6.96)

***p<0.01, **P<0.05, *P<0.10

TAgrowth is growth in *total assets* (Data6). *CASHgrowth* is growth in *cash and marketable securities* (Data1). *OAgrowth* is growth in *Operating Assets* (*OA*). *OA*＝*Total Asset* (Data6)－*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*＝*Total Assets* (Data6) －*Short-term Debt* (Data34) －*Long-term Debt* (Data9) －*Minority Interest* (Data38)－*Preferred Stock* (Data130)－*Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*－*OAgrowth_OL*. *CI* is the measure of abnormal capital investment as defined in Titman et al. (2004). *ROA* is return on assets, defined as *income before extraordinary items* (Data 18) divided by the average of the *total assets* (Data 6) employed at the beginning and the end of the year. Fama-Macbath (1973) t-statistics are included in parentheses.

Table 6

Tests of Stock Market Efficiency for The TA Growth Effect

Coefficient Estimates from the Simultaneous Estimation of the Following Two Equations
Using the Simultaneous Nonlinear Procedure Proposed by Mishkin[1983]

Panel A: Tests of the Market's Misunderstanding of the Implications of TA Growth for One-year-ahead ROA

Forecasting Equations: $ROA_{t+1}=\alpha + \beta_0\ TAgrowth_t + \beta_1\ CI_t + \beta_2\ ROA_t + \beta_3\ \Delta ROA_{t,t-1} + \xi_{t+1}$

Valuation Equations: $Abnormal\ Return_{t+1}=\alpha^* + \theta\ ROA_{t+1} - \theta\ \beta_0^*\ TAgrowth_t - \theta\ \beta_1^*\ CI_t - \theta\ \beta_2^*\ ROA_t - \theta\ \beta_3^*\ \Delta ROA_{t,t-1} + \xi^*_{t+1}$

	Announcement Period Windows	Year-Long
β_0 (TAgrowth)	**-0.01***** **(-8.43)**	**-0.01***** **(-9.15)**
β_0^* (TAgrowth)	**0.05***** **(5.51)**	**0.05***** **(9.98)**
β_1 (CI)	-0.01*** (-9.88)	-0.01*** (-11.19)
β_1^* (CI)	0.02** (2.40)_	0.01*** (2.94)
β_2 (ROA_t)	0.77*** (203.37)	0.78*** (222.94)
β_2^* (ROA_t)	0.59*** (27.51)	0.60*** (40.57)
θ	27.16*** (43.85)	128.65*** (63.49)

	Likelihood Ratio Statistics to Test Market Efficiency Constrains	
	Announcement Period Windows	Year-Long
$\beta_0=\beta_0^*$	**48.42*****	**145.01*****

Table 6 (cont.)

Panel B: Tests of the Market's Misunderstanding of the Implications of the TA growth's Subcomponents for One-year-ahead ROA

Forecasting Equations: $ROA_{t+1}=\alpha + \beta_0\ TAgrowth_t + \beta_1\ NOAgrowth_t + \beta_2\ ROA_t + \beta_3\ \Delta ROA_{t,t-1} + \xi_{t+1}$

Valuation Equations: $\text{Abnormal Returns}_{t+1}=\alpha^* + \theta\ ROA_{t+1} - \theta\ \beta_0^*\ TAgrowth_t - \theta\ \beta_1^*\ NOAgrowth_t - \theta\ \beta_2^*\ ROA_t - \theta\ \beta_3^*\ \Delta ROA_{t,t-1} + \xi^*_{t+1}$

	Announcement Period windows	Year-Long
β_0 (TAgrowth)	**0.05*****	**0.05*****
	(23.57)	**(25.99)**
β_0^* (TAgrowth)	**0.04*****	**0.05*****
	(2.83)	**(5.16)**
β_1 (NOAgrowth)	-0.05***	-0.05***
	(-20.19)	(-23.40)
β_1^* (NOAgrowth)	0.09***	0.09***
	(6.17)	(8.99)
β_2 (ROA_t)	0.48***	0.52***
	(144.88)	(170.44)
β_2^*(ROA_t)	0.24***	0.34***
	(10.58)	(22.79)
θ	18.77***	89.95***
	(39.45)	(58.85)

	Likelihood Ratio Statistics to Test Market Efficiency Constrains	
	Announcement Period windows	Year-Long
$\beta_0=\beta_0^*$	0.57	0.08
$\beta_1=\beta_1^*$	**86.98*****	**191.94*****
$\beta_0+\beta_1=\beta_0^*+\beta_1^*$	**119.23*****	**304.90*****

$^{***}p<0.01$, $^{**}P<0.05$, $^{*}P<0.10$

TAgrowth is growth in *total assets* (Data6). *OAgrowth* is growth in *operating assets* (*OA*). *OA*=*Total Asset* (Data6)−*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*=*Total Assets* (Data6)−*Short-term Debt*(Data34) −*Long-term Debt*(Data9) − *Minority Interest*(Data38) − *Preferred Stock* (Data130) − *Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth* − *OAgrowth_OL*. *CI* is the measure of abnormal capital investment as defined in Titman et al. (2004). *ROA* is return on assets, defined as *income before extraordinary items* (Data 18) divided by the average of the *total assets* (Data 6) employed at the beginning and the end of the year.

Table 7

The Implications for the Arbitrage-risk Based Explanation

Panel A: Fama-French Monthly Alphas of The TAgrowth Anomaly

IVOL	TAgrowth					Control Hedge
	Low	1	2	3	High	H-L
Low	0.22	0.21	0.19	0.16	0.10	**-0.12**
	(3.13)	(3.44)	(2.61)	(2.23)	(1.22)	**(-1.65)**
Medium	0.37	0.33	0.31	0.22	-0.23	-0.60***
	(3.01)	(3.76)	(3.55)	(2.72)	(-2.39)	(-4.56)
High	0.84	0.70	0.36	-0.02	-0.69	-1.53***
	(-2.87)	(3.38)	(2.44)	(-0.19)	(-4.77)	(-6.48)

Panel B: Fama-French Monthly Alphas of The NOAgrowth Anomaly

IVOL	NOAgrowth					Control Hedge
	Low	1	2	3	High	H-L
Low	0.35	0.29	0.19	0.09	-0.03	**-0.38******
	(4.75)	(4.83)	(3.32)	(1.26)	(-0.32)	**(-5.33)**
Medium	0.56	0.39	0.34	0.08	-0.37	-0.93***
	(4.89)	(4.21)	(4.70)	(0.90)	(-3.51)	(-7.71)
High	0.85	0.74	0.32	-0.05	-0.67	-1.52***
	(3.34)	(3.60)	(1.98)	(-0.34)	(-4.35)	(-8.05)

***p<0.01, **P<0.05, *P<0.10

TAgrowth is growth in *total assets* (Data6). *CASHgrowth* is growth in *cash and marketable securities* (Data1). *OAgrowth* is growth in *operating assets* (*OA*). *OA*＝*Total Asset* (Data6) －*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*＝*Total Assets* (Data6) －*Short-term Debt* (Data34) －*Long-term Debt* (Data9) －*Minority Interest* (Data38) －*Preferred Stock* (Data130) －*Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*－*OAgrowth_OL*. All growth variables are scaled by lagged total assets except *NOA_Level* which is defined as NOA_t/TA_{t-}. *IVOL* is arbitrage risk, defined as the standard deviation of the residuals of a market model regression of firm returns over the 48-month prior to portfolio formation. Fama-Macbath (1973) t-statistics are included in parentheses.

Table 8

Comparison of Return Predictability of TA and NOA Growth in Short Windows Around Announcements

$Ret3_{t+1} = \alpha + \beta_1 TAgrowth_t + \beta_2 NOAgrowth_t + CONTROLS + \xi_{t+1}$

	TAgrowth	NOAgrowth	BM	5YSALESG	RET6	RET36	CI	NOA_Level
Mean	**-1.10*****		1.33***	0.10	1.18***	-0.12	**-0.56****	-0.47
	(-3.65)		(3.50)	(0.30)	(3.94)	(-0.25)	**(-2.59)**	(-1.39)
Mean		**-1.86*****	1.28***	0.30	1.07***	-0.09	**-0.26**	-0.03
		(-7.44)	(3.41)	(0.88)	(3.66)	(-0.19)	**(-1.10)**	(-0.09)
Mean	0.12	**-1.90*****	1.29***	0.26	1.07***	-0.10	-0.25	-0.01
	(0.32)	**(-5.78)**	(3.42)	(0.75)	(3.60)	(-0.22)	(-1.11)	(-0.02)

$^{***}p<0.01$, $^{**}P<0.05$, $^{*}P<0.10$

TAgrowth is growth in *total assets* (Data6). *CASHgrowth* is growth in *cash and marketable securities* (Data1). *OAgrowth* is growth in *operating assets* (*OA*). *OA*＝*Total Asset* (Data6) －*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*＝*Total Assets* (Data6) －*Short-term Debt* (Data34) －*Long-term Debt* (Data9) －*Minority Interest* (Data38) －*Preferred Stock* (Data130) －*Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*－*OAgrowth_OL*. All growth variables are scaled by lagged total assets except *NOA_Level* which is defined as NOA_t/TA_{t-}. *IVOL* is arbitrage risk, defined as the standard deviation of the residuals of a market model regression of firm returns over the 48-month prior to portfolio formation. *BM* is book to market ratio at the year-end. *5YSALESG* is a 5-year weighted average rank of growth rate in sales. *RET6* is the 6-month buy-and-hold return ending over October (year *t*) – March (year *t +1*). *RET36* is the 36-month buy and hold return over April (year *t-2*) -March (year *t+1*). *CI* is the measure of abnormal capital investment as defined in Titman et al. (2004). *ROA* is return on assets, defined as *income before extraordinary items* (Data18) divided by the average of the *total assets* (Data6) employed at the beginning and the end of the year. *Abret* is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same market-capitalization-matched decile. *Ret3* is announcement returns calculated as the 12-day size-adjusted return, consisting of the four three-day periods surrounding quarterly earnings announcements in year *t+1*. Fama-Macbath (1973) t-statistics are included in parentheses

Table 9

Tests of Risk-factor Based Explanations

Panel A : Average Monthly Raw Returns

TAgrowth	NOAgrowth					Control Hedge
	Low	1	2	3	High	H−L
Low	1.36	1.21	0.93	0.85	0.70	**-0.80*****
	(4.45)	(4.13)	(2.98)	(2.40)	(1.50)	**(-2.71)**
1	1.49	1.29	1.12	0.69	0.57	**-0.99*****
	(5.24)	(5.21)	(4.37)	(2.18)	(1.22)	**(-2.74)**
2	1.50	1.44	1.16	0.96	0.59	**-0.85*****
	(5.38)	(5.62)	(4.47)	(3.37)	(1.47)	**(-3.91)**
3	1.41	1.32	1.23	0.96	0.62	**-0.82*****
	(4.41)	(4.33)	(4.03)	(3.33)	(1.89)	**(-5.56)**
High	1.09	1.35	1.02	0.84	0.15	**-0.95*****
	(2.55)	(3.08)	(2.74)	((2.22)	(0.39)	**(-4.24)**
H−L	**-0.30**	**0.17**	**0.12**	**0.05**	**-0.31**	*-0.15*
Control Hedge	**(-1.13)**	**(0.61)**	**(0.59)**	**(0.22)**	**(-1.06)**	*(-0.41)*

Panel B: CAPM Monthly Alphas

TAgrowth	NOAgrowth					Control Hedge
	Low	1	2	3	High	H−L
Low	0.45	0.32	0.01	-0.10	-0.44	**-0.89*****
	(2.85)	(2.12)	(0.07)	(-0.44)	(-1.36)	**(-3.11)**
1	0.63	0.45	0.26	-0.22	-0.42	**-1.11*****
	(3.91)	(3.63)	(2.01)	(-1.15)	(-1.11)	**(-3.03)**
2	0.60	0.56	0.29	0.07	-0.39	**-0.93*****
	-4.12	(4.80)	(2.35)	(0.48)	(-1.52)	**(-4.52)**
3	0.45	0.37	0.29	0.03	-0.34	**-0.81*****
	(2.50)	(2.66)	(2.03)	(0.23)	(-2.05)	**(-5.49)**
High	0.05	0.35	0.01	-0.21	-0.91	**-0.97*****
	(0.19)	(1.18)	(0.05)	(-1.03)	(-4.89)	**(-4.38)**
H−L	**-0.42**	**0.03**	**0.03**	**-0.05**	**-0.34**	*-0.08*
Control Hedge	**(-1.60)**	**(0.10)**	**(0.13)**	**(-0.23)**	**(-1.21)**	*(-0.21)*

Panel C: Fama-French Monthly Alphas

TAgrowth	NOAgrowth					Control Hedge
	Low	1	2	3	High	H−L
Low	0.19	0.08	-0.13	-0.17	-0.56	**-0.71****
	(2.15)	(0.88)	(-1.15)	(-0.92)	(-1.75)	**(-2.33)**
1	0.40	0.18	0.03	-0.30	-0.26	**-0.73****
	(3.85)	(2.77)	(0.33)	(-1.84)	(-0.76)	**(-2.08)**
2	0.49	0.44	0.10	-0.11	-0.40	**-0.85*****
	(4.71)	(6.21)	(1.40)	(-1.17)	(-1.94)	**(-4.18)**
3	0.46	0.40	0.28	-0.08	-0.46	**-0.93*****
	(3.47)	(3.96)	(2.99)	(-1.06)	(-4.23)	**(-6.38)**
High	0.29	0.53	0.24	-0.03	-0.86	**-1.15*****
	(1.39)	(2.29)	(1.38)	(-0.25)	(-6.18)	**(-5.12)**
H−L	**0.07**	**0.45****	**0.39****	**0.21**	**-0.22**	*-0.44*
Control Hedge	**(0.34)**	**(2.07)**	**(2.26)**	**(1.07)**	**(-0.76)**	*(-1.25)*

Table 9 (cont.)

Panel D: Carhart Four-factor Monthly Alphas

TAgrowth	NOAgrowth					Control Hedge
	Low	1	2	3	High	H－L
Low	0.37	0.26	0.07	0.13	-0.01	**-0.37**
	(3.93)	(2.92)	(0.51)	(0.61)	(-0.02)	**(-1.08)**
1	0.47	0.28	0.16	-0.06	0.20	**-0.32**
	(4.49)	(4.13)	(2.29)	(-0.39)	(0.49)	**(-0.76)**
2	0.59	0.50	0.20	0.05	-0.18	**-0.74*****
	(5.17)	(6.77)	(2.85)	(0.67)	(-0.85)	**(-3.20)**
3	0.63	0.52	0.36	0.06	-0.24	**-0.89*****
	(4.40)	(3.88)	(3.71)	(0.74)	(-2.39)	**(-6.02)**
High	0.34	0.57	0.35	0.13	-0.56	**-0.89*****
	(1.54)	(2.42)	(1.77)	(0.92)	(-3.82)	**(-4.27)**
H－L	**-0.06**	**0.31**	**0.29***	**0.06**	**-0.48**	*-0.53*
Control Hedge	**(-0.28)**	**(-1.40)**	**(1.65)**	**(0.29)**	**(-1.44)**	*(-1.34)*

***p<0.01, **P<0.05, *P<0.10

TAgrowth is growth in *total assets* (Data6). *OAgrowth* is growth in *operating assets* (*OA*). *OA*＝*Total Asset* (Data6) －*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*＝*Total Assets* (Data6) －*Short-term Debt* (Data34) －*Long-term Debt* (Data9) －*Minority Interest* (Data38) －*Preferred Stock* (Data130) －*Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*－*OAgrowth_OL*.

Table 10

Non-overlap Hedge Analyses

Panel A: Equal-weighted Portfolios

Hedge Type			Abret
Basic hedge			
Top NOA growth Decile	−	Bottom NOA growth Decile	-14.91***
			(-8.29)
Top TA growth Decile	−	Bottom TA growth Decile	-10.70***
			(-5.23)
Non-overlap hedge			
Top TA growth Decile	−	Bottom TA growth Decile	-2.21
(Excluding High NOA growth obs)		(Excluding low NOA growth obs)	(-0.82)
Top NOA growth Decile	−	Bottom NOA growth Decile	-14.08***
(Excluding High TA growth obs)		(Excluding low TA growth obs)	(-4.53)

Panel B: Value-weighted Portfolios

Hedge Type			Abret
Basic hedge			
Top NOA growth Decile	−	Bottom NOA growth Decile	-10.40***
			(-5.87)
Top TA growth Decile	−	Bottom TA growth Decile	-7.43***
			(-3.62)
Non-overlap hedge			
Top TA growth Decile	−	Bottom TA growth Decile	-0.39
(Excluding High NOA growth obs)		(Excluding low NOA growth obs)	(-0.11)
Top NOA growth Decile	−	Bottom NOA growth Decile	-9.74***
(Excluding High TA growth obs)		(Excluding low TA growth obs)	(-3.66)

***p<0.01, **P<0.05, *P<0.10

TAgrowth is growth in *total assets* (Data6). *OAgrowth* is growth in *operating assets* (*OA*). *OA*=*Total Asset* (Data6) −*Cash and Marketable Securities* (Data1). *OAgrowth_OL* is growth in *OA* financed by growth in *operating liabilities* (*OL*). *OL*=*Total Assets* (Data6) −*Short-term Debt* (Data34) −*Long-term Debt* (Data9) − *Minority Interest* (Data38) − *Preferred Stock* (Data130) − *Common Equity* (Data60). *NOAgrowth* is defined as *OAgrowth*−*OAgrowth_OL*. All growth variables are scaled by lagged total assets except *NOA_Level* which is defined as NOA_t/TA_t. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same market-capitalization-matched decile.