

# Balance sheet growth and the predictability of stock returns

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May 2008

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## **Abstract**

Recent empirical research suggests that growth in the size of firms' balance sheets, or in the size of various balance sheet components, predicts the cross-section of average returns. In particular, firms that experience high growth in total assets earn abnormal returns of -5.88 percent in the following year, and -4.85 percent in the second year. However the economic rationale for the subsequent drift in returns remains unresolved. We explore several hypotheses about the sources of the predictability: 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. In line with the agency cost hypothesis, the adverse consequences of asset expansion are aggravated in cases where past profitability is low, or corporate governance is weak. Conversely when asset growth is primarily in the form of cash accumulation, the negative returns are mitigated.

An extensive body of empirical work in finance and accounting studies whether there is information in firms' financial statements for their future stock price performance. One strand of this research follows in the same vein as fundamental stock analysis, and asks whether accounting-based valuation ratios, such as earnings and cash flow yields or book-to-market ratios, forecast the cross-section of average returns. The association between such financial attributes and returns is documented in a voluminous body of research, including Basu (1977), Fama and French (1992), Lakonishok, Shleifer and Vishny (1995). It is hard to know what to make of these findings, however. One interpretation is that investors do not fully incorporate the information in accounting numbers into equity values. Under a rational pricing story, on the other hand, a stock's price reflects its underlying risks and discount rate, so the information in price-scaled accounting variables originates from the stock price rather than any accounting data. Ball (1978), for example, argues that price-scaled financial ratios stand in for the underlying determinants of expected returns. An association between such proxies and measured future abnormal returns, by this argument, reflects mismeasurement of stocks' risk, rather than a failure of market efficiency.

A more recent, but growing, literature tries to sidestep some of the ambiguities in interpreting the forecast power of financial statement data as captured by valuation multiples. Instead, many studies focus on changes over time in the size of firms' balance sheets, or various components of assets and liabilities. Sloan (1996), for instance, uncovers the accrual anomaly, whereby operating accruals, or changes in working capital minus depreciation, are negatively related to subsequent returns. Stocks ranked in the top decile by accruals relative to average total assets underperform similarly-sized firms by 5.5 percent in the following year. Chan, Chan, Jegadeesh and Lakonishok (2006) find that each component of accruals, such as changes in accounts receivable, inventory changes, and changes in accounts payable, are associated with the cross-section of future returns. Thomas and Zhang (2002) also report that firms experiencing large increases in inventory experience poor stock returns in the future.

Other studies suggest that changes in firms' fixed assets have predictive power for returns. Titman, Wei and Xie (2004) find some evidence of weak stock price performance following large increases in capital expenditures. Firms ranked in the top quintile by changes in investment spending have average abnormal returns of -0.127 percent per month over the following year. Fairfield, Whisenant and Yohn (2003) report that

changes in long-term net operating assets (change in property plant and equipment plus change in intangibles less depreciation and amortization expense) lead to lackluster future returns as well. The abnormal return on the high growth (low growth) portfolio averages -1.9 percent (5.5 percent) over the next year. Hirshleifer et al. (HHTZ, 2004) present a similar, attention-grabbing set of results. They study whether levels of net operating assets predict stock returns in the cross-section. In sorts by current-year net operating assets relative to total assets in the prior year, firms ranked in the top decile go on to earn average monthly abnormal returns of -0.73 percent compared to 0.51 percent for the bottom decile, producing a spread of 1.24 percent per month.

Cooper, Gulen and Schill (2005) provide the starkest findings from this line of research. They find that the growth rate in a firm's total assets is the most important predictor of stock returns in the cross-section, dominating beta, book-to-market, size and momentum. Return spreads associated with this variable stand head and shoulders above the others: estimated one-year abnormal returns from the Fama-French three factor model are -9.1 percent and 9.2 percent for the high- and low-growth portfolios, respectively.

The results from this literature are provocative, and appear to document economically significant predictability in returns following shifts in firms' asset positions. Notably, it is difficult to think of the growth rate of assets as a valuation indicator. Accordingly the argument that asset growth rates proxy for risk or discount rates on this account is strained. Nevertheless, the evidence raises several broader questions. First, it is not clear whether the effects documented in these papers are independent phenomena or at least partially overlap. Net operating assets generally make up a substantial portion of firms' total assets so these accounts share much common variation. Second, asset growth can take a variety of forms (growth in cash, current assets, or long-term assets). Previous work has not generally distinguished between different forms of asset growth and their effects on stock prices. At the very least, one potentially important distinction is between internally generated expansion in assets ("organic" growth) and acquisitions of other companies and their assets. Many studies find that acquiring firms in takeovers experience disappointing stock returns (Loughran and Vijh (1997), Moeller, Schlingemann and Stulz (2005)). The consequences of asset growth as a result of business acquisitions thus reflect an already well-documented phenomenon.

Last, and most importantly, the economic rationale for the drift in returns following changes in assets

remains ambiguous. Several explanations, which are not mutually exclusive, can be put forward. The most common line of thought follows Jensen's (1986) argument that excessive accumulation of assets is a consequence of the agency cost of delegated management, as firm executives engage in wasteful spending that serves their own interests. When investors learn that such expenditures dissipate firm value, stock prices adjust downward. As another explanation, firms with high growth tend to be relatively more successful companies with strong past performance. Accordingly, their poor returns in subsequent years may reflect the reversal phenomenon documented in DeBondt and Thaler (1985) and Lakonishok, Shleifer and Vishny (1995). Physical assets can expand when managers spend the proceeds from earlier offerings of securities. To the extent that managers time equity issues to take advantage of overpricing of their firm's shares, external financing is a negative signal that triggers low returns. The rise in assets (which may be profitable investments by themselves) happens to coincide with the poor stock price performance. In short the existing studies do little to discriminate between different hypotheses about the effects of asset changes on stock prices.

These issues motivate what we do in this paper. Using a common sample and methodology, we explore whether previous studies on the association between returns and capital expenditures, growth in net operating assets, or growth in total assets capture different facets of the same underlying pattern in returns. We break down the sources of growth and examine their individual effects. Further, we assess explanations for the observed association between asset growth and subsequent returns. Since mergers and takeovers are prime sources of growth in assets, we first check that the return drifts are not solely due to the low post-acquisition returns of bidder firms. Unlike earlier studies we take into account the influence of past performance and external financing when examining the effect of asset growth.

Ultimately, growth in a firm's balance sheet reflects management's choices concerning investment and, on the other side of the ledger, financing and payout activity. The consequences of balance sheet expansion for future stock prices thus hinge on investors' perceptions of the quality of managerial decisions. The larger point, then, is whether investors can exploit information about the quality of managers' choices to distinguish between wealth-enhancing and value-destroying forms of asset growth. In this vein we examine whether measures of the profitability of past capital investments, and the quality of corporate governance

help to weed out instances of wasteful spending.

The remainder of the paper is organized as follows. Section 1 describes the sample and methodology. Section 2 takes up the asset growth anomaly and studies the overlap with capital investment and net operating asset growth. Different explanations are explored in section 3, and additional evidence is provided in section 4. In light of the debate sparked by the results of HHTZ (2004) and Richardson, Sloan and Tuna (2006), in section 5 we connect our results to the net operating asset anomaly.

## **1. Data and methods**

We study the effect of each variable by investigating the properties of portfolios formed by sorts on the variable (in section 3 we consider the joint effects of the variables). This lets us assess the economic significance of the information in each variable for returns. Further, the portfolio analysis helps to reveal whether the association holds over the entire range of the variable, or shows up only at the extremes. Data on returns are from CRSP, and financial statement information is from Compustat. All listed domestic common stock with data from these sources are eligible for inclusion in the portfolios, subject to two additional selection criteria. Since there is ambiguity as to what constitutes operating assets and liabilities for financial firms, all stocks in the financial sector (with SIC codes between 6000 and 6999) are dropped from the sample. This practice follows what has been done in the prior literature. We also exclude firms whose market value of equity (at the time of portfolio formation) places them in the bottom decile of the distribution of firm size based on NYSE breakpoints. Dropping the smallest firms mitigates return measurement problems due to market microstructure issues. As well we avoid instances where asset growth is large in percentage terms but not in economic terms because the starting value of assets is trivial. The smallest stocks have large cross-sectional variability in their attributes and more volatile returns, as shown in Fama and French (2006). Accordingly, the performance of extreme portfolios from sorting procedures gives tiny stocks a weight that is disproportionate to their significance in terms of wealth. At year-end 2006, for example, 4696 domestic common stock issues have data on market value of outstanding shares available on CRSP. Of these, 2180 are smaller than the tenth percentile cutoff for size based on NYSE firms, representing 46 percent of the sample by count but only 1.6 percent by capitalization.

Data on the accounting variables are taken from firms' annual financial statements over the sample period of 1968–2004. In each calendar year  $t$  firms are ranked based on accounting data from the fiscal year ending in  $t$ , and assigned to one of ten portfolios. Stocks in a portfolio are equally weighted. We measure firm characteristics at fiscal year-end for the portfolios, and cumulate buy-and-hold returns starting four months after the fiscal year-end. Returns are measured over each of the three years following portfolio formation.<sup>1</sup> The characteristics and returns are then averaged over years.

Each stock is also paired with a reference portfolio, and its buy-and-hold return is measured net of the buy-and-hold return on the control portfolio. A decile portfolio's abnormal return is the equally-weighted average across member stocks of their net returns. To construct the control groups we draw on Chan, Dimmock and Lakonishok (2007), who evaluate different procedures for measuring portfolio performance. They find that reference portfolios formed from sorts first by market value of equity and then by book-to-market value of equity within each size group track active portfolio returns better than the Fama-French (1996) reference portfolios from independent sorts by size and book-to-market. Accordingly we use as benchmarks the returns on portfolios from dependent sorts first by size and then by book-to-market. Our classification by size follows practice in the investment industry as represented by the widely-followed Russell indexes. There are five size groups: going down the list of stocks ranked by market value of equity they are, in order, the largest 200 stocks, the following 300, then 500, the next 1000, and the remainder. These partitions are selected so that each group constitutes a well-diversified portfolio with a meaningful share of market capitalization. Within each size bracket stocks are further ranked by the ratio of book to market value of equity and placed into one of five groups with roughly the same number of stocks.

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<sup>1</sup>If a stock is subsequently delisted we assume that any remaining funds are reinvested in the equally weighted market index until the end of the event-year. At the start of the following year the remaining stocks are rebalanced to equal weights.

## 2. The effects of asset growth

### 2.1. Returns and portfolio attributes

Previous research uses a variety of indicators of growth in firms' balance sheets as forecast variables. Sloan (1996) relates operating accruals, which are changes in one component of net operating assets (working capital) less depreciation and amortization, to future returns. Fairfield, Whisenant and Yohn (2004) look at growth in long-term net operating assets. The appropriate definition of operating assets and liabilities is still debatable, however. Moreover, many firms do not have Compustat data available for all the individual balance sheet items required to perform the calculations. On the other hand, the level of total assets is available for almost all listed domestic common stock issues. For these reasons we choose to work with the growth in total assets,  $TAGROW = \frac{TA_t}{TA_{t-1}} - 1$  as a simple, readily available, catch-all measure of asset expansion.

Table 1 describes the returns and characteristics of portfolios sorted by growth in total assets,  $TAGROW$ . Part 1 of the table provides statistics based on the full sample (all eligible stocks above the bottom decile). Part 2 gives results for large firms only (the top 1000 firms ranked by market value of equity), which represents the bulk of equity market value and hence is of primary interest from an investment perspective. Full details on the definitions and measurement of the accounting variables are provided in the appendix.

Stocks in the highest-ranked decile on average experience asset growth of 71.78 percent in the formation year (panel C), while the assets of stocks in the lowest-ranked decile shrink by 13.20 percent. Growth rapidly reverts in the following years, however. In the year following portfolio formation, for example, average ranks by asset growth differ by only 0.2858 between the top and bottom deciles.

The variation in total asset growth across portfolios shows up as differences in returns only in the top decile (panel A). Specifically, the set of firms ranked highest by asset growth under-performs in the years following portfolio formation. The abnormal returns are -5.88 percent in the first year, -4.85 percent in the second year, and they are large relative to their time series standard errors. In contrast, returns are not notably different across the other portfolios. For example, the mean raw return for the bottom decile of stocks is 13.14 percent in the first year, compared to the overall average of 13.29 percent. The conclusion is

that the effect of asset growth on future returns is not symmetric: a difference in returns arises only for firms with the highest asset growth rates in the cross-section.

The absence of an association with returns when asset growth is low stands in contrast to the results of Cooper et al. (2006). They find high average returns on stocks which experience large contraction in assets (decile portfolio 1). Crucially, our sample differs from that in Cooper et al. because we exclude the decile of smallest stocks. While the smallest stocks are many in number they represent a trivial fraction of total market capitalization. Fama and French (2006) also find that the asset growth effect is considerably muted when the sample comprises large and mid-sized stocks only.

The remaining panels of Table 1 provide clues in identifying explanations for the association between asset growth and future returns. In particular, panel B examines whether the portfolios display features that have been documented in previous work to be correlated with future returns. Firms that enjoy high asset growth tend to be glamour companies with low ratios of book to market value of equity, and have enjoyed strong past performance. Their stock returns and growth in sales per share are outstanding in the years preceding portfolio formation. In the top decile by asset growth, the growth rate in sales per share over the four years prior to portfolio formation averages 29.78 percent per year, and the mean annualized return from four years ago to the year before portfolio formation is 32.04 percent. Lakonishok, Shleifer and Vishny (1995) argue that investors extrapolate past growth too far into the future and overprice glamour firms that have been successful in the past. Insofar as high-growth firms share these attributes with glamour firms, they may also be subject to similar valuation errors and experience disappointing returns in the future.

Business takeovers and combinations are a primary avenue for increases in firm assets. Panel B verifies that firms highly ranked by asset growth are relatively more likely to be involved in merger and acquisition activity in the past year. Our source for firms' acquisition activity is the Securities Data Company's (SDC) Platinum database on mergers and acquisitions by U.S. companies. For each firm as of a given portfolio formation date we check if it is identified as an acquirer on the SDC Platinum database of corporate financial transactions over the preceding sixteen months.<sup>2</sup> Targets can be domestic or foreign firms, and can be

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<sup>2</sup>The sixteen months include the fiscal year just ended as of the portfolio formation date plus an assumed publication delay of four months.

privately held companies or publicly listed. On average 51.28 percent of the firms in the top decile are involved in past M&A activity over the previous year. The frequency of acquisition activity, however, does not take into account the magnitude of the transaction. As a refinement we consider cases where the acquisition size is material relative to the year-to-year change in total assets. To measure the size of the deal we perform several sequential tests. First we verify whether the acquisition size as given by SDC constitutes at least 10 percent of the asset change. Transaction values are not always reported by SDC, however, and particularly in the earlier years its coverage may be incomplete. As an additional filter we check if the accounting statement of cash flows shows acquisitions exceeding 10 percent of the change in total assets. Failing this, our last test is if the change in intangibles or goodwill from the balance sheet amounts to 15 percent or more of the asset change.<sup>3</sup> These filters indicate that on average 42.50 percent of firms in the top decile have conducted major acquisitions in the portfolio formation year for the full sample. The above-average incidence indicates that for many firms in the highest-ranked group, business combinations rather than internally-generated opportunities are a primary source of the expansion in assets.

Panel C provides a bridge to studies that relate returns to the structure of firms' balance sheets - specifically, to the net operating asset component. However, different indicators have been used in this line of research, raising the possibility that they highlight distinct influences. Hirshleifer et al. express net operating assets as of the portfolio formation year  $t$  relative to total assets in the pre-formation year ( $NOA_t/TA_{t-1}$ ); on the other hand Richardson et al. argue in favor of measuring net operating assets as a proportion of contemporaneous total assets ( $NOA_t/TA_t$ ). To sort out these separate effects we report average levels of both variables for the decile portfolios from the sort by asset growth.

Deflating the level of net operating assets in year  $t$  by total assets in the previous year compares a firm's asset position across dates. Accordingly it mixes information from two sources – the make-up of the balance sheet in terms of net operating assets, and changes in the firm's asset base over time. Panel C confirms that the sort by growth in total assets also induces variation across portfolios in net operating assets relative to

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<sup>3</sup>Goodwill is included in the intangibles item and is not always broken out separately, so we examine both accounts. In turn, intangible assets can grow for reasons other than acquisition of another firm, such as the addition of new copyrights, software development costs or the purchase of specific intangible assets. To avoid picking up such sources of growth beyond business combinations we apply a more demanding cutoff point to intangibles and goodwill.

previous year total assets. In the highest-ranked decile by asset growth, net operating assets are on average 1.1407 times the previous year's total assets, while in the bottom decile the corresponding average is 0.5490 times. There is thus a close association between rates of growth in total assets and the indicator of net operating asset levels used by Hirshleifer et al. (2004). The correlation suggests that the pattern in returns documented by Hirshleifer et al. (2004) may overlap with the effects of past asset growth.

In contrast, levels of net operating assets relative to contemporaneous total assets are uncorrelated with asset growth.  $NOA_t/TA_t$  is roughly constant across the portfolios sorted by growth. Net operating assets are on average 61.46 percent of contemporaneous total assets for the high-growth portfolio, and 62.22 percent for the low-growth portfolio. Unlike HHTZ, therefore, the effect studied by Richardson et al. does not share a direct commonality with the effect of past asset growth.

The results for large firms (part 2) generally follow the same patterns. Notably, the magnitude of abnormal returns for the high-growth decile of large firms (-5.17 percent in the first post-formation year) is about the same as in part 1 (-5.88 percent). The high-growth large firms also tend to be glamour companies with elevated past sales growth and past return. They stand out from other firms with respect to levels of net operating assets relative to prior-year total assets, but not relative to current-year assets. In the top decile, 57.64 percent of large firms are involved in some merger and acquisition activity in the portfolio formation year. Large merger transactions occur in 48.05 percent of the cases.

The message from Table 1 is that sorting by growth in total assets generates notable return drifts only in the top decile. The low subsequent returns associated with high growth may stem from the effects of past success, as well as the post-merger experience of acquirers. Some of the information in asset growth also overlaps with the information in net operating asset levels relative to prior-year total assets (but not net operating assets relative to current-year assets).

## **2.2. Association between growth, investment and financing indicators**

Table 2 provides evidence that growth in total assets  $TAGROW$  moves in tandem with other indicators of asset composition, investment and financing activity that have been studied in other papers. For each stock within a decile portfolio from the sort by growth in total assets, we measure its rank (from zero

to one, corresponding to the lowest and highest values respectively) on a variable and take the equally-weighted average of the ranks. Part 1 of Table 2 reports each portfolio's rank on the following investment variables as of the portfolio grouping date: year-to-year changes in net operating assets, *DNOA*, changes in net property, plant and equipment *DPPE*, and capital expenditures minus depreciation expense (both from the statement of cash flows), *NETCAPX*. We also examine the following variables that reflect changes in the firm's financing position: new external financing raised over the year *DXFIN*; and internal financing *INTFIN*.<sup>4</sup> All of these variables are expressed relative to total assets at the beginning of the year. Finally, we report ranks on net operating assets relative to previous year total assets (*NOATAL1*), and net operating assets as a proportion of contemporaneous total assets (*NOATAL0*). Additionally, cross-sectional correlations between these variables are computed each year. Mean correlations over years are given in part 2 of the table.

Growth in total assets serves as a good stand-in for firms' investment activities. Portfolio ranks by *DNOA*, *DPPE* and *NETCAPX* all rise steadily across the asset-growth portfolios. Average correlations between *TAGROW* and the investment variables range from 0.433 for *NETCAPX* to 0.750 for *DNOA*. Differences in total asset growth also pick up cross-sectional variation in new external and internal financing. The bottom (top) decile by *TAGROW* has a mean rank on external financing of 0.3113 (0.8549), and a mean rank on internal financing of 0.2269 (0.6418). *TAGROW* and *DXFIN* share an average correlation of 0.588, while the correlation between asset growth and internal financing is 0.398. Growth rates of total assets thus serves as a parsimonious, comprehensive indicator of firms' investment and financing activities. Notably this catch-all measure can be calculated for almost all firms even in the absence of detailed flow data on capital spending or capital raising efforts. Moreover, its computation does not involve distinctions between operating and financing components of assets and liabilities.

The two measures of net operating asset levels, *NOATAL1* and *NOATL0* are closely correlated, sharing an average cross-sectional correlation of 0.797. At first blush, then, the choice of asset scale appears to be an innocuous one. Closer inspection suggests, however, that *NOATAL1* and *NOATAL0* pick up distinct influences. In particular, *NOATAL1* lines up closely with total asset growth, as the earlier results

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<sup>4</sup>See the appendix for complete details on these variables.

in Table 1 suggest. In part 1 of Table 2, the average rank by *NOATAL1* is 0.2187 in the bottom decile by *TAGROW* and climbs to 0.7837 in the top decile. Total asset growth and net operating assets as a proportion of total assets in the prior year have a correlation of 0.461. Similarly, *NOATAL1* tends to be positively aligned with other measures of investment and financing activity. In contrast, net operating assets relative to current-year assets is only weakly correlated with firm expansion, investment and financing. Average ranks by *NOATAL0* are roughly constant across the *TAGROW* portfolios. From part 2, the average correlation between *NOATAL0* and *TAGROW* is actually slightly negative (-0.028). The choice of asset scale thus puts the role of net operating asset levels on very different footing: in particular, net operating assets relative to previous year's assets are closely related to firm expansion, unlike net operating assets relative to contemporaneous assets.

Table 3 verifies that growth in total assets does about as well as more detailed descriptors of investment or financing activity in spreading out future returns. We report the variation in returns and selected characteristics across decile portfolios formed from sorts on one of various indicators of investment or financing activity. In particular we focus on the change in net operating assets *DNOA*; change in net property, plant and equipment *DPPE*; net capital expenditures *NetCAPX*, and new external financing *DXFIN*, all scaled by total assets in the previous year. To eliminate clutter we report only the average abnormal returns in each of the three post-formation years; annualized return from 4 years to 1 year prior to portfolio formation; annualized growth in sales per share over the preceding four years; and average frequency of large M&A transactions.

Stocks that are placed in the top classification by either growth in net operating assets, property, plant and equipment, capital expenditures, or new external financing, tend to have disappointing stock price performance in subsequent years. The abnormal returns are close to those reported for the top decile by growth in total assets in Table 1. In the first post-formation year, the highest-ranked category by *TAGROW* earns a mean abnormal return of -5.88 percent, compared to -7.47 percent for *DNOA*, -4.38 percent for *DPPE*, -5.65 percent for *NetCAPX*, and -6.60 percent for *DXFIN*. There are generally no major differences in returns across the other portfolios, except in the case of the sort by change in external financing. In the latter case firms which have decreases in external financing (including those which repurchase shares) have

positive abnormal returns of 3.48 percent on average.

The distinctive features that characterize firms falling in the high *TAGROW* portfolio show up as well in Table 3. The portfolio of stocks ranked highest by any of the investment or financing variables comprises firms that have been very successful in the past. For instance, firms in the top decile by net capital expenditures enjoyed elevated growth in sales as well as strong stock price gains in the periods leading up to portfolio formation. Over the preceding four years their sales grow on average by 24.36 percent per year, while their mean return from four years ago to the year prior to portfolio formation is 22.64 percent per year. Firms ranked in the top decile by any of the indicators are also more likely to be part of a major M&A transaction in the portfolio formation year. In the case of the top *NetCAPX* decile portfolio, for instance, roughly one out of three firms engages in a sizeable takeover.

The results from the sample of large stocks in part 2 of Table 3 are similar. In the sort by *TAGROW* the top decile portfolio's abnormal return in the first year is -5.17 percent. The corresponding performance for the top decile is -6.54 percent based on *DNOA*, -4.26 percent based on *DPPE*, -4.02 percent for *NetCAPX*, and -4.67 percent after sorting on *DXFIN*. The upshot is that anomalies based on total asset growth, growth in net operating assets, growth in property, plant and equipment, capital expenditures, as well as new external financing bear many close resemblances. These similarities prompt the suspicion that they share a common root cause. As a result, spelling out the underlying sources of the effect of asset growth on returns should go a long way to providing an understanding of the others.

### **3. Evaluating the effects of asset growth**

We explore several hypotheses to account for the association between growth in assets and future returns. The possible explanations, which are not mutually exclusive, are: the acquisition hypothesis, the managerial agency cost hypothesis, the extrapolation hypothesis and the market timing hypothesis.

Under the acquisition hypothesis, sharp rises in assets are predominantly due to acquisitions of other businesses. An extensive body of research studies the consequences of corporate takeovers for long-term shareholder wealth. Previous studies generally find that the stock prices of acquirers tend to falter in years subsequent to a merger (see, for example, Loughran and Vijh (1995), and Moeller et al. (2005)). Hence the

negative association between asset growth and future returns is a disguised version of the poor performance of acquirers in takeovers.

One reason why corporate acquisitions reduce shareholder wealth is because managers tend to engage in takeovers for self-serving reasons, and not necessarily because they are good investments. In the free cash flow theory of Jensen (1986), for instance, managers of successful firms where the agency cost problem is severe spend cash by undertaking acquisitions rather than returning funds to shareholders. As a generalization of this argument managers may expand the resources under their control by means beyond takeovers, such as spending on capital projects. The agency cost argument thus suggests that managers' incentives drive them to expand assets beyond the firm's economically optimal scale, leading to low future returns.

The extrapolation hypothesis of Lakonishok, Shleifer and Vishny (1995) offers a different interpretation for why fast-growing firms tend to do poorly in subsequent years. Studies in psychology suggest that individuals tend to extrapolate past trends too far into the future. Accordingly investors overlook long-term reversion in profitability and growth, but instead believe that firms which have been successful in the past maintain their strong performance in the future. Such stocks tend to be overpriced as a result. As well, it may be the case that firm managers suffer from such a cognitive bias and over-commit the firm's resources after past success.

Finally, asset accumulation may be a passive result of managers' decisions to raise additional funding from capital markets. There is evidence that managers successfully time share issuances to take advantage of temporary drops in the cost of equity capital, such as when a firm's stock is overvalued (Baker and Wurgler (2002)). As share valuations are thereafter corrected, equity issuers experience low stock returns (Ritter (1991), Brav and Gompers (1997), Jegadeesh (2000)). Opportunistic financing by managers thus induces a negative correlation between the accompanying increase in firm assets and subsequent returns.

### **3.1. Attribution by asset growth source**

We evaluate the hypotheses about the effects of asset growth on future returns through partitioning the sample by the source of asset growth. In particular, we verify whether the poor returns are confined to those firms whose assets grow mainly due to external acquisitions as opposed to internal expansion.

Table 1 shows that the association between asset growth and returns is limited to the highest-ranked decile portfolio and, to a lesser extent, the next-highest ranked portfolio. Accordingly, we focus our attention on the behavior of these two decile portfolios. We take each constituent firm and attribute the primary source of asset growth to one of five mutually exclusive items. The amount of assets can grow due to acquisition of another firm or due to change in one of the following items: cash and marketable securities, net property, plant and equipment, current assets other than cash and securities, and other long-term assets excluding property, plant and equipment.

Given the strong presumption that spikes in asset levels are driven by takeovers, we first break out those firms where asset growth is due primarily to acquisition activity. This is measured by whether the acquisition size is at least twenty percent of the dollar change in total assets. The size of the acquisition is taken from SDC if available; if not we measure it (in the following order) as acquisitions from the statement of cash flows, or change in the value of goodwill or intangible assets. In the absence of a substantial acquisition based on any of these indicators we go on to compute the change in each of the remaining four sources of asset changes. The item with the largest change relative to the dollar change in total assets qualifies as the dominant source, provided its increase is at least 10 percent of the rise in total assets.

The results of the attribution of asset growth are given in Table 4. Observation counts in each category are too small to permit meaningful comparisons until 1988, so our sample period in this section extends from 1988 to 2004. On average there are 203 firms ranked in the top decile by growth in total assets for the full sample of firms. In 95 (or roughly 47 percent) of these cases the SDC database indicates they complete acquisitions of other companies over the sixteen months preceding portfolio formation, and these takeovers represent at least 20 percent of the asset increase. For 17 additional firms, there are signs of takeover activity from the statement of cash flows, goodwill or intangibles, amounting to at least 20 percent of the rise in assets. In total, business combinations account for the bulk of the change for 112 (or 55 percent) of the firms in the top decile by asset growth. Results for the next-highest ranked decile portfolio by *TAGROW* yield a similar conclusion: takeovers are the prime source of the increase in assets for 47 percent (95 out of 203 firms) of the cases for the full sample. Firms that are ranked highly by total asset growth are thus heavily weighted toward acquirers in takeovers.

Of the remaining non-acquisition cases, the dominant source of asset increases in the majority of firms is through cash and marketable securities. This item is the leading contributor to asset growth in roughly 25 percent of the cases in the top decile for the full sample (20 percent of cases in the next-highest ranked decile). Growth due to the other asset categories do not represent large proportions of the sample. In particular, increases in property, plant and equipment are the main component for 6 percent of the top decile.

Large companies are more prone to engage in corporate acquisitions. For the large firm sample, takeover activity is the chief source of the asset growth in 43 of 71 cases (or 61 percent). Growth in the form of cash is the other main source, representing 17 percent of the large, high-growth firms.

### **3.2. Stock price performance by growth source**

The future stock price performance of firms ranked in the top two deciles by asset growth, classified by the primary source of the increase in assets, is reported in Table 5. Stocks within each category are equally-weighted. The mean of the time series of portfolio returns is shown, along with *t*-statistics based on the standard error of the time series.<sup>5</sup>

Over the period 1988–2004 the mean return on stocks ranked in the top decile by *TAGROW* is -7.52 percent in the first year after ranking, and -4.40 percent in the second year for the full sample. Abnormal returns for the large stock sample, as well as the stocks in decile 9, are attenuated but are still negative. For example, returns for large stocks in the top decile during the first year are -5.73 percent and in the second year are -2.22 percent. Much of the sub-par performance can be traced to the poor long-term price performance of acquirers after takeovers. Those firms who engage in major acquisitions earn abnormal returns of -8.77 percent in the first post-formation year, and -6.23 percent in the second year. For the subset identified as acquirers on SDC, abnormal returns are -8.15 and -5.79 percent respectively. The experience of large firms with high asset growth due to acquisitions is similar, and the same result holds for firms ranked

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<sup>5</sup>In several portfolio formation years, some of the categories are sparsely populated. To provide more reliable inferences about performance we pool firms over adjacent years within a category until it contains at least 10 stocks. The one-year returns on these stocks are then averaged and counted as a single time-series observation.

in the next highest category by asset growth (decile 9). As a specific case, average abnormal returns are -8.42 and -3.81 percent in the first and second years for large stocks in panel (B).

The disappointing performance of acquirers in our sample matches up with the findings from an extensive literature (such as Moeller et al. (2005)). In turn, the poor long-term results for acquiring firms could be due to a variety of reasons. Purchasing another company may be a signal that the acquirer has run out of internal growth opportunities. Acquisitions may also disclose that management suffers from over-confidence and the board is unable or unwilling to exercise oversight. As another possibility, a transaction that is paid for with shares may be interpreted by investors as an indication that the acquirer's equity is overvalued, triggering a downward revision in the stock price.

The lackluster returns of firms with high asset growth is not confined to the group of acquirers, however. Notably, in those cases where the main source of growth is through property, plant and equipment, abnormal returns in the first year average -9.69 percent in the first year and -7.46 percent in the second year for the full sample. The corresponding returns for large stocks are also notable (-10.06 percent and -6.65 percent). Since the sample sizes are not large, however, the verdict is not entirely clear-cut.

One subset of the high-growth firms, however, does not on average experience below-par future returns. In particular, when assets grow primarily in the form of cash accumulation, mean abnormal returns are small and not reliably different from zero. In the full sample, for instance, the average abnormal return is 1.17 percent in the first post-ranking year and 1.10 percent in the second. The result is robust across the top two deciles by *TAGROW* and for large stocks as well. Averaged over the three post-formation years for the firms in decile 10 from the large stock sample, the abnormal return is 2.92 percent.

In summary, Table 5 does not support the acquisition hypothesis. The negative correlation between asset expansion and returns is not solely due to the performance of acquirers. Instead, there is some variation across asset classes in the effect of high past growth. In particular in section 4 we delve more deeply into the set of firms where growth is primarily in the form of increased cash holdings.

### 3.3. Financing decisions and stock returns

It is possible that adjustments on the asset side of a firm's balance sheet are a consequence of other changes, and have no direct association with subsequent share prices. Rather, the increase in assets is a consequence of financing activities and these transactions on capital markets trigger a revision in the value of shares. In particular new security issues may occur when managers believe that the firm is temporarily overvalued. Investors respond to this negative signal by revising downward the stock price, possibly with a lag. Since the correction in equity prices occurs with a delay after funds are raised from issuing securities and assets accumulate, it appears that the expansion in assets leads returns. Under this scenario the correlation arises irrespective of agency costs due to managerial discretion or managerial over-confidence about the profitability of investments.

To check on this misvaluation hypothesis of the effects of new financing and asset expansion we partition the firms with large asset increases by financing source. Firms that raise new capital through equity issues are more likely to be cases where managers are taking advantage of temporary overvaluation of their stock. On the other hand, there is a less compelling reason to think that firms obtaining funds through debt issues are doing so to exploit mispricing.

In Table 6 we split the firms in each of the top two deciles by asset growth into disjoint categories depending on the primary financing source. There are three possible sources: equity, debt or internal financing. We choose as the primary source the one constituting the largest portion of the dollar change in total assets, as long as it exceeds 20 percent of the asset increase. In each financing category we track the yearly equal-weighted average of the component stocks' abnormal returns.

Firms in the highest-ranked growth decile are roughly divided into equal numbers by financing source. On average, in about 49 percent of the sample the largest portion of the increase in assets is financed through equity, while in 41 percent of the cases debt financing is the leading source of funding. Internally-generated funding is not often the main source, representing only about 9 percent of the firms in the top growth decile. Given the low number of firm-year observations in the internal funding category our main contrast in Table 6 is between equity- and debt-financed expansion in assets.

Both equity- and debt-financed asset expansion are associated with lackluster future returns. Firms in

the top decile by growth that raise equity funds earn mean abnormal returns of -9.28 percent in the first year while firms using debt earn mean returns of -7.09 percent. The associated *t*-statistics are -3.34 and -3.23, respectively. Returns are equally disappointing for both financing sources for firms in the ninth decile by growth (-3.61 percent for equity and -4.97 percent for debt). The similarity in returns across financing sources calls into question the hypothesis that managers opportunistically time major asset expansions to take advantage of temporary overvaluation of the firm's shares.

Turning to the specific forms of investment, the results continue to be roughly comparable for equity and debt financing. Notably, acquisitions that are funded with equity, which are associated with first year abnormal returns of -12.56 percent, are detrimental to shareholder wealth. Nonetheless, even debt-financed takeovers are plagued with poor returns of -6.68 percent. The poor price performance of firms increasing property, plant and equipment is also eye-catching, regardless of the method of financing. First-year abnormal returns average -11.44 percent when financed through equity and -10.63 percent when financed through debt. On the other hand firms with large increases in cash holdings are not associated with any signs of significant abnormal returns.<sup>6</sup>

### **3.4. Return regressions**

Sorts by a variable do not confine the relation between returns and the underlying variable to any particular functional form. However, sorts do less well in controlling for the influence of multiple explanatory variables. To tease out the influence of different investment and financing decisions while controlling for past performance we turn to the results from cross-sectional regressions. We fit a cross-sectional regression each calendar year to all firms with fiscal year-ends falling in that year. The model relates abnormal returns over the first post-formation year (beginning four months after a firm's fiscal year-end) to explanatory variables observed as of the formation year or earlier.

We study the consequences of different sources of asset growth on returns by estimating a model of the

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<sup>6</sup>Sample sizes in a financing category are very small in several years. We follow the same procedure as for the investment categories in Table 5 and pool across years until there are at least ten firms in a financing category. The pooled average one-year return is treated as one time series datapoint. Since different years are aggregated in the two tables, the results for individual categories are not directly comparable between tables.

form

$$ar_{it} = \gamma_{0t} + \gamma_{1t}AQSDC_{it-1} + \gamma_{2t}AQDUM_{it-1} + \gamma_{3t}CASH_{it-1} + \gamma_{4t}OPA_{it-1} \\ + \beta_{1t}GSALES4_{it-1} + \beta_{2t}PASTR41_{it-1} + \beta_{3t}PASTR1_{it-1} + \epsilon_{it}$$

where  $ar_{it}$  is the abnormal return for stock  $i$  in year  $t$ . Growth in assets can be from one of five mutually exclusive sources. If the SDC database reports an acquisition by firm  $i$  in year  $t - 1$  then  $AQSDC_{it-1}$  is the dollar value of acquisitions relative to the change in the firm's total assets.  $AQDUM_{it-1}$  is a dummy variable taking on the value of one if there is evidence of an acquisition by firm  $i$  worth at least 20 percent of the asset change from either the statement of cash flows, or increase in goodwill or intangible assets over year  $t$ . The variable is zero otherwise. Since intangible assets can change for reasons other than business combinations we use an indicator variable to capture this event, rather than the dollar value of the growth in intangibles. In cases where firm  $i$ 's increase in cash is at least 20 percent of the asset change then  $CASH_{it-1}$  is the change in cash relative to the change in total assets. To increase the power of our tests, we aggregate the remaining sources of changes in assets into one broad category of non-cash operating assets. When the change in property, plant and equipment, non-cash current assets and other long-term assets is the dominant source (at least 20 percent) of the asset change,  $OPA_{it-1}$  measures its change relative to the asset increase. The remaining variables control for the effects of past firm performance.  $GSALES4_{it-1}$  is the past growth rate in firm  $i$ 's sales per share. We use up to four years ending in year  $t - 1$  to measure growth (fewer if any past year's sales are not available). As a measure of long-term past returns we use  $PASTR41_{it-1}$ , the stock's rate of return beginning from year  $t - 4$  (if available) to year  $t - 2$ ; the variable  $PASTR1_{it-1}$ , stock  $i$ 's return over year  $t - 1$  captures the effect of intermediate-term price trends.

The results from portfolio sorts indicate that returns are associated with asset growth only when growth is at relatively high levels. To capture this relationship using the parsimonious functional specification (1) without eliminating any observations, we adopt the following procedure. The investment variables  $AQSDC$ ,  $AQDUM$ ,  $CASH$  and  $OPA$  take on non-zero values in the regression only for firms in the top decile by asset growth; for the rest of the sample these variables are set to zero. As a result cross-sectional variation in asset growth influences returns only in the relevant region. As a safeguard against extreme values of the

regressors driving the results we also express each asset growth indicator as a percentile value. In the case of *CASH*, to take as an example, we take all firms categorized in the top decile in a given year by asset growth and rank them by the dollar change in cash relative to the asset increase. The firm with the lowest relative cash increase is assigned a value of zero while the firm with the largest relative cash increase receives a value of one for *CASH* in that year.

We average the time series of regression slope coefficients from (1) and compare them to the standard error of the time series. Table 7 reports the results for a variety of fitted models.

Model (1) in Table 7 confirms that, without controlling for past firm performance, abnormal returns are negatively related to each source of asset growth except for cash. For those acquirers with transaction values available on SDC, increases in acquisition size, given the change in total assets, are associated with mean abnormal returns of -12.66 percent with a *t*-statistic of -2.84. Similarly, firms with high growth in non-cash operating assets underperform those with low growth by -18.66 percent on average (*t*-statistic of -4.00). Growth in cash holdings, on the other hand, have virtually no relationship with subsequent abnormal returns.

Firms with high rates of asset growth tend to enjoy past success with respect to sales growth and returns (see Table 1). Their past performance may have a separate confounding effect on future stock returns. Investors who naively extrapolate past trends too far into the future may overvalue the shares of such firms. At the same time, the cognitive biases may be on the part of managers, who wind up over-extending firm resources and ultimately fall short. Model (2) introduces past sales growth, past long-term returns and the preceding one-year return to control for these influences. They do not detract from the strong effects of asset growth. The coefficients of the acquisition variables and growth in operating assets are not much different between the two models. The message from model (2) is that past performance does not subsume the effect of asset growth on future abnormal returns.

The remaining models in Table 7 introduce the effects of financing decisions. Within each investment category we categorize firms on the basis of the primary funding source (equity or debt). The item that constitutes the largest portion of the increase in assets, provided it makes up at least 20 percent of the increase, is taken to be the main financing source. In the enhanced models (3) and (4) we interact each of

the three investment variables with separate indicator variables for financing:

$$ar_{it} = \gamma_{0t} + \left( \sum_{j=1}^3 \gamma_{jt} INV_{ijt-1} \right) EQUITY_{it-1} + \left( \sum_{j=1}^3 \delta_{jt} INV_{jt-1} \right) DEBT_{it-1} \\ + \beta_{1t} GSALES_{it-1} + \beta_{2t} PASTR4_{it-1} + \beta_{3t} PASTR1_{it-1} + \epsilon_{it}.$$

$EQUITY_{it-1}$  equals one if firm  $i$ 's increase in assets is primarily financed through equity and is zero otherwise; and similarly  $DEBT_{it-1}$  is one if its asset growth is chiefly funded through debt and is zero otherwise.

Regardless of the source of funding, acquisitions and growth in non-cash operating assets lead to weak future returns. The coefficient for acquisition size relative to asset increase is -0.1087 for equity and -0.0596 for debt in model (3). Change in non-cash operating assets relative to the asset increase has a coefficient of -0.1702 for equity and -0.1220 for debt. Results after controlling for past firm performance (model (4)) are similar.

In contrast, firms whose assets grow substantially due to increases in cash holdings show no signs of stock price under-performance. Model (5) estimates the model for firms in the top decile by asset growth, but with no R&D spending. We focus on firms not engaged in R&D activity because they form the majority of the sample. For these firms there is some evidence that increases in cash holdings, along with acquisitions and increases in non-cash operating assets, are all associated with negative abnormal returns. However, while the coefficients for cash for the subset of firms with zero R&D spending are negative, they are not significantly different from zero.

## 4. Additional evidence

### 4.1. The effects of investment efficiency and corporate governance

When investors learn from financial statements about large increases in a firm's assets, their response is shaped by beliefs about management's ability to generate a net return on the new assets. A firm with a consistent record of earning favorable returns on capital is likely to have a higher expectation of deploying assets profitably. In such a case there is a lower chance of a negative long-term price response to asset

increases. In comparison, when a firm without a background of profitable investments increases assets, there is a higher likelihood that managers are making self-serving decisions or over-committing resources. Long-term returns in the latter situation will tend to be less appealing. At the same time, managers' inclination to consume perquisites at shareholders' expense can be partially curtailed by monitoring devices such as an independent board of directors, performance-based compensation schemes, or the threat of external takeover. Accordingly, the chances of excessive asset expansion are mitigated in firms with strong governance mechanisms.

Table 8 checks up on whether long-term returns following asset expansions vary with investment efficiency, or the quality of governance. We use past return on equity (income before extraordinary items relative to book value of equity from the prior year) as an indicator of management's ability to use new capital to increase shareholder wealth. Accounting income has a large transitory element, however. To smooth out year-to-year fluctuations and obtain more reliable signals of the quality of management's investment decisions, we average income before extraordinary items over the past two years before scaling by the book value of common equity as of the formation year. Our measure of corporate governance is the index of shareholder rights developed by Gompers, Ishii and Metrick (2003).<sup>7</sup>

We take all firms ranked in the top decile by asset growth in a given year and sort them based on one of our indicators into three categories: firms with low past investment return (or weak governance), a middle category, and firms with high past return on equity (or strong governance). The low (high) investment return group comprises firms ranked in the bottom (top) twenty percent by past return on equity over all high-growth firms. Similarly, the sample of weak (strong) governance firms includes companies ranked in the top (bottom) thirty percent based on the Gompers-Ishii-Metrick index.<sup>8</sup> Equally-weighted returns are calculated

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<sup>7</sup>Gompers, Ishii and Metrick (2003) combine information on 24 different aspects of shareholders' control over incumbent managers to create a composite index of the quality of governance. The various features considered include the ease of mounting a hostile bid for the firm (such as the strength of antitakeover defenses), shareholder voting rights (such as unequal voting rights across different shareholders), and managerial job entrenchment (golden parachutes for departing executives, for example).

<sup>8</sup>The Gompers-Ishii-Metrick index takes on high values for firms with low shareholder protection. Further, the sample of firms with data on the index is generally limited to bigger companies. We choose the cutoff values for the index to obtain a reasonably large number of firms in each comparison group.

for each group in the three post-formation years.

As hypothesized, firms with high asset growth but poor historical investment efficiency have more severe stock price under-performance. When classified by past return on equity, for example, firms with historically less profitable investments earn abnormal returns of -15.16 percent on average during the first year after portfolio formation. Abnormal returns for firms with relatively superior efficiency, on the other hand, are close to zero. The resulting difference between the high- and low-efficiency groups is 14.35 percent on average with a *t*-statistic of 4.13.

High-growth firms with poor governance are also more prone to have slumping returns in the future. In the partition by the governance index, share price performance is weakest for the high-growth firms with the least favorable shareholder rights. Returns in this category average -7.21 percent in the first following year, representing under-performance of 4.88 percent relative to firms with strong governance. The relation between governance quality and future returns for high-growth firms is not clearcut, however. Firms in the strong governance category do not have the most favorable share price performance. The sparse coverage of the governance index sample across firms and across time may be limiting our ability to see more clearly the effect of stockholder monitoring in limiting wasteful managerial spending.

#### **4.2. Characteristics of cash growth firms**

A potential explanation for why companies accumulating large cash balances do not under-perform to the same extent as other high-growth firms comes from Opler, Pinkowitz, Stulz and Williamson (1999). Building up cash reserves helps to bypass the costs of raising external capital and avoid disruptions to investment when income is volatile. The costs of financing are especially acute when there is an information asymmetry problem between managers and investors, as is likely to be the case when firms have large investments in intangible assets such as research and development (R&D) spending. Table 9 provides some evidence on this hypothesis.

Specifically we look in more detail at the cash levels, financing and investing flows of those firms in the top decile by asset growth where increases in cash balances are the primary source. Their attributes are measured as of the classification year and also in the three succeeding years. To capture the behavior of total

assets and cash around the classification year we report the average rank by total asset growth (from zero for the lowest across all firms to one for the highest), and the average level of cash at year-end relative to total assets at the beginning of the year. As well, we track the financing source (net new external financing, internal financing) for the asset expansion, and the avenues for investing cash (net capital expenditures, incidence of any merger and acquisition activity, incidence of major merger and acquisition activity). Given that this set of high-growth firms accumulates assets in the form of cash, we take the financing and investing data from the statement of cash flows. Finally we tabulate the R&D intensity of the cash growth firms (research and development expenditures relative to sales in the same year) and average abnormal returns.

For comparison we take similar snapshots of a set of reference firms. The comparison group is constructed to resemble the cash growth firms in that, as of the classification year, they have enjoyed similar past success, have roughly the same equity valuation, and market capitalization. These attributes correspond to the central differences between high-growth firms and the overall population (see Table 1). Since we scale all our investment and financing activity indicators by total assets we also match with reference firms on the basis of total assets in the classification year, to ensure that comparisons are not driven by variation in asset bases. However, to isolate the distinctive features of the cash growth firms we select comparison firms that choose not to expand their assets. Accordingly, for each cash growth firm we choose forty adjacent firms when ranked by growth in sales per share over the last four years (twenty ranked immediately above and twenty immediately below).<sup>9</sup> For each of these we calculate its average absolute difference in rank from the sample firm based on market capitalization, book-to-market value of equity ratio, and total assets. The firm that has the lowest average absolute rank difference, and does not fall in the top decile by asset growth, is picked as the matching firm.

Relative to the comparison sample, the cash accumulators have somewhat lower total assets at the classification year-end (343 million dollars compared to 518 million dollars, respectively). They have also enjoyed a warmer reception by investors in the past. Stock returns for the cash growth firms average 31.76 percent in the portfolio formation year, while the comparison firms experience prior returns of 20.41 percent.

At the end of the portfolio formation year high cash growth firms hold cash balances that are on average

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<sup>9</sup>If the sample firm does not have a full four-year history of sales we match based on sales per share over the previous year.

58.28 percent of beginning total assets. This amounts to roughly twice the holdings (27.23 percent) of the comparison group. The large cash positions are generated by net new external financing over the past year of 65.77 percent on average of initial assets. In comparison, income before extraordinary items represents -2.16 percent of beginning assets over the same period, so internal financing is not the primary source of the build-up in cash. Moreover, since the cash-growth firms do not on average have a past record of high profitability, their subsequent performance reflects something beyond the effect of past return on equity documented in table 8.

Over the post-formation period total assets of the cash growth firms do not continue growing at their previous rapid pace. Instead average ranks by asset growth rate revert quickly to the mean. With respect to the potential uses of the increase in funds, the cash accumulators do not diverge notably from the control group in the following years. For instance, levels of net capital expenditures in the first subsequent year are 6.36 percent and 3.96 percent of assets, respectively. Similarly, the cash growth firms are not more inclined to engage in business acquisitions.

Returns of capital to stockholders and bondholders are also not major occurrences for the cash growth firms. In particular net new external financing (equity issues less repurchases and dividends, in addition to new debt less retirements) stays positive in each of the three post-formation years. During the first post-classification year, for instance, net new capital raising averages 15.41 percent of assets for the cash accumulators compared to 9.93 percent for the comparison group.

Instead, cash balances persist at relatively lofty levels for the cash-growth firms. They account for at least forty percent of start-of-year assets in each post-formation year, while for the comparison group the corresponding level is about twenty-five percent. The other notable feature of the cash-rich firms is their heavy involvement in research and development expenditures. On average they spend about 28 percent of their sales revenues on R&D, as opposed to 17 percent on average for the matching firms. Their high level of R&D expense may account, at least in part, for the drag on their short-term profitability. Over the post-formation period, average values of internal financing continue to be negative.

The evidence from Table 9 fits the broad argument that firms with large investments in intangible capital can avoid financing costs and disruptions to spending by maintaining high cash balances. To the extent that

investors recognize the financial flexibility that such cash holdings provide, equity values do not respond as negatively when total assets rise as a result of cash accumulation.<sup>10</sup>

## 5. Net operating assets

Hirshleifer et al. (HHTZ, 2004) provide a different perspective on the predictability of returns based on balance sheet information. They start from the accounting identity that the level of net operating assets (operating assets minus operating liabilities) denotes the cumulative amount over time of the difference between a firm's net operating income and its free cash flow. A firm with high net operating assets, they argue, is likely to be one where high past growth in accounting net income is not accompanied by commensurate growth in cash flow. The discrepancy suggests that such a firm's future prospects are not likely to be on par with its past performance. To the extent that investors fail to anticipate the slowdown in future profitability growth, firms with high net operating assets ("bloated" balance sheets) suffer disappointing stock returns.

The empirical design in HHTZ has created some controversy, however (see Richardson et al. (2006)). While their logic indicates that balance sheet bloat should be measured by the level of net operating assets relative to the firm's contemporaneous asset base, HHTZ use total assets in the prior year as the scaling variable. Since current-year values are measured against asset levels in the preceding year, the effects of net operating asset levels are confounded with the effects of asset growth. As a result, it is ambiguous as to whether net operating asset levels have independent predictive power beyond past growth in assets. In this section we explore whether this is the case.

Table 10 compares the results from sorts by each of two variables: net operating assets in year  $t$  relative to total assets in the preceding year  $t - 1$ ,  $NOATAL1 = \frac{NOA_t}{TA_{t-1}}$ , or net operating assets as a proportion of total assets in the same year,  $NOATAL0 = \frac{NOA_t}{TA_t}$ . To minimize clutter, we report statistics for the full

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<sup>10</sup>There is some weak evidence that the effects of large increases in cash on future returns vary across firms depending on R&D intensities. Large cash increases are associated with a mean abnormal return in the first year of 2 percent for firms engaged in R&D. Cash-growth firms with no R&D spending, on the other hand, earn abnormal returns that are more in line with the results from the previous tables (-3.27 percent in the first year). There is large sampling variability in the returns, however, so the average returns are not statistically significant.

sample of firms only (the conclusions are qualitatively similar for the large firm sample).

The sort by *NOATAL1* induces a pattern in returns that is similar to the sort by total asset growth. Specifically, firms ranked in the top decile by *NOATAL1* earn disappointing future returns. Abnormal returns average -6.57 percent in the first year (compared to -5.88 percent in the sort by *TAGROW*) and remain low up to the third post-classification year. In the sort by *NOATAL0*, firms whose balance sheet make-up is most heavily tilted toward net operating assets also experience low stock price performance in the future. However the magnitude of abnormal returns is almost halved (to -3.46 percent in the first year, for instance). In all cases, there is scant evidence that portfolios other than the top-ranked decile earn notable abnormal returns.

The portfolio characteristics reported in part 1 of Table 10 confirm a close connection between the HHTZ measure *NOATAL1* and past growth in assets. Stocks that are highly ranked by *NOATAL1* also tend to have high past increases in total assets. Median asset growth in the formation year is 8.67 percent on average for portfolio 5 and climbs to 58.31 percent for the top portfolio. The resemblance with high-growth firms extends along other dimensions as well. Firms in the top decile by *NOATAL1* on average have also enjoyed the highest past growth in sales across all the portfolios in part 1 of Table 10 (25.29 percent per year over the preceding four years), and the highest past stock return as well (27.54 percent per year from four years to one year prior to formation). Of the firms in this category, 53.90 percent have engaged in a merger or acquisition in the preceding year and 47.21 percent have undergone a major expansion due to M&A activity. As another indication of the overlap with *TAGROW*, high levels of *NOATAL1* revert quickly in the post-formation period. When we calculate average rank values by *NOATAL1* across stocks in each decile portfolio in the following years, the difference between extreme portfolios in their average ranks is 0.61 in the first year, 0.53 in the second, and 0.48 in the third.

At the same time, stocks highly ranked by *NOATAL1* do not differ much in terms of the breakdown of the balance sheet into the net operating asset component. The top four portfolios in the sort by *NOATAL1* share similar average values of *NOATAL0*. In sum, *NOATAL1* does poorly at discriminating between firms on the basis of the preponderance of net operating assets in the makeup of their balance sheets. Instead, it is more successful at picking out firms with elevated past growth in assets.

In contrast, the sort by net operating assets scaled by total assets in the same year, *NOATAL0*, does not pick up differences due to past asset growth. The top decile by *NOATAL0* is associated with past growth in assets of 16.55 percent on average, which is not very different from asset growth rates in the intermediate portfolios. Unlike *NOATAL1* or *TAGROW*, *NOATAL0* demonstrates high persistence in the following years. More generally, firms in the top decile by *NOATAL0* do not on average have the same past record of success as firms with high *NOATAL1* or *TAGROW*. From part 2 of Table 10, their past sales growth rates are comparable to those of other firms and their past stock returns are not stellar. In line with their past performance, the top decile by *NOATAL0* tends to be relatively more value-oriented compared to the firms that are highly ranked based on *NOATAL1*. The mean book-to-market ratios are 0.8007 and 0.5954 for the top deciles by *NOATAL0* and *NOATAL1*, respectively.

The upshot is that the predictive power of the HHTZ variable *NOATAL1* for returns does not seem to reflect information about the importance of net operating assets in the make-up of a firm's balance sheet. Instead, the low subsequent returns associated with high levels of *NOATAL1* has more in common with the experience of relatively more successful firms with large past growth in total assets.

## **6. Summary and conclusions**

Financial statement information is commonly used in conjunction with equity prices to derive valuation measures for studying the behavior of stock prices. A growing area of research relates returns more directly to the information in firms' balance sheets, such as the growth rate in total assets, or in components such as working capital, net operating assets or fixed assets. Since these variables have little in common with standard market-based valuation indicators, this line of research suggests potentially new insights into how investors interpret financial statement information.

In particular we document, as do Cooper et al. (2005), that large expansions in firm assets on average are detrimental to shareholder wealth. There is a similar association between returns and specific forms of asset growth such as rises in capital expenditures and new external financing.

The nature of the information in balance sheet expansion for future returns has not been thoroughly explored, however. Our analysis examines different, not mutually exclusive, hypotheses. Since merger and

acquisition activity is a prime reason for significant expansions in the scale of a firm, one argument is that the association is driven by the poor long-term performance of acquiring firms. It is indeed the case that 55 percent of the firms categorized in the top decile by asset growth are involved in acquisition activity in the ranking year. These firms tend to have weak returns in the following years: mean abnormal returns are -8.77 percent in the first subsequent year and -6.23 percent in the second year. However, other forms of asset growth also are accompanied by negative drifts in returns. In the case of increases in property, plant and equipment, for example, the returns are -9.69 percent and -7.46 percent in the first and second years, respectively. In brief, the link between asset growth and future returns is not entirely driven by corporate acquisition activity.

A second line of argument is that the timing of increases in assets coincides with episodes when the firm's equity is temporarily overvalued, and managers raise funds to take advantage of the opportunity. The expansion then leads future declines in the stock price as investors realize that the firm is overvalued and adjust valuations accordingly. The correlation holds irrespective of the profitability of the investments financed by the additional funds. When we classify firms based on the method of financing for the expansion we find that future returns are disappointing regardless of the funding source. When growth in assets is funded through new equity the mean first-year abnormal return is -9.28 percent. In cases where debt capital is used to fund the growth the mean first-year abnormal return is -7.09 percent. The similarity across financing channels suggests that balance sheet growth is not proxying for the effects of overvalued equity.

Expansions in firm scale usually follow on the heels of favorable performance and strong stock returns. Controlling for these confounding factors in regressions does not drive out the effect of asset growth. It does not seem to be the case, therefore, that investors' extrapolation of past trends, or managerial over-commitment after past success, are the culprits behind the asset growth anomaly.

Balance sheet expansion may reflect managers' incentives to over-accumulate assets in order to consume the perquisites that come with a larger firm. We find that firms with the weakest governance mechanisms have the worst stock price performance across the high-growth firms. The relationship is not clear-cut however (high-growth firms with strong governance also under-perform but to a lesser extent), perhaps due to the paucity of governance data for many firms.

Two sets of firms appear to depart from the average pattern of poor returns following high asset growth. First, of the firms in the high growth category, those with high past return on equity, indicating an ability to generate profit from previous investments, tend to have higher returns than firms with low past return on equity. The spread in abnormal returns after sorting high-growth firms into subsets with high and low past return on equity averages 14.35 percent in the first post-ranking year, for example. Second, when the expansion primarily takes the form of increases in cash balances, future abnormal returns are not notably different from zero. Some preliminary evidence suggests that these cash accumulators may be building financial flexibility in order to maintain investments in research and development.

## Appendix

Accounting data for portfolios formed in calendar year  $t$  are taken from the fiscal year ending in year  $t$ . We generally scale the accounting variables by total assets  $TA$ , given by Compustat annual data item 6. Net operating assets  $NOA$  are given by total assets minus cash and equivalents (data item 1) minus operating liabilities. Operating liabilities are given by accounts payable (item 70) plus deferred taxes (item 74) plus other current liabilities (item 75). We set net operating assets to be missing if any of these items is unavailable.

For other measures of firm expansion we use the change in net property, plant and equipment or new external financing, both relative to prior-year total assets. Net property, plant and equipment  $PPE$  is annual data item 8 on Compustat. The default measure of new external financing is based on the statement of cash flows. New external financing  $DXFIN$  is given by the sum of new equity financing and new debt financing. New equity financing is the sum of: sale of common and preferred stock (item 108) minus purchase of common and preferred stock (item 115) minus cash dividends (item 127). New debt financing is issuance of long-term debt (item 111) minus reduction in long-term debt (item 114) plus changes in current debt (item 301). We follow Richardson et al. (2006) in treating dividends to common equity as a return of shareholders' capital and hence a negative financing source. If changes in current debt (item 301) is missing we set it to zero. In the event that the statement of cash flow items are unavailable we switch to the balance sheet and measure  $DXFIN$  as the change in common equity plus change in preferred equity plus the change in debt. The change in common equity is given as the year-to-year change in book value of common equity (item 60) minus net income (item 172). Change in preferred equity is the yearly change in carrying value of preferred stock (item 130). Change in debt is yearly change in long-term debt (item 9) plus the change in the current portion of long-term debt (item 44) plus change in short-term debt (debt in current liabilities, item 34, minus the current portion of long-term debt, item 44).

Portions of our analysis decompose the growth in total assets into mutually exclusive components. One component is expansion through corporate takeovers. Growth in total assets for reasons other than acquisitions is attributed to one of the following items. Growth can be primarily due to an increase in one of the following: cash and equivalents (item 1), net property, plant and equipment (item 8), current assets other

than cash and short-term investments (total current assets, item 4, minus cash and equivalents), other long-term assets (investments and advances, items 31 and 32, plus intangibles, item 33, plus other assets, item 69).

We also categorize firms with large growth in assets by the primary source of funding (as a percentage of the dollar increase in assets). There are three mutually exclusive primary financing sources: equity, debt and internal financing. The amount of equity and debt funding is measured as above for new external financing through equity or debt. Internal financing is measured as income before extraordinary items available for common (data item 237). (item 21).

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Table 1  
Returns and characteristics for portfolios sorted by growth in total assets

Each month from 1968 to 2004 all listed domestic U.S. nonfinancial common stocks in the intersection of the CRSP-Compustat universe and with market value of equity exceeding the bottom decile of NYSE stocks are ranked by growth in total assets ( $\frac{TA_t}{TA_{t-1}}$ ) and assigned to decile portfolios. All stocks are equally weighted in a portfolio. Returns on the portfolio are reported over each of the following three years, as well as abnormal returns (in excess of the return on a control portfolio matched on size and book-to-market value of equity). Characteristics of the portfolio at the formation date and in subsequent years are also reported. All accounting information for a stock is from the most recently ended fiscal year assuming a four-month publication delay. Results are averaged over years in the sample period. Results are given in part 2 for the same set of stocks but whose market value of equity at the classification date exceeds the median of NYSE stocks.

<b>Part 1. All stocks</b>										
(A) Returns in years following portfolio formation										
Return in first year	0.1314	0.1481	0.1504	0.1459	0.1493	0.1515	0.1455	0.1303	0.1095	0.0673
Return in second year	0.1628	0.1696	0.1653	0.1586	0.1550	0.1610	0.1544	0.1418	0.1197	0.0836
Return in third year	0.1653	0.1527	0.1666	0.1505	0.1456	0.1538	0.1433	0.1476	0.1391	0.1257
Abnormal return in first year	-0.0064	0.0036	0.0050	0.0051	0.0058	0.0112	0.0108	0.0021	-0.0177	-0.0588
t-statistic	-0.56	0.49	0.84	0.96	1.08	1.78	2.08	0.33	-1.99	-4.57
Abnormal return in second year	-0.0018	0.0075	0.0032	-0.0016	0.0018	0.0081	0.0030	0.0007	-0.0178	-0.0485
t-statistic	-0.14	0.99	0.58	-0.29	0.37	1.16	0.45	0.10	-1.99	-4.76
Abnormal return in third year	0.0180	0.0025	0.0125	0.0008	-0.0005	0.0089	0.0060	0.0063	-0.0048	-0.0150
t-statistic	1.43	0.34	1.60	0.12	-0.08	1.18	0.81	0.60	-0.47	-1.08
(B) Characteristics										
Book-to-market ratio	0.8681	0.8959	0.8357	0.7821	0.7332	0.6794	0.6235	0.5762	0.5244	0.4898
Size (billion \$)	0.8812	1.4443	1.9551	2.1296	2.2497	2.3468	2.1723	1.9956	1.5934	1.1841
Growth in sales over past 4 years	0.0631	0.0819	0.0895	0.1014	0.1146	0.1275	0.1481	0.1741	0.2216	0.2978
Annualized return from 4 years ago to prior year	0.0214	0.0585	0.0857	0.1121	0.1261	0.1488	0.1756	0.2082	0.2589	0.3204
Return over prior year	0.0525	0.0973	0.1087	0.1254	0.1248	0.1387	0.1543	0.1677	0.1768	0.1961
Incidence of M&A activity over past year	0.1984	0.2175	0.2606	0.2741	0.3177	0.3303	0.3606	0.4059	0.4527	0.5128
Incidence of major M&A activity over past year	0.0382	0.0554	0.1781	0.2086	0.2473	0.2500	0.2717	0.3185	0.3623	0.4250
(C) Assets and growth in assets										
$NOA_t/TA_{t-1}$	0.5490	0.6687	0.7055	0.7265	0.7380	0.7497	0.7689	0.7894	0.8626	1.1407
$NOA_t/TA_t$	0.6222	0.6752	0.6863	0.6873	0.6797	0.6706	0.6636	0.6470	0.6392	0.6146
Growth in total assets over prior year	-0.1320	-0.0130	0.0259	0.0555	0.0846	0.1176	0.1592	0.2231	0.3543	0.7178
Rank by $TA_t/TA_{t-1}$ in first year	0.3337	0.3584	0.3926	0.4242	0.4616	0.4999	0.5402	0.5732	0.6101	0.6195
Rank by $TA_t/TA_{t-1}$ in second year	0.3837	0.3898	0.4080	0.4308	0.4590	0.4800	0.5087	0.5246	0.5487	0.5503
Rank by $TA_t/TA_{t-1}$ in third year	0.4029	0.4075	0.4194	0.4280	0.4490	0.4619	0.4866	0.4977	0.5173	0.5248

**Part 2. Large stocks**

	(A) Returns in years following portfolio formation									
Return in first year	0.1374	0.1416	0.1442	0.1288	0.1372	0.1376	0.1295	0.1170	0.1135	0.0649
Return in second year	0.1589	0.1617	0.1512	0.1514	0.1318	0.1412	0.1390	0.1336	0.1182	0.0970
Return in third year	0.1530	0.1532	0.1420	0.1365	0.1333	0.1301	0.1301	0.1296	0.1225	0.1274
Abnormal return in first year	0.0048	0.0075	0.0104	0.0024	0.0038	0.0051	0.0029	-0.0038	-0.0137	-0.0517
t-statistic	0.45	1.00	1.39	0.35	0.66	0.56	0.49	-0.67	-1.35	-3.16
Abnormal return in second year	0.0083	0.0122	0.0039	0.0030	-0.0059	0.0038	0.0033	0.0012	-0.0091	-0.0220
t-statistic	0.86	1.40	0.59	0.55	-0.84	0.60	0.51	0.19	-1.10	-1.71
Abnormal return in third year	0.0148	0.0081	0.0031	-0.0024	0.0000	-0.0039	-0.0022	0.0024	-0.0076	0.0036
t-statistic	1.64	1.31	0.36	-0.30	0.00	-0.59	-0.33	0.23	-0.73	0.24
	(B) Characteristics									
Book-to-market ratio	0.7798	0.7788	0.7333	0.6861	0.6449	0.5971	0.5676	0.5199	0.4752	0.4335
Size (billion \$)	3.1079	3.7975	4.5067	4.8020	5.0106	5.5665	5.1298	4.8028	4.4868	3.6388
Growth in sales over past 4 years	0.0572	0.0760	0.0817	0.0951	0.1042	0.1145	0.1293	0.1480	0.1876	0.2419
Annualized return from 4 years ago to prior year	0.0576	0.0888	0.1047	0.1253	0.1344	0.1536	0.1698	0.1997	0.2605	0.3404
Return over prior year	0.1110	0.1113	0.1303	0.1359	0.1240	0.1361	0.1437	0.1511	0.1631	0.1976
Incidence of M&A activity over past year	0.2832	0.2740	0.3095	0.3301	0.3723	0.3832	0.4026	0.4439	0.4851	0.5764
Incidence of major M&A activity over past year	0.0526	0.0905	0.2358	0.2550	0.2853	0.2700	0.2942	0.3357	0.3725	0.4805
	(C) Assets and growth in assets									
$NOA_t/TA_{t-1}$	0.6034	0.6920	0.7217	0.7356	0.7491	0.7491	0.7700	0.7894	0.8281	1.0680
$NOA_t/TA_t$	0.6562	0.6870	0.6961	0.6934	0.6908	0.6744	0.6738	0.6634	0.6463	0.6347
Growth in total assets over prior year	-0.0869	0.0049	0.0349	0.0593	0.0832	0.1101	0.1433	0.1918	0.2852	0.5927
Rank by $TA_t/TA_{t-1}$ in first year	0.3247	0.3528	0.3927	0.4184	0.4680	0.5070	0.5478	0.5696	0.6257	0.6327
Rank by $TA_t/TA_{t-1}$ in second year	0.3588	0.3897	0.4100	0.4274	0.4711	0.4869	0.5112	0.5264	0.5619	0.5662
Rank by $TA_t/TA_{t-1}$ in third year	0.3971	0.3979	0.4187	0.4342	0.4441	0.4706	0.4973	0.4983	0.5257	0.5505



Table 3  
Returns and characteristics for portfolios sorted by investment or financing activity indicators

Each month over the sample period all listed domestic U.S. nonfinancial common stocks in the intersection of the CRSP-Compustat universe and with market value of equity exceeding the bottom decile of NYSE stocks are ranked by an indicator of investment or financing activity, and assigned to a decile portfolio. All stocks are equally weighted in a portfolio. Abnormal returns (buy-and-hold returns in excess of the return on a control portfolio matched on size and book-to-market value of equity) on the portfolios are reported over each of the following three years, as well as characteristics of the portfolios at the formation date. All accounting information for a stock is from the most recently ended fiscal year assuming a four-month publication delay. Results are averaged over years in the sample period. The investment or financing indicators are: change in net operating assets relative to prior year total assets ( $\frac{\Delta NOA_t}{TA_{t-1}}$ ) in panel (A), change in property, plant and equipment relative to prior year total assets ( $\frac{\Delta PPE_t}{TA_{t-1}}$ ) in panel (B), capital expenditures minus depreciation and amortization from the statement of cash flows relative to prior year total assets ( $\frac{(CAPEX_t - DEP_t)}{TA_{t-1}}$ ) in panel (C), or external financing relative to prior year total assets ( $\frac{XFIN_t}{TA_{t-1}}$ ) in panel (C). The sample period is either 1968–2004 for panels A, B and D, or 1988–2004 in panel C.

<b>Part 1. All stocks</b>										
	(A) Portfolios sorted by $\Delta NOA_t/TA_{t-1}$									
Abnormal return in first year	0.0160	0.0235	0.0161	0.0148	0.0079	0.0027	-0.0056	-0.0120	-0.0275	-0.0747
Abnormal return in second year	-0.0001	0.0167	0.0014	0.0105	0.0060	0.0021	0.0011	-0.0130	-0.0186	-0.0519
Abnormal return in third year	0.0064	0.0160	0.0105	0.0041	0.0023	0.0054	0.0040	0.0050	0.0042	-0.0241
Return from 4 years to 1 year ago	0.0358	0.0661	0.0931	0.1131	0.1310	0.1563	0.1711	0.2006	0.2451	0.3036
Growth in sales over past 4 years	0.0732	0.0870	0.0974	0.1035	0.1139	0.1312	0.1419	0.1641	0.2105	0.2757
Major M&A activity over past year	0.0612	0.0928	0.1216	0.1683	0.1981	0.2362	0.2805	0.3107	0.3892	0.4965
	(B) Portfolios sorted by $\Delta PPE_t/TA_{t-1}$									
Abnormal return in first year	0.0067	0.0113	0.0068	0.0052	0.0013	-0.0022	-0.0006	-0.0059	-0.0177	-0.0438
Abnormal return in second year	0.0077	0.0035	-0.0003	0.0031	-0.0048	0.0018	0.0003	-0.0047	-0.0201	-0.0320
Abnormal return in third year	-0.0008	0.0159	0.0021	-0.0020	0.0174	0.0044	0.0120	-0.0019	0.0041	-0.0168
Return from 4 years to 1 year ago	0.0284	0.0821	0.1171	0.1302	0.1482	0.1584	0.1705	0.1915	0.2165	0.2720
Growth in sales over past 4 years	0.0732	0.0947	0.1067	0.1140	0.1249	0.1316	0.1402	0.1517	0.1761	0.2324
Major M&A activity over past year	0.1111	0.1191	0.1534	0.1837	0.2131	0.2312	0.2622	0.2980	0.3383	0.4458
	(C) Portfolios sorted by $(CAPEX_t - DEP_t)/TA_{t-1}$									
Abnormal return in first year	0.0181	0.0083	0.0076	0.0068	-0.0134	0.0026	-0.0084	-0.0209	-0.0104	-0.0565
Abnormal return in second year	-0.0053	0.0100	-0.0030	-0.0238	0.0036	-0.0099	-0.0062	0.0099	-0.0033	-0.0360
Abnormal return in third year	0.0341	0.0028	0.0038	-0.0036	0.0069	-0.0085	-0.0029	0.0176	0.0298	0.0194
Return from 4 years to 1 year ago	0.0187	0.0660	0.0922	0.1069	0.1242	0.1317	0.1593	0.1716	0.1842	0.2264
Growth in sales over past 4 years	0.0748	0.0876	0.0973	0.1057	0.1186	0.1289	0.1406	0.1572	0.1833	0.2436
Major M&A activity over past year	0.2435	0.3016	0.3225	0.3715	0.3771	0.3909	0.3811	0.3665	0.3440	0.3350
	(D) Portfolios sorted by $XFIN_t/TA_{t-1}$									
Abnormal return in first year	0.0348	0.0236	0.0190	0.0116	0.0034	0.0040	-0.0093	-0.0152	-0.0304	-0.0660
Abnormal return in second year	0.0154	0.0067	0.0089	-0.0026	0.0084	-0.0038	0.0037	-0.0109	-0.0086	-0.0558
Abnormal return in third year	0.0184	0.0083	0.0025	0.0096	0.0058	0.0085	0.0115	-0.0011	-0.0091	-0.0235
Return from 4 years to 1 year ago	0.1301	0.1206	0.1230	0.1182	0.1190	0.1298	0.1442	0.1492	0.1891	0.2684
Growth in sales over past 4 years	0.0960	0.0959	0.0998	0.1028	0.1120	0.1275	0.1419	0.1545	0.1837	0.2624
Major M&A activity over past year	0.1354	0.1763	0.1906	0.1866	0.1983	0.2058	0.2473	0.2766	0.3547	0.3815

**Part 2. Large stocks**

	(A) Portfolios sorted by $\Delta NOA_t/TA_{t-1}$									
Abnormal return in first year	0.0252	0.0120	0.0174	0.0132	0.0061	0.0009	-0.0051	-0.0161	-0.0195	-0.0654
Abnormal return in second year	0.0165	0.0170	0.0052	0.0102	0.0010	-0.0043	-0.0061	-0.0014	-0.0129	-0.0274
Abnormal return in third year	0.0017	0.0068	0.0087	0.0034	0.0058	0.0003	-0.0093	0.0046	-0.0039	-0.0028
Return from 4 years to 1 year ago	0.0767	0.0913	0.1149	0.1293	0.1387	0.1570	0.1824	0.1871	0.2403	0.3175
Growth in sales over past 4 years	0.0662	0.0831	0.0903	0.0982	0.1033	0.1142	0.1266	0.1390	0.1676	0.2250
Major M&A activity over past year	0.0880	0.1239	0.1598	0.2055	0.2406	0.2652	0.3024	0.3463	0.4214	0.5194
	(B) Portfolios sorted by $\Delta PPE_t/TA_{t-1}$									
Abnormal return in first year	0.0048	0.0128	0.0029	0.0050	0.0069	-0.0013	-0.0058	0.0035	-0.0184	-0.0426
Abnormal return in second year	0.0003	0.0150	0.0168	-0.0051	-0.0036	0.0115	-0.0034	0.0012	-0.0147	-0.0211
Abnormal return in third year	-0.0036	0.0073	0.0020	0.0019	0.0150	0.0064	-0.0062	0.0051	-0.0085	-0.0037
Return from 4 years to 1 year ago	0.0674	0.0992	0.1332	0.1481	0.1581	0.1615	0.1794	0.1940	0.2155	0.2766
Growth in sales over past 4 years	0.0674	0.0853	0.0956	0.1079	0.1115	0.1182	0.1222	0.1324	0.1524	0.1923
Major M&A activity over past year	0.1468	0.1829	0.2089	0.2327	0.2472	0.2565	0.2806	0.3061	0.3544	0.4563
	(B) Portfolios sorted by $(CAPEX_t - DEP_t)/TA_{t-1}$									
Abnormal return in first year	0.0150	0.0012	0.0127	-0.0060	-0.0099	-0.0024	-0.0041	-0.0197	-0.0099	-0.0402
Abnormal return in second year	0.0098	0.0043	-0.0028	-0.0093	0.0060	-0.0235	-0.0028	0.0020	0.0032	-0.0227
Abnormal return in third year	0.0101	-0.0052	-0.0126	-0.0102	0.0062	0.0006	-0.0001	-0.0032	0.0165	0.0181
Return from 4 years to 1 year ago	0.0801	0.1067	0.1211	0.1278	0.1421	0.1589	0.1682	0.1952	0.2198	0.2653
Growth in sales over past 4 years	0.0562	0.0719	0.0796	0.0809	0.0963	0.0965	0.1206	0.1205	0.1558	0.1964
Major M&A activity over past year	0.3070	0.3847	0.3982	0.4337	0.4352	0.4321	0.4212	0.4231	0.3655	0.3766
	(D) Portfolios sorted by $XFIN_t/TA_{t-1}$									
Abnormal return in first year	0.0236	0.0182	0.0220	0.0067	0.0015	-0.0006	-0.0028	-0.0066	-0.0376	-0.0467
Abnormal return in second year	0.0163	0.0046	0.0036	0.0018	0.0029	0.0082	-0.0034	-0.0011	-0.0099	-0.0217
Abnormal return in third year	0.0106	-0.0030	0.0067	0.0007	0.0015	0.0083	-0.0024	0.0098	-0.0015	-0.0135
Return from 4 years to 1 year ago	0.1535	0.1408	0.1296	0.1311	0.1318	0.1453	0.1488	0.1626	0.1819	0.2708
Growth in sales over past 4 years	0.0967	0.0936	0.0927	0.0970	0.0995	0.1076	0.1191	0.1312	0.1455	0.2028
Major M&A activity over past year	0.1788	0.2265	0.2212	0.2233	0.2245	0.2374	0.2655	0.2890	0.3468	0.4473

Table 4  
 Number of firms in deciles 10 and 9 from sort by growth in total assets  
 classified by source of asset growth, all stocks and large stocks

Each month from 1988 to 2004 all listed domestic U.S. nonfinancial common stocks in the intersection of the CRSP-Compustat universe and with market value of equity exceeding the bottom decile of NYSE stocks are ranked by growth in total assets ( $\frac{\Delta TA_t}{TA_{t-1}}$ ). Firms ranked in deciles 9 and 10 by asset growth are further categorized by the dominant source of the change in total assets. First firms are screened for whether they conducted an acquisition over the prior year that is at least twenty percent of the dollar change in total assets. Acquisition deal size is as measured either from the SDC Platinum database, acquisitions from the statement of cash flows, or change in the value of goodwill or intangible assets. The remaining firms not engaged in merger and acquisition activity are classified by the largest source of the change in assets (change in cash and short-term investments, change in property, plant and equipment, change in non-cash current assets, change in other long-term assets), provided that the largest source accounts for at least 10% of the change in assets. All accounting information for a stock is from the most recently ended fiscal year assuming a four-month publication delay. Results are averaged over years in the sample period.

Number of firms in category	All stocks		Large stocks	
	Decile 10	Decile 9	Decile 10	Decile 9
Total	203	203	71	72
M&A activity (from SDC)	95	74	38	29
M&A activity (multiple sources)	112	95	43	35
Asset growth from cash	51	40	12	12
Asset growth from $\Delta PPE$	13	27	6	10
Asset growth from other current assets	17	31	5	9
Asset growth from other long-term assets	9	9	4	5

Table 5  
Returns of firms in deciles 10 and 9 from sort by growth in total assets  
classified by source of asset growth, all stocks and large stocks

Each month from 1988 to 2004 all listed domestic U.S. nonfinancial common stocks in the intersection of the CRSP-Compustat universe and with market value of equity exceeding the bottom decile of NYSE stocks are ranked by growth in total assets ( $\frac{\Delta TA_t}{TA_{t-1}}$ ). Firms ranked in deciles 9 and 10 by asset growth are further categorized by the dominant source of the change in total assets. First firms are screened for whether they conducted an acquisition over the prior year that is at least twenty percent of the dollar change in total assets. Acquisition deal size is as measured either from the SDC Platinum database, acquisitions from the statement of cash flows, or change in the value of goodwill or intangible assets. The remaining firms not engaged in merger and acquisition activity are classified by the largest source of the change in assets (change in cash and short-term investments, change in property, plant and equipment, change in non-cash current assets, change in other long-term assets), provided that the largest source accounts for at least 10% of the change in assets. All accounting information for a stock is from the most recently ended fiscal year assuming a four-month publication delay. Abnormal returns (net of the return on a control portfolio of stocks matched by size and book-to-market) on the equally weighted portfolio of stocks in each category are calculated in the first, second and third years following portfolio formation. Results are averaged over years in the sample period. *t*-statistics based on the time series mean and standard deviation of portfolio returns are reported in parentheses.

(A) All stocks

Abnormal return of firms in category	First year		Second year		Third year	
	Decile 10	Decile 9	Decile 10	Decile 9	Decile 10	Decile 9
Total	-0.0752 (-3.55)	-0.0191 (-1.35)	-0.0440 (-2.53)	-0.0208 (-1.30)	0.0144 (0.65)	0.0115 (0.70)
M&A activity (from SDC)	-0.0815 (-3.11)	-0.0334 (-2.29)	-0.0579 (-3.51)	-0.0200 (-1.20)	-0.0106 (-0.42)	0.0001 (0.01)
M&A activity (multiple sources)	-0.0877 (-3.32)	-0.0308 (-2.01)	-0.0623 (-4.19)	-0.0258 (-1.71)	-0.0089 (-0.36)	0.0012 (0.07)
Asset growth from cash	0.0117 (0.25)	0.0709 (1.81)	0.0110 (0.30)	0.0294 (0.60)	0.0439 (1.00)	0.0415 (1.13)
Asset growth from $\Delta PPE$	-0.0969 (-1.39)	-0.0374 (-1.15)	-0.0746 (-3.20)	-0.0129 (-0.36)	-0.0250 (-0.80)	-0.0076 (-0.28)
Asset growth from other current assets	-0.0762 (-2.35)	-0.0661 (-2.52)	0.0480 (0.60)	-0.0157 (-0.34)	0.0005 (0.02)	0.0324 (1.22)
Asset growth from other long-term assets	-0.1650 (-7.19)	-0.0476 (-1.00)	-0.0420 (-0.82)	-0.0565 (-1.87)	0.0701 (1.99)	-0.0037 (-0.12)

(B) Large stocks

Abnormal return of firms in category	First year		Second year		Third year	
	Decile 10	Decile 9	Decile 10	Decile 9	Decile 10	Decile 9
Total	-0.0573 (-1.83)	-0.0027 (-0.15)	-0.0222 (-0.90)	-0.0155 (-1.21)	0.0247 (0.98)	0.0082 (0.46)
M&A activity (from SDC)	-0.0821 (-2.49)	-0.0283 (-1.60)	-0.0354 (-1.65)	-0.0281 (-1.68)	0.0058 (0.29)	0.0058 (0.31)
M&A activity (multiple sources)	-0.0842 (-2.60)	-0.0304 (-1.88)	-0.0381 (-1.93)	-0.0298 (-1.98)	0.0127 (0.53)	-0.0010 (-0.05)
Asset growth from cash	0.0161 (0.33)	0.1025 (2.79)	-0.0182 (-0.56)	0.0167 (0.69)	0.0896 (1.90)	0.0263 (1.15)
Asset growth from $\Delta PPE$	-0.1006 (-2.39)	-0.0495 (-1.37)	-0.0665 (-5.10)	-0.0576 (-3.10)	0.0178 (0.46)	0.0165 (0.41)
Asset growth from other current assets	0.0154 (0.48)	-0.0129 (-0.50)	0.2417 (2.07)	0.0049 (0.13)	-0.0265 (-0.91)	0.0600 (0.93)
Asset growth from other long-term assets	-0.0035 (-0.10)	0.0318 (0.84)	-0.0417 (-1.09)	0.0189 (0.71)	-0.0099 (-0.69)	-0.0396 (-2.90)

Table 6

Returns of firms in deciles 10 and 9 from sort by growth in total assets classified by source of financing and by source of asset growth, all stocks

Each month from 1988 to 2004 all listed domestic U.S. nonfinancial common stocks in the intersection of the CRSP-Compustat universe and with market value of equity exceeding the bottom decile of NYSE stocks are ranked by growth in total assets ( $\frac{\Delta TA_t}{TA_{t-1}}$ ). Firms ranked in deciles 9 and 10 by asset growth are further categorized by the primary source of financing (equity or debt), and then by the primary source of growth in assets. The dominant source of growth in assets is defined to be one of the following. First firms are screened for whether they conducted an acquisition over the prior year that is at least twenty percent of the dollar change in total assets. Acquisition deal size is as measured either from the SDC Platinum database, acquisitions from the statement of cash flows, or change in the value of goodwill or intangible assets. The remaining firms not engaged in merger and acquisition activity are classified by the largest source of the change in assets (change in cash and short-term investments, change in property, plant and equipment, change in non-cash current assets, change in other long-term assets), provided that the largest source accounts for at least 10% of the change in assets. All accounting information for a stock is from the most recently ended fiscal year assuming a four-month publication delay. Abnormal returns (net of the return on a control portfolio of stocks matched by size and book-to-market) on the equally weighted portfolio of stocks in each category are calculated in the first, second and third years following portfolio formation. Results are averaged over years in the sample period. *t*-statistics based on the time series mean and standard deviation of portfolio returns are reported in parentheses.

(A) Stocks in decile 10 by growth in total assets

Abnormal return of firms in category	First year		Second year		Third year	
	Equity	Debt	Equity	Debt	Equity	Debt
Total	-0.0928 (-3.34)	-0.0709 (-3.23)	-0.0660 (-2.19)	-0.0346 (-1.91)	0.0193 (0.56)	0.0072 (0.33)
M&A activity (from SDC)	-0.1294 (-3.70)	-0.0580 (-2.49)	-0.0894 (-4.08)	-0.0451 (-1.86)	-0.0369 (-1.13)	-0.0056 (-0.16)
M&A activity (multiple sources)	-0.1256 (-3.50)	-0.0668 (-2.72)	-0.0801 (-3.48)	-0.0551 (-2.69)	-0.0508 (-1.70)	0.0099 (0.31)
Asset growth from cash	-0.0086 (-0.15)	-0.0286 (-0.47)	-0.0145 (-0.28)	0.0256 (0.56)	0.0522 (1.15)	-0.0235 (-0.48)
Asset growth from $\Delta PPE$	-0.1144 (-2.46)	-0.1063 (-1.59)	-0.0819 (-2.03)	-0.0498 (-1.41)	-0.0483 (-0.96)	-0.0039 (-0.07)
Asset growth from other current assets	-0.1080 (-2.52)	-0.0708 (-1.21)	-0.1728 (-4.93)	0.2274 (1.23)	0.0558 (1.45)	-0.0292 (-0.48)
Asset growth from other long-term assets	-0.2632 (-6.36)	-0.0464 (-0.81)	-0.0459 (-0.76)	-0.0943 (-3.49)	0.1031 (1.87)	0.0153 (0.37)

(B) Stocks in decile 9 by growth in total assets

Abnormal return of firms in category	First year		Second year		Third year	
	Equity	Debt	Equity	Debt	Equity	Debt
Total	-0.0361 (-1.02)	-0.0497 (-4.00)	-0.0586 (-1.64)	-0.0132 (-0.88)	-0.0130 (-0.42)	0.0001 (0.01)
M&A activity (from SDC)	-0.0423 (-0.84)	-0.0207 (-1.15)	-0.0249 (-0.47)	-0.0018 (-0.08)	0.0026 (0.05)	-0.0008 (-0.04)
M&A activity (multiple sources)	-0.0208 (-0.47)	-0.0358 (-2.51)	-0.0425 (-1.09)	-0.0113 (-0.57)	-0.0134 (-0.34)	-0.0012 (-0.07)
Asset growth from cash	-0.0189 (-0.44)	-0.0404 (-0.64)	-0.0200 (-0.29)	0.0365 (0.48)	0.0050 (0.10)	0.0502 (0.80)
Asset growth from $\Delta PPE$	-0.0883 (-1.25)	-0.0669 (-2.38)	-0.0735 (-1.77)	0.0117 (0.21)	0.0033 (0.10)	-0.0259 (-0.40)
Asset growth from other current assets	-0.1162 (-2.64)	-0.1108 (-1.94)	-0.1203 (-3.54)	-0.0271 (-0.56)	-0.0450 (-0.45)	0.0519 (0.84)
Asset growth from other long-term assets	-0.0388 (-0.86)	-0.0583 (-0.98)	-0.0472 (-0.46)	-0.0629 (-3.97)	0.0990 (0.84)	-0.0183 (-0.30)

Table 7

## Regression results for future stock returns, growth in assets and financing source

Each year from 1988 to 2004 all listed domestic U.S. nonfinancial common stocks in the intersection of the CRSP-Compustat universe and with market value of equity exceeding the bottom decile of NYSE stocks are ranked by growth in total assets ( $\frac{\Delta TA_t}{TA_{t-1}}$ ). Firms ranked in the top decile by asset growth are categorized by the primary source of asset growth and also by main source of financing (equity or debt). For the categorization by source of growth we first check whether the firm engaged in major acquisition activity over the prior year, as determined by whether the SDC database reports an acquisition of at least 20% of the dollar value of the change in the firm's assets. In the absence of such information, we also screen for takeover activity amounting to at least 20% of the change in assets, as identified from either acquisitions from the statement of cash flows, or change in goodwill, or change in intangible assets). For firms with such indications we set the value of a dummy variable denoting other acquisition activity to equal one (it takes a value of zero for all other cases). For the remaining firms not engaged in merger and acquisition activity, we classify them by the largest source of the change in assets: change in cash and short-term investments, or change in operating assets (property, plant and equipment, non-cash current assets, other long-term assets), provided that the largest source accounts for at least 20% of the change in assets. The primary financing source is determined as the larger of either debt or equity as long as the item is at least 20% of the change in assets. All accounting information for a stock is from the fiscal year ending in the specific calendar year, assuming a four-month publication delay. The dependent variable in the regression is a firm's abnormal return (net of the return on a control portfolio of stocks matched by size and book-to-market) in the first year following ranking. Other regressors include the growth rate in the firm's sales per share extending up to four years before the ranking date; the stock's past rate of return beginning four years and ending one year before ranking; the stock's past rate of return over the year leading up to the ranking date. Regressions are estimated each year, and coefficients are averaged over years in the sample period. *t*-statistics based on the time series mean and standard deviation of coefficients are reported in parentheses.

*(A) Returns and growth in assets*

Equation	Intercept	SDC acquisition amount	Other acquisition dummy	Growth in cash	Growth in operating assets	Growth in sales over past 4 years	Return from 4 years ago to 1 year ago	Return over past year
(1)	-0.0006 (-0.09)	-0.1266 (-2.84)	-0.1942 (-3.00)	0.0001 (0.00)	-0.1866 (-4.00)			
(2)	0.0021 (0.52)	-0.1217 (-2.92)	-0.1181 (-1.46)	0.0343 (0.53)	-0.1687 (-3.84)	0.0147 (0.75)	-0.0528 (-1.98)	0.0432 (2.78)

*(B) Returns, growth in assets and financing*

Equation	Intercept	Merger and acquisition activity financed by:		Growth in cash financed by:		Growth in operating assets financed by:		Growth in sales over past 4 years	Return from 4 years ago to 1 year ago	Return over past year
		Equity	Debt	Equity	Debt	Equity	Debt			
(3)	-0.0003 (-0.04)	-0.1087 (-2.52)	-0.0596 (-1.94)	-0.0094 (-0.18)	0.0188 (0.26)	-0.1702 (-6.19)	-0.1220 (-2.64)			
(4)	0.0019 (0.48)	-0.0986 (-2.59)	-0.0537 (-1.70)	0.0095 (0.18)	0.0526 (0.69)	-0.1800 (-7.06)	-0.1220 (-2.52)	0.0194 (0.99)	-0.0502 (-1.91)	0.0436 (2.85)
(5)	0.0018 (0.19)	-0.0986 (-2.54)	-0.0533 (-1.65)	-0.0479 (-0.90)	0.0020 (-0.02)	-0.1795 (-6.97)	-0.1211 (-2.50)	0.0181 (0.89)	-0.0520 (-1.93)	0.0441 (2.89)

Table 8  
Returns for firms with high growth in total assets  
classified by past profitability and governance index

Each year from 1988 to 2004 all listed U.S. nonfinancial common stocks in the intersection of the CRSP-Compustat universe and with market value of equity exceeding the bottom decile of NYSE stocks are ranked by growth in total assets. Firms categorized in the top decile are further divided into groups based on past return on equity, or governance index. Abnormal returns relative to a control portfolio matched on size and book-to-market are calculated for the equally-weighted portfolio of stocks in each group over the subsequent three years. Return on equity is measured as income before extraordinary items available to common equity averaged over the prior two years divided by book value of common equity at the end of the ranking year. The groups by return on equity are: the bottom 20 percent (low), the middle 60 percent (medium), and the top 20 percent (high). The governance index is from Gomers, Ishii and Metrick (2003) and is a composite of 24 measures of shareholder rights. The three groups by governance index are: the top 30 percent (weak governance), the middle 40 percent (medium), and the bottom 30 percent (strong governance).

Sorted by	Year	Low	Medium	High	Difference
Return on equity	First year	-0.1516 (-5.14)	-0.0701 (-2.71)	-0.0081 (-0.30)	0.1435 (4.13)
	Second year	-0.0718 (-2.07)	-0.0336 (-1.83)	-0.0413 (-2.01)	0.0305 (0.75)
	Third year	0.0384 (0.88)	0.0047 (0.18)	0.0228 (0.73)	-0.0156 (-0.28)
Sorted by	Year	Weak	Medium	Strong	Difference
Governance index	First year	-0.0721 (-2.34)	0.0257 (0.73)	-0.0232 (-0.88)	0.0488 (1.41)
	Second year	-0.0173 (-0.71)	0.0036 (0.15)	-0.0171 (-0.52)	0.0001 (-0.00)
	Third year	-0.0108 (-0.38)	0.0209 (0.55)	0.0398 (1.08)	0.0506 (1.82)

Table 9  
Returns and characteristics for firms with high growth in assets  
due primarily to increase in cash and comparison sample

The sample comprises domestic U.S. nonfinancial common stocks ranked in the top decile when sorted by growth in total assets, where merger and acquisition activity represents less than twenty percent of the change in the value of total assets, and where the change in cash and short-term investments is the largest source of the change in assets and is at least 10 percent of the change in assets. Each firm in the sample is paired with a control firm not falling in the top decile by past year asset growth that is ranked most closely by growth in sales per share over the past four years, and with the closest average rank value with respect to book-to-market, market capitalization, and total assets. Equally-weighted characteristics and returns on each set of firms are calculated as of the year ending in the month of classification (year  $t$ ) and each of the three subsequent years. All accounting information for a stock is from the most recently ended fiscal year assuming a four-month publication delay. Stocks are selected every month over the sample period 1988–2004, and results are averaged over calendar years in the sample period.

Characteristic	Year	Cash growth firms	Matched firms
Book-to-market ratio	$t$	0.3013	0.3265
Size (billion \$)	$t$	1.2251	1.1938
Growth in sales per share over prior year	$t - 1$ to $t$	0.1875	0.1608
Return from 4 years ago to 1 year ago	$t - 4$ to $t - 1$	0.3604	0.2187
Return over previous year	$t$	0.3176	0.2041
Total assets (million \$)	$t$	343.2	517.5
Growth in total assets rank	$t$	0.9524	0.5302
	$t + 1$	0.5880	0.5814
	$t + 2$	0.5489	0.5652
Cash relative to total assets	$t + 3$	0.5090	0.5356
	$t$	0.5828	0.2723
	$t + 1$	0.4753	0.2595
New external financing	$t + 2$	0.4384	0.2518
	$t + 3$	0.4166	0.2528
	$t$	0.6577	0.0381
Internal financing	$t + 1$	0.1541	0.0993
	$t + 2$	0.1326	0.0903
	$t + 3$	0.1468	0.0673
Net capital expenditures relative to total assets	$t$	-0.0216	0.0228
	$t + 1$	-0.0421	0.0194
	$t + 2$	-0.0518	0.0250
Incidence of M&A activity	$t + 3$	-0.0553	0.0292
	$t$	0.0781	0.0353
	$t + 1$	0.0636	0.0396
Incidence of major M&A activity	$t + 2$	0.0415	0.0309
	$t + 3$	0.0296	0.0342
	$t$	0.2582	0.4047
R&D relative to sales	$t + 1$	0.3382	0.3452
	$t + 2$	0.2631	0.2837
	$t + 3$	0.2166	0.2366
Abnormal return	$t$	0.2390	0.2193
	$t + 1$	0.1636	0.2233
	$t + 2$	0.1341	0.1553
	$t + 3$	0.1341	0.1408
	$t$	0.2765	0.1813
	$t + 1$	0.2881	0.1842
	$t + 2$	0.2845	0.1733
	$t + 3$	0.2874	0.1631
	$t + 1$	0.0117	0.0040
	$t + 2$	0.0110	0.0556
	$t + 3$	0.0439	0.0117

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Cash relative to total assets is the ratio of cash and equivalents at the end of year  $t$  to total assets at the end of year  $t - 1$ . New external financing is the sum of new equity financing (sale of common and preferred stock minus purchases of common and preferred stock minus cash dividends) plus new debt financing (issuance of long-term debt minus reduction in long-term debt plus changes in current debt, all over year  $t$ , relative to total assets at the end of year  $t$ ). Internal financing is net income before extraordinary items available for common at time  $t$  relative to total assets at the end of year  $t - 1$ . Net capital expenditures is capital expenditures minus depreciation and amortization expense over year  $t$  from the statement of cash flows, relative to total assets at the end of year  $t - 1$ . Merger and acquisition activity is taken from the Securities Data Corporation Platinum database. A business combination is counted as a major transaction if the deal size from the SDC Platinum database or acquisition amount from the statement of cash flows is at least five percent of total assets at the end of the prior year. Abnormal returns are buy-and-hold returns minus the buy-and-hold return on a portfolio of stocks matched by size and book-to-market.

Table 10  
Returns and characteristics for portfolios sorted by net operating assets (*NOA*) relative to total assets (*TA*)

Each month from 1968 to 2004 all listed domestic U.S. nonfinancial common stocks in the intersection of the CRSP-Compustat universe and with market value of equity exceeding the bottom decile of NYSE stocks are ranked by net operating assets ( $NOA_t$ ) relative to a measure of total assets and assigned to decile portfolios. In part 1, total assets are measured as of the end of the preceding fiscal year ( $TA_{t-1}$ ), while in part 2 total assets are measured as of the end of the most recently-ended fiscal year as of the ranking date ( $TA_t$ ). All stocks are equally weighted in a portfolio. Returns on the portfolio are reported over each of the following three years, as well as abnormal returns (in excess of the return on a control portfolio matched on size and book-to-market value of equity). Characteristics of the portfolio at the formation date and in subsequent years are also reported. All accounting information for a stock is from the most recently ended fiscal year assuming a four-month publication delay. Results are averaged over years in the sample period.

**Part 1. Net operating assets relative to prior year total assets**

	1	2	3	4	5	6	7	8	9	10
	Low									High
	(A) Returns over post-formation years									
Return in first year	0.1424	0.1549	0.1619	0.1528	0.1501	0.1470	0.1325	0.1207	0.1062	0.0608
Return in second year	0.1603	0.1627	0.1730	0.1723	0.1640	0.1523	0.1407	0.1360	0.1191	0.0909
Return in third year	0.1543	0.1574	0.1633	0.1564	0.1552	0.1568	0.1528	0.1437	0.1446	0.1053
Abnormal return in first year	0.0101	0.0147	0.0203	0.0101	0.0075	0.0060	-0.0026	-0.0158	-0.0245	-0.0657
t-statistic	0.73	1.73	2.83	1.69	1.28	0.96	-0.53	-3.05	-2.95	-4.47
Abnormal return in second year	0.0120	0.0083	0.0140	0.0115	0.0034	-0.0016	-0.0105	-0.0121	-0.0245	-0.0475
t-statistic	0.86	0.94	1.74	1.70	0.65	-0.29	-1.68	-1.85	-2.78	-4.94
Abnormal return in third year	0.0178	0.0126	0.0146	0.0108	0.0052	0.0068	0.0044	-0.0004	-0.0017	-0.0367
t-statistic	1.07	1.52	1.88	1.27	0.84	0.90	0.58	-0.05	-0.16	-3.21
	(B) Characteristics									
Book-to-market ratio	0.5974	0.7016	0.7416	0.7482	0.7628	0.7477	0.7326	0.6942	0.6742	0.5954
Size (billion \$)	1.2072	1.5682	2.2797	2.6232	2.5505	2.0105	1.8157	1.4515	1.2434	1.2042
Growth in sales over past 4 years	0.1091	0.1070	0.1025	0.1056	0.1113	0.1159	0.1298	0.1467	0.1747	0.2529
Return from 4 years ago to 1 year ago	0.1292	0.1156	0.1169	0.1203	0.1267	0.1277	0.1466	0.1673	0.1900	0.2754
Return over past year	0.1272	0.1330	0.1353	0.1267	0.1322	0.1318	0.1336	0.1394	0.1335	0.1497
Incidence of M&A activity over past year	0.2196	0.2714	0.2782	0.2971	0.3107	0.3178	0.3362	0.3604	0.4000	0.5390
Incidence of major M&A activity over past year	0.1208	0.1555	0.1648	0.1768	0.1975	0.2206	0.2423	0.2723	0.3329	0.4721
	(C) Assets and growth in assets									
$NOA_t/TA_{t-1}$	0.3358	0.5420	0.6307	0.6899	0.7374	0.7817	0.8270	0.8840	0.9714	1.2984
$NOA_t/TA_t$	0.3294	0.5205	0.6002	0.6500	0.6856	0.7177	0.7421	0.7675	0.7920	0.7798
Growth in total assets over prior year	0.0772	0.0673	0.0688	0.0752	0.0867	0.0997	0.1261	0.1654	0.2444	0.5831
Rank by $NOA_t/TA_{t-1}$ in first year	0.1295	0.2438	0.3413	0.4121	0.4900	0.5491	0.6102	0.6675	0.7375	0.7404
Rank by $NOA_t/TA_{t-1}$ in second year	0.1630	0.2743	0.3649	0.4242	0.4885	0.5391	0.5871	0.6393	0.6979	0.6928
Rank by $NOA_t/TA_{t-1}$ in third year	0.1855	0.2907	0.3770	0.4267	0.4793	0.5359	0.5696	0.6220	0.6761	0.6703

**Part 2. Net operating assets relative to current year total assets**

	1	2	3	4	5	6	7	8	9	10
	Low									High
	(A) Returns over post-formation years									
Return over first year	0.1379	0.1488	0.1497	0.1428	0.1333	0.1371	0.1318	0.1238	0.1239	0.1000
Return over second year	0.1486	0.1511	0.1513	0.1656	0.1667	0.1440	0.1480	0.1442	0.1339	0.1141
Return over third year	0.1448	0.1594	0.1650	0.1534	0.1502	0.1478	0.1416	0.1485	0.1524	0.1253
Abnormal return over first year	0.0065	0.0125	0.0121	0.0052	-0.0056	-0.0017	-0.0095	-0.0151	-0.0104	-0.0346
t-statistic	0.45	1.34	1.51	0.79	-0.91	-0.24	-1.50	-2.55	-1.57	-2.99
Abnormal return over second year	0.0060	0.0033	-0.0007	0.0082	0.0071	-0.0087	-0.0041	-0.0114	-0.0179	-0.0287
t-statistic	0.41	0.37	-0.10	1.16	1.03	-1.56	-0.64	-1.54	-2.67	-2.42
Abnormal return over third year	0.0109	0.0171	0.0210	0.0074	0.0050	-0.0043	-0.0098	-0.0034	0.0050	-0.0169
t-statistic	0.68	1.67	2.16	0.91	0.64	-0.56	-1.21	-0.44	0.48	-1.31
	(B) Characteristics									
Book-to-market ratio	0.5191	0.6065	0.6434	0.6818	0.7134	0.7310	0.7578	0.7655	0.7775	0.8007
Size (billion \$)	1.2322	1.6049	2.1705	2.8975	2.7090	2.1029	1.9451	1.3184	1.0460	0.9272
Growth in sales over past 4 years	0.1491	0.1355	0.1308	0.1242	0.1200	0.1205	0.1238	0.1252	0.1367	0.1494
Return from 4 years ago to 1 year ago	0.1857	0.1690	0.1677	0.1541	0.1518	0.1416	0.1374	0.1356	0.1426	0.1302
Return over past year	0.1599	0.1646	0.1534	0.1508	0.1308	0.1290	0.1240	0.1208	0.1105	0.0990
Incidence of M&A activity over past year	0.2426	0.3051	0.3236	0.3427	0.3614	0.3723	0.3750	0.3617	0.3505	0.2962
Incidence of major M&A activity over past year	0.1505	0.2022	0.2175	0.2370	0.2493	0.2622	0.2654	0.2642	0.2659	0.2418
	(C) Assets and growth in assets									
$NOA_t/TA_{t-1}$	0.3802	0.5966	0.6804	0.7324	0.7751	0.8146	0.8533	0.8910	0.9426	1.0324
$NOA_t/TA_t$	0.3012	0.4937	0.5768	0.6321	0.6735	0.7077	0.7395	0.7715	0.8098	0.8786
Growth in total assets over prior year	0.2230	0.1803	0.1619	0.1460	0.1397	0.1395	0.1429	0.1433	0.1531	0.1655
Rank by $NOA_t/TA_t$ in first year	0.0980	0.2120	0.3042	0.3912	0.4723	0.5433	0.6243	0.7071	0.7939	0.9109
Rank by $NOA_t/TA_t$ in second year	0.1311	0.2454	0.3332	0.4115	0.4760	0.5389	0.6132	0.6804	0.7651	0.8898
Rank by $NOA_t/TA_t$ in third year	0.1570	0.2706	0.3499	0.4220	0.4789	0.5376	0.6000	0.6639	0.7435	0.8729