Balance Sheet Information and Future Stock Returns

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Abstract: Numerous studies have documented that the most recent annual change in net operating assets is negatively related to future stock returns. In recent work, Hirshleifer, Hou, Teoh and Zhang (2004) show that the level of net operating assets scaled by the previous year's total assets is also negatively related to future returns. They argue that their levels variable is superior to the change variable used in prior research because it picks up cumulative past changes, rather than just the most recent annual change. We point out that deflation of a level by a lagged level produces a change. As such, their level variable is similar to the change variable used in prior research, and their claim that it picks up cumulative past changes in net operating assets is misleading.

1. Introduction

Prior research documents that the most recent annual change in net operating assets predicts future earnings and stock returns. For example, Sloan (1996) shows that the most recent annual change in non-cash working capital is negatively related to future accounting rates of return and future stock returns. Subsequent research by Fairfield, Whisenant and Yohn (2003) and Richardson, Sloan, Soliman and Tuna (2005) shows that Sloan's results extend to the most recent annual change in net operating assets.

A recent paper by Hirshleifer, Hou, Teoh and Zhang (2004) (HHTZ hereafter) argues that the level of net operating assets (NOA hereafter) is a superior predictor of future earnings and stock returns. In an intuitively appealing argument, HHTZ suggest that the level of NOA picks up all cumulative past difference between operating income and free cash flow. They argue that the most recent annual change in NOA is only a fragmentary indicator of these differences, and that the level of NOA provides a more comprehensive measure (HHTZ, p. 300). They further ague that:

> "A stock measure is also simpler, as it derives from the current year balance sheet, whereas a flow measure is calculated as a difference across years in balance sheet numbers." (HHTZ, p.300, footnote 5)

In support of their argument, they estimate a number of regressions using the level of NOA deflated by lagged total assets as their measure of the level of NOA. The empirical results support their prediction that this variable is a robust predictor of future earnings performance and stock returns.

Our primary objective in this note is to make a simple point. A level deflated by a lagged level is equivalent to a change. As such, HHTZ's claim that their measure is more comprehensive because it picks up the cumulative amount of past changes is incorrect. Similar to previous research, their variable essentially just measures the most recent annual change in net operating assets.

We show that HHTZ's measure differs in subtle ways from the change in net operating variable used in previous research. As such, its ability to predict future earnings and stock returns differs somewhat from the measures used in previous research. The signs and the magnitudes of these differences depend on the sample period and research design. We emphasize that these differences cannot be attributed to the ability of HHTZ's variable to capture cumulative past changes in NOA. Rather, it is just an alternative way of capturing the most recent annual change in NOA.

We close by briefly presenting some empirical results that illustrate our point. First, we show that most of the explanatory power of HHTZ's levels variable with respect to future returns comes from the most recent annual change in NOA. Second, we show that most of the variation in HHTZ's levels variable is attributable to the most recent annual change in NOA. Third, we show that contrary to HHTZ's conclusion, lagged changes in NOA contribute relatively little to the prediction of future stock returns.

2. Levels versus changes

Our basic point in this section is that when a level is deflated by a lagged level, it is a change. Any changes that occur in the level variable prior to the date of the lagged level are present in both the level and the lagged level. These changes cancel out when we deflate the level by the lagged level. Thus, it is incorrect to claim that a level deflated by a lagged level picks up the cumulative effect of all past changes in the level. Instead, it only picks up changes occurring between the date of the lagged level and the level. Algebraically, for any variable X:

$$\frac{X_t}{X_{t-1}} = 1 + \frac{X_t - X_{t-1}}{X_{t-1}}$$

While X_t measures cumulative past changes in X for the prior t periods, this equation shows us that X_t/X_{t-1} only measures the percentage change in X between t-1 and t. Note that the choice of the lagged level as a deflator is key to generating this result. This is because the lagged level contains all the changes in X that occur prior to period t-1. To emphasize this point, note that if we were to deflate X_t by X_{t-2}, then the resulting variable would measure the percentage change in X between t-2 and t.

The above point is critical to the interpretation of the results in the HHTZ paper. They measure the level of NOA as:

$$\frac{NOA_t}{A_{t-1}}$$

where A_{t-1} represents total assets at time t-1. Previous research measures the change in NOA as:

$$\frac{NOA_t - NOA_{t-1}}{A_{t-1}}$$

At first glance, we can see that the situation is a little more complicated than the simple situation of a level deflated by a lagged level, because the level of NOA is deflated by lagged total assets instead of lagged NOA. However, the same basic point applies, because net operating assets represent a major component of total assets. So deflation by lagged total assets eliminates cumulative past changes in NOA. We can demonstrate this point with some simple algebra. First, following previous research, we define NOA as:

NOA = OA – OL = A – Cash – OL

where

OA = Operating Assets

OL = Operating Liabilities

A = Total Assets

Cash = Cash and Short-Term Investments

Thus, we can rewrite HHTZ's measure of the level of NOA as:

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

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

In words, we subtract lagged NOA from HHTZ's measure to arrive at the change measure used in previous research, and simultaneously add back an offsetting lagged NOA term to bring us back to HHTZ's measure. Next, we decompose lagged NOA into lagged total assets, lagged operating liabilities and lagged cash. Because all these terms are deflated by lagged assets, the lagged assets variable reduces to a constant equal to one. In other words, changes in total assets taking place prior to period t-1 are not captured by HHTZ's variable. Their choice of lagged assets as a deflator eliminates this source of variation. Richardson, Sloan, Soliman and Tuna (2005) find that much of the predictive power of the change in NOA with respect to future earnings and stock returns comes from the change in assets. HHTZ's decision to deflate NOA by lagged assets eliminates cumulative past changes in assets from their measure. Thus, their claim that their measure is more comprehensive because it picks up cumulative past changes in NOA is misleading. Instead, their measure eliminates cumulative past changes in the most important component of NOA – assets. Consequently, their measure does not capture the cumulative past difference between earnings and cash flows.

The above equation shows us that HHTZ's measure can be expressed as a linear combination of the one-period change in NOA variable used in prior research, the lagged level of cash deflated by lagged assets and the lagged level of operating liabilities deflated by lagged assets. It is possible that the incorporation of the two additional variables enhances the predictive ability of HHTZ's measure with respect to future stock returns. We provide empirical evidence on this issue in the next section. But it is important to note that even if their measure were better at predicting future stock returns, the explanation cannot lie in its ability to capture cumulative past differences between earnings and cash flows. Consequently, the explanation offered in HHTZ is misleading and their contribution to previous research is unclear.

3. Empirical Analysis

Our objective in this section is to document several robust empirical regularities that highlight the intuition behind the algebra in the previous section. First, we show that variation in the change in NOA variable used in previous research is the primary source of variation and return predictability in HHTZ's measure. Second, we show that variation in the change in assets is the primary source of variation and return predictability in the change in NOA. This finding is important, because HHTZ's choice of lagged assets as their deflator eliminates cumulative past changes in assets from their measure. Since the change in NOA is primarily attributable to change in assets, the elimination of cumulative past changes in assets essentially leads to the elimination of cumulative past changes in NOA.[1] Thus, HHTZ's measure simply serves as a proxy for the most recent annual change in NOA variable used in prior research. Finally, we directly examine the correlations between lagged changes in NOA and future stock returns. These correlations indicate that past changes in NOA have little predictive ability with respect to future stock returns. These results confirm that the predictive ability of HHTZ's measure with respect to future stock returns cannot be attributable to cumulative past changes in NOA.

Our empirical analysis uses the same definitions as HHTZ. Specifically, we measure scaled net operating assets (NOA) as the difference between operating assets (OA) and operating liabilities (OL), all scaled by lagged total assets. Operating assets (OA) are calculated as the difference between total assets (Compustat item 6) and cash & short-term investments (Compustat item 1). Operating liabilities (OL) are defined as total liabilities (Compustat item 181) less long-term debt (Compustat Item 9) less short-term debt (Compustat Item 34) less minority interest (Compustat Item 38). We winsorize all financial statement data at the extreme percentiles.[2] Our stock return tests use data from the *CRSP* monthly files. Future size-adjusted returns are measured using compounded buy-hold returns, inclusive of dividends and other distributions and adjusted for delisting returns. The size adjustment is incorporated by

[1] In other words, this result shows that past changes in NOA are primarily attributable to past changes in assets as opposed to past changes in operating liabilities or past changes in cash.
[2] Results are similar if we instead restrict all financial statement variables to be less than one in absolute value.

subtracting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. All stock returns are measured over the twelve-month period beginning four months after the end of the fiscal year. Our sample period covers all firm-years with available data on *Compustat* and *CRSP* for 1951-2004 period. These criteria yield a final sample size with non-missing financial statement and returns data of 157,037 firm-year observations.

Table 1 reports our first set of results. This table reports correlations between HHTZ's variable, its underlying components, and future stock returns. Following our earlier algebraic decomposition, HHTZ's NOA measure can be decomposed as follows:

$$\frac{NOA_t}{A_{t-1}} = \frac{\Delta NOA_t}{A_{t-1}} + 1 - \frac{OL_{t-1}}{A_{t-1}} - \frac{Cash_{t-1}}{A_{t-1}}$$

And the change in NOA component can be further decomposed as follows:

$$\frac{\Delta NOA_t}{A_{t-1}} = \frac{\Delta A_t}{A_{t-1}} - \frac{\Delta Cash_t}{A_{t-1}} - \frac{\Delta OL_t}{A_{t-1}}$$

Table 1 reports correlations for the first of these decompositions. There are two important takeaways from this table. First, of the three components of the level of NOA decomposition, the change in NOA is most highly correlated with the level of NOA. The Pearson (Spearman) correlation between NOA_t/A_{t-1} and $\Delta NOA_t/A_{t-1}$ is 0.520 (0.591), while the correlation between NOA_t/A_{t-1} and $Cash_{t-1}/A_{t-1}$ is -0.427 (-0.362) and the correlation between NOA_t/A_{t-1} and OL_{t-1}/A_{t-1} is -0.454 (-0.317). Second, the change in NOA has by far the highest correlation with future abnormal stock returns. The Pearson (Spearman) correlation between Ret_{t+1} and $\Delta NOA_t/A_{t-1}$ is -0.082 (-0.100), while the correlation between Ret_{t+1} and $Cash_{t-1}/A_{t-1}$ is 0.025 (-0.034) and the correlation between Ret_{t+1} and OL_{t-1}/A_{t-1} is -0.009 (0.020). It is particularly noteworthy that the correlation between the change in NOA and future returns is even stronger than the correlation between the HHTZ's level of NOA variable and future returns (Pearson correlation=-0.074; Spearman Correlation=-0.079). In summary, the results for the first decomposition indicate that the change in NOA is the primary determinant of variation in HHTZ's levels measure, and the change in NOA is the primary predictor of future stock returns.

Our second decomposition takes a closer look at the change in NOA variable used in prior research, decomposing it into asset changes, cash changes and operating liability changes. The purpose of this decomposition is to show that the change in assets is the primary driver of the change in NOA and is also the main predictor of future stock returns. This analysis is important given that HHTZ used lagged assets as their deflator. If they had used lagged NOA as their deflator, then their measure would have captured only the most recent annual change in NOA and all prior changes in NOA would have been eliminated. In contrast, they use lagged total assets as their deflator, which eliminates cumulative past changes in assets, but does not eliminate cumulative past changes in operating liabilities and cash. The second decomposition allows us to determine the relative contributions of the change in assets, the change in operating liabilities and the change in cash to the change in NOA. Finding a high correlation between $\Delta NOA_t/A_{t-1}$ and $\Delta A_{t-1}/A_{t-1}$ and simultaneously finding low correlations between $\Delta NOA_t/A_{t-1}$ and both $\Delta OL_t/A_{t-1}$ and $\Delta Cash_t/A_{t-1}$ indicates that changes in assets are the primary determinant of contemporaneous changes in NOA. Such a finding is important because it means that HHTZ's measure effectively eliminates cumulative past changes in NOA.

Table 2 reports correlations for the second decomposition. There are two important takeaways from this table. First, of the three components of the change in NOA decomposition, the change in assets is most highly correlated with the change in NOA. The Pearson (Spearman) correlation between $\Delta NOA_t/A_{t-1}$ and $\Delta A_t/A_{t-1}$ is 0.748 (0.706), while the correlation between $\Delta NOA_t/A_{t-1}$ and $\Delta Cash_t/A_{t-1}$ is 0.150 (-0.095) and the correlation between $\Delta NOA_t/A_{t-1}$ and $\Delta OL_t/A_{t-1}$ is 0.263 (0.218). Second, $\Delta A_t/A_{t-1}$ has by far the highest correlation with future abnormal stock returns. The Pearson (Spearman) correlation between Ret_{t+1} and $\Delta A_t/A_{t-1}$ is -0.089 (-0.083), while the correlation between Ret_{t+1} and $\Delta Cash_t/A_{t-1}$ is -0.049 (-0.012) and the correlation between Ret_{t+1} and $\Delta OL_t/A_{t-1}$ is -0.041 (-0.022). Again, it is particularly noteworthy that the Pearson correlation between $\Delta A_t/A_{t-1}$ future returns is even stronger than that between $\Delta NOA_t/A_{t-1}$ (which, in turn, is stronger than the HHTZ measure) and future returns. In summary, the results for the second decomposition indicate that the change in assets is the primary determinant of the change in NOA, and is also primarily responsible for predicting future stock returns. Recall that HHTZ's measure eliminates cumulative past changes in assets beyond one lag, thus their claim that their measure picks up cumulative past changes in NOA is misleading.

Our empirical analysis thus far indicates that HHTZ's level of NOA variable is basically just a proxy for the change in NOA variable used in previous research. As such, the results in both HHTZ and tables 1 and 2 of this paper shed little light on the ability of cumulative past changes in NOA to predict future returns. Since HHTZ conjecture that cumulative past changes in NOA will be superior to the most recent past change in NOA at predicting future stock returns, we finish by providing more direct evidence on this issue. We do so by directly computing a measure of the cumulative past change in NOA as follows:

$$\frac{\Delta_\tau NOA_t}{A_{t-\tau}} = \frac{NOA_t - NOA_{t-\tau}}{A_{t-\tau}}$$

This measure directly computes the change in NOA over the past τ periods. Note that with $\tau=1$, this measure is just the one-year change in NOA variable used in prior research. We report results for values of τ from 1 year through 5 years. Unreported tests confirm that the general tenor of our results holds for values of τ though 10 years.

Our results are presented in table 3. This table reports correlations between HHTZ's level of NOA variable, the one-year change in NOA variable used in previous research, our cumulative change in NOA variable for values of τ from 2 through 5, and future annual stock returns. The key takeaway from this table is that the correlation between the change in NOA and future stock returns is strongest for low values of τ and gets weaker as τ increases. Focusing first on the Pearson correlations, the highest return correlation is observed using the one-year change in NOA and the correlations decline steadily as we add cumulative past changes in NOA. The Spearman correlations tell a similar story, with the two-year change in NOA having the highest correlation and the correlations declining steadily thereafter. In short, incorporating cumulative past changes in NOA from more than the most recent 2 years reduces the ability of the resulting change in NOA variable to predict future stock returns. This result is in direct conflict with HHTZ's claim that incorporating cumulative past changes in NOA increases predictive ability with respect to future stock returns. Table 3 also provides additional evidence supporting our earlier claim that HHTZ's level of NOA measure is ineffective in capturing the cumulative past change in NOA. Specifically, this table reports the correlations between HHTZ's level of NOA variable and our direct measure of the cumulative past change in NOA for $\tau=2$ through 5. HHTZ's variable is most highly correlated with the one-year change in NOA variable, and the correlation between HHTZ's measure and cumulative past change in NOA gradually decreases as we cumulate changes in NOA from earlier periods. This evidence corroborates our earlier conclusion that HHTZ's levels variable simply proxies for the one-year change variable of prior research.

5. Conclusion

HHTZ conjecture that the cumulative past changes in NOA should be superior to the most recent annual change in NOA at predicting future stock returns. In support of their conjecture, they demonstrate that NOA divided by one-year lagged assets is a robust predictor of future stock returns. We argue that their measure is basically a level deflated by a one-year lagged level, and as such, simply serves a proxy for the one-year change variable used in prior research. We present algebra and empirical results supporting our argument. We also directly address the issue of whether past changes in NOA are useful in predicting future stock returns. We find that incorporating cumulative past changes in NOA leads to a reduction in predictive ability with respect to future stock returns. We conclude that HHTZ's conclusions about the importance of cumulative past changes in NOA for predicting future returns are incorrect.

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TABLE 1
Descriptive Statistics and Correlations for Level of NOA Decomposition

Panel A: Descriptive Statistics

	Mean	Std. Dev.	25%	Median	75%
NOA_t/A_{t-1}	0.645	0.292	0.496	0.703	0.858
$\Delta NOA_t/A_{t-1}$	0.103	0.253	-0.019	0.051	0.161
$Cash_{t-1}/A_{t-1}$	0.142	0.182	0.026	0.070	0.181
OL_{t-1}/A_{t-1}	0.330	0.242	0.175	0.266	0.406
Ret_{t+1}	0.185	0.831	-0.207	0.070	0.383

Panel B: Correlations (Pearson above diagonal)

	NOA_t/A_{t-1}	**$\Delta NOA_t/A_{t-1}$**	**$Cash_{t-1}/A_{t-1}$**	**OL_{t-1}/A_{t-1}**	**Ret_{t+1}**
NOA_t/A_{t-1}	--	0.520 *(0.0001)*	-0.427 *(0.0001)*	-0.454 *(0.0001)*	-0.074 *(0.0001)*
$\Delta NOA_t/A_{t-1}$	0.591 *(0.0001)*	--	0.099 *(0.0001)*	0.147 *(0.0001)*	-0.082 *(0.0001)*
$Cash_{t-1}/A_{t-1}$	-0.362 *(0.0001)*	0.099 *(0.0001)*	--	-0.048 *(0.0001)*	0.025 *(0. 2991)*
OL_{t-1}/A_{t-1}	-0.317 *(0.0001)*	0.123 *(0.0001)*	-0.020 *(0.0001)*	--	-0.009 *(0.0004)*
Ret_{t+1}	-0.079 *(0.0001)*	-0.100 *(0.0001)*	-0.034 *(0.0001)*	0.020 *(0.0001)*	--

The sample consists of 157,037 firm-years from 1951 to 2004.
Net Operating Assets (NOA) is defined as the difference between operating assets (OA) and operating liabilities (OL), all scaled by lagged total assets (A). Operating assets (OA) are calculated as the difference between total assets (Compustat item 6) and cash & short-term investments ('Cash' - Compustat item 1). Operating liabilities (OL) are defined as total liabilities (Compustat item 181) less long-term debt (Compustat Item 9) less short-term debt (Compustat Item 34) less minority interest (Compustat Item 38). ΔNOA_t denotes $NOA_t - NOA_{t-1}$.
Ret_{t+1} is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. The return cumulation period begins four months after the end of fiscal year t.

TABLE 2
Descriptive Statistics and Correlations for Change in NOA Decomposition

Panel A: Descriptive Statistics

	Mean	Std. Dev.	25%	Median	75%
NOA_t/A_{t-1}	0.645	0.292	0.496	0.703	0.858
$\Delta NOA_t/A_{t-1}$	0.103	0.253	-0.019	0.051	0.161
$\Delta A_t\ /A_{t-1}$	0.164	0.313	-0.002	0.092	0.616
$\Delta Cash_t\ /A_{t-1}$	0.039	0.204	-0.019	0.003	0.039
$\Delta OL_t\ A_{t-1}$	0.055	0.157	-0.006	0.025	0.076
Ret_{t+1}	0.185	0.831	-0.207	0.070	0.383

Panel B: Correlations (Pearson above diagonal)

	NOA_t/A_{t-1}	$\Delta NOA_t/A_{t-1}$	$\Delta A_t/A_{t-1}$	$\Delta Cash_t/A_{t-1}$	$\Delta OL_t/A_{t-1}$	Ret_{t+1}
NOA_t/A_{t-1}	--	0.520 *(0.0001)*	0.333 *(0.0001)*	-0.011 *(0.0001)*	0.022 *(0.0001)*	-0.074 *(0.0001)*
$\Delta NOA_t/A_{t-1}$	0.591 *(0.0001)*	--	0.748 *(0.0001)*	0.150 *(0.0001)*	0.263 *(0.0001)*	-0.082 *(0.0001)*
$\Delta A_t/A_{t-1}$	0.434 *(0.0001)*	0.706 *(0.0001)*	--	0.581 *(0.0001)*	0.576 *(0.0001)*	-0.089 *(0.0001)*
$\Delta Cash_t/A_{t-1}$	0.003 *(0.2966)*	-0.095 *(0.0001)*	0.0381 *(0.0001)*	--	0.291 *(0. 0001)*	-0.049 *(0.0001)*
$\Delta OL_t/A_{t-1}$	0.097 *(0.0001)*	0.218 *(0.0001)*	0.615 *(0.0001)*	0.206 *(0.0001)*	--	-0.041 *(0.0001)*
Ret_{t+1}	-0.079 *(0.0001)*	-0.010 *(0.0001)*	-0.083 *(0.0001)*	-0.012 *(0.0001)*	-0.022 *(0.0001)*	--

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Ret_{t+1} is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. The return cumulation period begins four months after the end of fiscal year t.

TABLE 3
Descriptive Statistics and Correlations for Direct Measures of Cumulative Past Change in NOA

Panel A: Descriptive Statistics

	Mean	**Std. Dev.**	**25%**	**Median**	**75%**
$\mathbf{NOA_t/A_{t-1}}$	0.645	0.292	0.496	0.703	0.858
$\mathbf{\Delta_1 NOA_t / A_{t-1}}$	0.103	0.253	-0.019	0.051	0.161
$\mathbf{\Delta_2 NOA_t / A_{t-2}}$	0.197	0.351	-0.011	0.117	0.334
$\mathbf{\Delta_3 NOA_t / A_{t-3}}$	0.273	0.404	0.007	0.190	0.514
$\mathbf{\Delta_4 NOA_t / A_{t-4}}$	0.337	0.441	0.029	0.270	0.700
$\mathbf{\Delta_5 NOA_t / A_{t-5}}$	0.387	0.471	0.047	0.351	0.889
$\mathbf{Ret_{t+1}}$	0.185	0.831	-0.207	0.070	0.383

Panel B: Correlations (Pearson above diagonal)

	$\mathbf{NOA_t/A_{t-1}}$	$\mathbf{\Delta_1 NOA_t / A_{t-1}}$	$\mathbf{\Delta_2 NOA_t / A_{t-2}}$	$\mathbf{\Delta_3 NOA_t / A_{t-3}}$	$\mathbf{\Delta_4 NOA_t / A_{t-4}}$	$\mathbf{\Delta_5 NOA_t / A_{t-5}}$	$\mathbf{Ret_{t+1}}$
$\mathbf{NOA_t/A_{t-1}}$	--	0.520 *(0.0001)*	0.490 *(0.0001)*	0.476 *(0.0001)*	0.471 *(0.0001)*	0.459 *(0.0001)*	-0.074 *(0.0001)*
$\mathbf{\Delta_1 NOA_t / A_{t-1}}$	0.590 *(0.0001)*	--	0.732 *(0.0001)*	0.571 *(0.0001)*	0.467 *(0.0001)*	0.377 *(0.0001)*	-0.083 *(0.0001)*
$\mathbf{\Delta_2 NOA_t / A_{t-2}}$	0.540 *(0.0001)*	0.750 *(0.0001)*	--	0.827 *(0.0001)*	0.680 *(0.0001)*	0.565 *(0.0001)*	-0.082 *(0.0001)*
$\mathbf{\Delta_3 NOA_t / A_{t-3}}$	0.507 *(0.0001)*	0.601 *(0.0001)*	0.838 *(0.0001)*	--	0.869 *(0.0001)*	0.736 *(0.0001)*	-0.068 *(0.0001)*
$\mathbf{\Delta_4 NOA_t / A_{t-4}}$	0.486 *(0.0001)*	0.504 *(0.0001)*	0.703 *(0.0001)*	0.879 *(0.0001)*	--	0.890 *(0.0001)*	-0.059 *(0.0001)*
$\mathbf{\Delta_5 NOA_t / A_{t-5}}$	0.462 *(0.0001)*	0.427 *(0.0001)*	0.603 *(0.0001)*	0.758 *(0.0001)*	0.898 *(0.0001)*	--	-0.057 *(0.0001)*
$\mathbf{Ret_{t+1}}$	-0.079 *(0.0001)*	-0.099 *(0.0001)*	-0.105 *(0.0001)*	-0.096 *(0.0001)*	-0.081 *(0.0001)*	-0.073 *(0.0001)*	--

The sample consists of 157,037 firm-years from 1951 to 2004.
Net Operating Assets (NOA) is defined as the difference between operating assets (OA) and operating liabilities (OL), all scaled by lagged total assets (A). Operating assets (OA) are calculated as the difference between total assets (Compustat item 6) and cash & short-term investments ('Cash' - Compustat item 1). Operating liabilities (OL) are defined as total liabilities (Compustat item 181) less long-term debt (Compustat Item 9) less short-term debt (Compustat Item 34) less minority interest (Compustat Item 38). $\Delta_\tau X_t$ denotes $X_t - X_{t-\tau}$.
Ret_{t+1} is the annual buy-hold size-adjusted return. The size-adjusted return is calculated by deducting the value-weighted average return for all firms in the same size-matched decile, where size is measured as market capitalization at the beginning of the return cumulation period. The return cumulation period begins four months after the end of fiscal year t.