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REVERSION OF RNOA AND ITS COMPONENTS

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ABSTRACT

Prior research documents the reversion to a mean value over time of returns on assets and equity and increasing rates of reversion for firms that are farther from the mean and for poorly performing firms. Researchers have also begun to explore factors that may have predictive ability for expected reversion, such as changes in the profit margin and asset turnover, in an effort to increase forecasting accuracy. My study adds to this line of research and provides a comprehensive investigation of the reversion characteristics of the components of both the numerator and the denominator of the returns ratio. I find that the observed reversion of returns is associated with reversions of both its numerator and its denominator. I also find that components of earnings in the numerator and net assets in the denominator exhibit differing rates of reversion and that these differences in the rates of reversion of the income statement and balance sheet components can be exploited to improve forecasts of the return ratio.

1. Introduction

Nissim and Penman [2001] present evidence that the return on net operating assets (RNOA) exhibits a pattern of reversion to a mean value over time. Freeman, Ohlson, and Penman [1982] and Fama and French [2000] report similar patterns of reversion for the return on equity (ROE) and the return on assets (ROA). This line of research also documents that the rate of reversion is greater for portfolios of firms that report initial returns that are further from the mean and for those firms that are performing poorly. The objective of my study is to further investigate the reversion of RNOA by examining the reversion characteristics of its income statement and balance sheet components and to explore the extent to which an understanding of the reversion characteristics of the RNOA components is useful in forecasting future values of RNOA.¹

Understanding the process of the reversion of RNOA may be helpful in predicting its future values and, therefore, in estimating the price of the firm's equity securities. The residual operating income (ROPI) equity valuation model for, example, models the estimate of firm value as a function of future values of the firm's net operating profit after tax (NOPAT) and net

¹ I provide definitions for RNOA and its components in Table 1 and in the Appendix.

operating assets (NOA) and, therefore, its expected RNOA, and Fama and French [2000] encourage analysts to “exploit the mean reversion in profitability” in their forecasts.

Researchers have begun to explore factors that are associated with the expected reversion of RNOA. Fairfield and Yohn [2001] investigate the effect of disaggregating RNOA into profit margin (operating performance) and asset turnover (asset utilization) on the accuracy of RNOA forecasts one period hence. They confirm the reversion of RNOA and find that current changes in RNOA and asset turnover are leading indicators of changes in future RNOA. Further, they find that the disaggregation of the change in RNOA into its profit margin and asset turnover components increases forecast accuracy. Work by Penman and Zhang [2002] and Soliman [2005 and 2008] also document that changes in asset turnover are predictive of future changes in RNOA.

Although an understanding of the factors that are associated with the reversion of RNOA might be useful in its prediction, it might also be helpful to identify cases in which the predicted reversion of RNOA is *not* likely to occur. Dickinson and Sommers [2008] explore that issue through an investigation of the association between RNOA and proxies for competitive advantage, including power over suppliers and the ability of the firm to signal expected retaliation. Their focus is on the factors that may *inhibit* the reversion process to aid in the identification of the firms that are likely to maintain current levels of returns. They find that these proxies for competitive advantage reliably predict the persistence of RNOA.

The research design employed in these studies utilizes a regression of future changes RNOA on the profit margin and asset turnover components of RNOA together with other variables. This research design provides useful insights into the degree to which changes in future RNOA are associated with changes in profit margins and asset turnover in the aggregate. It might also be useful, however, to explore the reversion behavior of the underlying income statement and balance sheet items that comprise the profit margins and asset turnover rates. Such an examination would explore the degree to which specific line items in the financial statements are associated with the observed reversion of RNOA and document the magnitude of their influence. The first objective of my analysis is, therefore, to explore the reversion characteristics of the components of RNOA (net operating profit after tax (NOPAT) and net operating assets (NOA)) and their sub-components (gross profit and SG&A expenses for NOPAT and accounts receivable, inventories, PPE, other long-term assets, accounts payable and accrued liabilities for NOA).

I focus on firms in the top and bottom deciles of RNOA during 1968-2008 and investigate the extent to which differing rates of reversion in these components can be exploited to yield increased accuracy in the forecast of the RNOA ratio. My focus on deciles of RNOA in the ranking year is consistent with the approach utilized in Nissim and Penman [2001] and provides a useful extension of their work to provide further insight into the factors that appear to be driving the reversion rates that they observe. Specifically, I form decile portfolios of firms ranked by RNOA in the year of portfolio formation and examine the behavior of each component of RNOA in the four subsequent years. My focus is on the top and bottom deciles of this distribution as these deciles demonstrate the greatest rates of reversion and, thereby, afford the best opportunity to identify the factors that are associated with the reversion process.

For firms in the top decile, I find that median RNOA declines from an initial value of 37.2 percent to 19.7 percent in the fourth year following portfolio formation, a 47.1 percent reduction. Cumulatively, 66.3 percent of the total reduction occurs in the first two years and 83 percent by the end of the third year. For firms in the bottom decile, median RNOA increases from -15.9 percent to 5.1 percent in the fourth year following portfolio formation, a 131.9 percent increase. Cumulatively, 80.7 percent of the total increase is realized by the end of the second year and 90.6 percent by the end of the third year. These results confirm the reversion of RNOA documented in prior studies and that the rate of reversion is greater for firms in the bottom decile.

I next examine the primary components of RNOA: net operating profit after tax (NOPAT) and net operating assets (NOA). For firms in the top decile, NOPAT declines from an initial value of 10.3% to 7.2% in the fourth year following portfolio formation, a 3.1 percentage point decrease. Cumulatively, 77.6% of the total reduction occurs in the first two years and 94.8% by the end of the third year. Firms in the top decile also experience increases in NOA from an initial value of 26.5% of sales to 35.5% in the fourth year following portfolio formation, a 9 percentage point increase. Cumulatively, 69.8% of the total NOA increase occurs in the first two years and 97.5% by the end of the third year. In sum, the decline in RNOA for firms in the top decile is the result of both a decrease in NOPAT and an increase in NOA.

For firms in the bottom decile, NOPAT increases from an initial value of -9.4% to 1.9% in the fourth year following portfolio formation, an 11 percentage point increase. Cumulatively, 84.9% of the total increase occurs in the first two years and 93% by the end of the third year. Firms in the bottom decile also experience decreases in NOA from an initial value of 60.5% of sales (over twice the percentage for firms in the top decile) to 42.2% in the fourth year following portfolio formation, an 18 percentage point decrease. Cumulatively, 77.2% of the total NOA decrease occurs in the first two years and 89.4% by the end of the third year. The results confirm the greater rate of reversion for firms in the bottom decile and suggest that this is the result of greater reversion rates for both NOPAT and NOA. Overall, the results suggest that reversions of both NOPAT and NOA contribute to the reversion of RNOA.

I also examine the reversion of the components of NOPAT and NOA. Firms in the top decile experience a contraction of NOPAT resulting from a 1.6 percentage point decrease in Gross Profit as a percent of sales (the Gross Profit Margin) and a 2.4 percentage point increase in SG&A expenses as a percentage of sales (the SGA Margin). For firms in the bottom decile, NOPAT increases as a result of a 5.5 percentage point increase in the Gross Profit Margin and a 4.4 percentage point decrease in the SGA Margin.

Net working capital of firms in the top decile increases in the four years following portfolio formation as receivables and inventories increase by 1.5 and 1.0 percentage points, respectively, while accounts payable and accrued liabilities experience an increase of only .3 percentage points and .7 percentage points, respectively. For firms in the bottom decile, net working capital decreases as receivables and inventories decrease by 3.7 percentage points and 4.1 percentage points, respectively, while accounts payable and accruals decrease by 2.8 percentage points and 0.7 percentage points, respectively. Finally, a significant portion of the change in net operating assets is driven by changes in PPE assets, which increase by 6.9 percentage points as a percentage of sales for firms in the top decile and decrease by 12.5 percentage points for firms in the bottom decile.

Overall, the reversion in RNOA documented in previous studies is associated with changes in both the numerator (NOPAT) and the denominator (NOA), and each is, in turn, significantly affected by changes in their respective components. Further, the components of NOPAT and NOA exhibit differing rates of reversion both over time and between firms in the top and bottom deciles of RNOA.

If profit margins and asset turnover rates and their respective components follow similar mean reversion patterns, then the disaggregation of RNOA into its components offers no incremental benefit in forecasting the RNOA ratio. However, if the components follow different mean reversion patterns, this additional information might be useful in the prediction of future values of RNOA.

The research design in previous studies utilizes parameter estimates from a linear regression model to predict future changes in RNOA. Although the parameter estimates are allowed to vary over time (predictions are typically made using parameter estimates from rolling estimation periods), the functional form of the prediction model is constrained to be the linear model used in the regression. The second objective of my analysis is to examine the extent to which forecasting accuracy can be improved by expanding the information set used in the forecast discussed above (i.e., to the components of RNOA) and by allowing the functional form of the forecast model to vary over time (i.e., fluctuating rates of reversion in each year across projection horizons).

Specifically, as in Nissim and Penman [2001], I perform seven forecasts of RNOA for firms in the top and bottom deciles, each beginning with the firm's initial level of RNOA and for the subsequent four years. Fairfield, et. al. [2009] document increased out-of-sample predictive accuracy of RNOA-focused forecasting models based on economy-wide estimates of the mean value to which RNOA reverts. Consequently, for each forecast, I use the economy-wide reversion data from the previous period to forecast the rates of reversion for each year in the subsequent period (i.e., the 1968-1972 period is used to forecast the 1973-1977 period, the 1973-1977 period is used to forecast the 1978-1983 period, and so on). No data subsequent to the forecast period is used in the forecast. I report the median forecast and the forecast error for each of the seven forecasting periods and an average for the seven forecasting periods. This forecasting model implicitly assumes that the observed reversion rates for the analysis period will continue into the following forecast period and these reversion rates are allowed to change over time. As a result, the reversion patterns of the forecasting models may change over time.

As a benchmark, I forecast RNOA using only the historical reversion data for the ratio from the previous 5-year period. For firms in the top decile, the average forecast error (forecast $RNOA_{t+4}$ – actual $RNOA_{t+4}$) is 2.0 percentage points while, for firms in the bottom decile, the average forecast error is 28.7 percentage points. All forecast errors are less than those for the naïve forecast of no change in RNOA and are statistically significant at the <1 percent level based on a Wilcoxon signed rank test.

The second approach forecasts $RNOA_{t+4}$ using forecasts of $NOPAT_{t+4}$ and NOA_{t+4} and constructs the forecasted $RNOA_{t+4}$ from the NOPAT and NOA reversion rates from the analysis period. For firms in the top decile, this forecasting approach yields forecast improvements in six out of seven years with an average improvement of 1 percentage point. For firms in the bottom decile, the forecast improvement is 6.3 percentage points for the six of seven forecast years for

which the error variance is positive. These results suggest some improvement as a result of the disaggregation of RNOA into NOPAT and NOA.

Finally, I disaggregate NOPAT into Gross profit and SG&A Expense and NOA into Accounts Receivable, Inventories, PPE assets, Other assets, Accounts Payable and Accrued liabilities and forecast NOPAT and NOA using forecasted reversion rates for each of their components, computing forecasted RNOA from forecasted NOPAT and NOA as before. For firms in the top decile, the average forecast error is 1 percentage point (about half of the forecast error using only the historical reversion of the RNOA ratio). This approach improves forecast errors in five of the seven forecast periods. For firms in the bottom decile, the forecast error is 3.3 percentage points, an improvement of over 25 percentage points from the original forecast error of 28.7 percentage points, and the forecast error is reduced in five of the seven forecast periods, four at the <1 percent level of statistical significance based on a Wilcoxon signed rank test.

My research provides evidence on the time series behavior of the components that underlie the reversion of RNOA. I document that the components of NOPAT and NOA demonstrate evidence of reversion at different rates both among the components and between firms in the top and bottom deciles. My results also confirm the findings of prior research that the speed of reversion is greater for firms in the bottom decile. These findings suggest that forecasts of RNOA can be improved by broadening the information set than beyond the historical time series of the RNOA ratio and aggregate measures of profitability and turnover, and I document a reduction of forecast errors by using forecasts of the components of RNOA to develop forecasts of the RNOA ratio.

The rest of the paper is organized as follows. In the next section I discuss the theoretical foundation for the focus on the prediction of RNOA in firm valuation and previous research documenting the reversion of returns. In section three, I describe the data selection process and discuss overall historical characteristics of RNOA and its components. In section four, I discuss the portfolio formation process and present my findings relating to the reversion of RNOA and its components and the relative contributions of the components to the reversion of the ratio. In section five, I examine the extent to which an understanding of the reversion of the underlying components of RNOA can be exploited to improve forecasts of the ratio. In the final section, I summarize the conclusions of my study.

2. Firm Valuation and Forecasts of RNOA

The residual operating income (ROPI) valuation model defines value of the firm as a function its current net operating assets (NOA) and the expected values of future net operating profit after tax (NOPAT) and net operating assets (NOA), discounted at rate r_0 , as follows:

$$V_0 = NOA_0 + \sum_{t=1}^{\infty} \left(\frac{NOPAT_t - r_0 NOA_{t-1}}{(1+r_0)^t} \right) \quad 2.1$$

Multiplying the numerator in the summation term of expression 2.1 by $\frac{NOA_{t-1}}{NOA_{t-1}}$, $NOPAT_t - r_0 NOA_{t-1}$ can be rewritten as $(RNOA_t - r_0) \times NOA_{t-1}$ and the valuation model is as follows:

$$V_0 = NOA_0 + \sum_{t=1}^{\infty} \left(\frac{(RNOA_t - r_0)(NOA_{t-1})}{(1+r_0)^t} \right) \quad 2.2$$

where $RNOA = \frac{NOPAT_t}{NOA_{t-1}}$. This format for the valuation model highlights the importance of forecasts of RNOA.

Forecasting measures of profitability, such as RNOA, has been the focus of numerous studies. Freeman, Ohlson, and Penman [1982] examine the time series properties of the return on equity (ROE) and conclude that rates of return have predictive power with respect to earnings changes. The authors also suggest “other accounting variables besides the book rate-of-return might also add to the predictive model used here” [p. 652].

Sloan [1996] investigates the persistence of accrual and cash flow components of earnings and documents the lower persistence of earnings performance attributable to the accrual component of earnings, especially for portfolios of firms in the extreme deciles. Fama and French [2000] also document mean reversion in profitability (defined as return on assets) and find that “the rate of mean reversion is higher when profitability is far from its mean, in either direction” [p. 163]. They exhort security analysts to exploit the mean reversion in profitability in their earnings forecasts. Fairfield, Ramnath and Yohn [2009], Soliman [2005], and Nissim and Penman [2001] also document mean reversion in profitability measures such as ROE and RNOA. The latter also confirms the findings in Fama and French [2000] that the rate of mean reversion is greater for extreme deciles of firms (see especially their fig. 4b on p. 141).

Prior research has also begun to investigate the association of the components of the return measures with the expected reversion of the ratio. Fairfield and Yohn [2001] document the relative contributions of asset turnover and profit margins to the improvement of forecasts of one-year-ahead changes in RNOA and Fairfield, Sweeney and Yohn [1996] explore the extent to which the components of net income in the numerator of ROE can be weighted to improve prediction of ROE one year ahead.

My study continues this line of inquiry into the factors that appear to contribute to the documented reversion of RNOA. I focus on the return on net operating assets (RNOA) and examine the behavior of both the numerator (NOPAT) and the denominator (NOA). I disaggregate each component into their respective sub-components to explore those factors that appear to be driving the mean-reverting behavior we observe. Finally, I investigate the extent to which a deeper understanding of the underlying factors associated with mean-reversion of RNOA can be exploited to improve forecasts of the ratio.

3. Variable Definitions and Historical Statistics of RNOA, NOPAT and NOA

3.1 Variable Definitions

I include all U.S. nonfinancial, nonutility and nongovernmental firms reported in the COMPUSTAT database and listed on the NYSE, NASDAQ and AMEX exchanges for the 40 years from 1968 to 2008. I exclude financial firms with SIC codes from 6000 to 6999, utilities with SIC codes from 4900 to 4999, public administration entities with SIC codes greater than 9000, and firms with negative Stockholders' Equity. To mitigate the effects of extreme values, I truncate all variables at 1 percent and 99 percent.

I summarize the variable definitions in Table 1. All variables are computed as in Nissim and Penman [2001] and, for convenience, I reproduce their definitions in the Appendix together with associated COMPUSTAT numbers. Since the forecasting of RNOA is one of the objectives of this study, I remove unusual (transitory) items from NOPAT. Using their definitions, then, RNOA is defined as Core Operating Income from Sales divided by Net Operating assets. All variables, other than RNOA, are scaled by sales to eliminate size effects and for comparability with ratios commonly cited by analysts.

[insert Table 1]

3.2 Historical Statistics of RNOA, NOPAT and NOA

I present quartiles of RNOA, together with its components, NOPAT and NOA (scaled by sales), in Table 2 and graph the medians of those variables in Figure 1. RNOA has fluctuated within a range from a high of 12.5 percent at the height of the business expansion of 1979 to a low of 5.5 percent in the business contraction of 2001. The fluctuation in NOPAT as a percentage of sales (the net operating profit margin) has been smaller than that of RNOA, ranging from a high of 5.8 percent during 1979-1981 to a low of 1.0 percent in the downturn of 2001. Net operating assets (NOA) has ranged from a high of over 54 percent of sales in 1970 and 2001-2002 to a low of 40.7 percent as a percentage of sales in 1978-1979.

While NOPAT as a percentage of sales generally increases (decreases) during periods of business expansion (contraction), NOA as a percentage of sales generally exhibits the opposite pattern. Interestingly, in the recession years beginning in late 2007, NOPAT declined to 2.7 percent, near its low of 2.1 percent in the business downturn of 2001. In 2007, however, businesses exhibited more control over net operating assets than they did in 2001 and median NOA in 2008 was 48 percent as a percentage of sales as opposed to 54.4 percent of sales in 2001. As a result, RNOA only declined to 7.7 percent in 2008 as compared with 5.5 percent in 2001.

[insert Table 2 and Figure 1]

3.3 Historical Statistics of the Components of NOPAT and NOA

One objective of my study is to explore the relative contributions of the components of NOPAT and NOA to the reversion of RNOA. I disaggregate NOPAT into the Gross Profit and Selling, General and Administrative Expenses. Both of these variables are scaled by sales yielding the Gross Profit Margin (GPM) and SG&A Margin (SGAM), respectively. I disaggregate net operating assets into Accounts Receivable (AR), Inventories (INV), Property Plant and Equipment (PPE), Other assets (OTH), Accounts Payable (AP), and Accrued Liabilities (ACC). Other Assets (OTH) include Other operating assets net of Other operating liabilities. Cash is defined as a non-operating asset as in Nissim and Penman (2001).² All balance sheet accounts are scaled by sales. The resulting variables are, therefore, the inverse of turnover ratios computed on year-end values of the balance sheet account.

² The cash account reported on the balance sheet includes cash equivalents (interest-bearing assets) and the proportion of transaction cash is not disclosed. It is reasonable to assume that companies routinely invest excess cash balances in interest-bearing assets (a non-operating asset) and that the proportion of cash not so invested is relatively small.

I present quartiles of the Gross Profit Margin (GPM) and the SG&A Margin (SGAM) in Table 3 and graph the medians of those variables in Figure 2. Both the Gross Profit Margin and the SG&A Margin have demonstrated a significant upward trend since 1968. During the sample period, companies have generally been successful in maintaining net operating profit margin in the 4-6 percent range, except during the business contractions of 2001 and 2008.

[insert Table 3 and Figure 2]

I present the quartiles of the working capital accounts in Table 4 and graph the medians of those variables in Figure 3. Receivables have fluctuated within a fairly narrow range of 14-16 percent of sales during the sample period, corresponding to a median average collection period of 51-58 days (receivable percentage x 365). In the previous section, I remark that companies appear to be managing net operating assets more effectively in recent years, and this fact is evident in the graph of inventories as a percent of sales (INV) which has trended downward from 16 percent of sales in 1968 to 8 percent of sales in 2008. Interestingly, the reduction in inventories on hand has not been accompanied by a corresponding reduction in accounts payable (AP) as the median value of the latter has remained relatively constant at 6 percent of sales (corresponding to an average payment period of 22 days).

In addition to the reduction of inventories, companies have also reduced net operating assets as a result of an increase in median accrued liabilities from less than 2 percent of sales in 1968 to 5.9 percent of sales in 2008. Payables have remained constant and slightly over 5 percent of sales during the sample period. Overall, companies have been able to reduce median net operating working capital ($AR + INV - AP - ACC$) from 26.3 percent of sales (13.6 percent + 15.7 percent - 1.8 percent - 1.2 percent) in 1968 to 9.7 percent of sales (13.9 percent + 7.6 percent - 6.0 percent - 5.8 percent) in 2008.

[insert Table 4 and Figure 3]

Finally, I present the percentiles of Property, Plant & Equipment (PPE) and net Other (OTH) long-term assets in Table 5 and graph the medians of those variables in Figure 4. The investment in Property, Plant & Equipment (PPE) assets has fluctuated greatly over the sample period from a high of 42.5 percent of sales in 1986 to a low of 30.5 percent of sales in 1979. Long-term assets increased as a percentage of sales during the business contractions of 1980-82, 1990-1991, and 2001. Interestingly, companies have significantly reduced median PPE assets as a percentage of sales in the downturn of 2008. This has contributed to the reduction of investment in net operating assets and, as a result has cushioned the negative effect of the decline in NOPAT on RNOA in that period of business contraction. Net Other assets, on the other hand, have increased from a net liability of 20.9 percent of sales in 1968 to a net liability of 6.4 percent of sales in 2008, offsetting, to some extent, the reductions of net operating working capital and PPE assets.

[insert Table 5 and Figure 4]

4. Formation of Portfolios and the Reversion of RNOA and its Components

4.1 Formation of Portfolios

Using the methodology in Nissim and Penman [2001], in each of eight base years (1968, 1973, 1978, 1983, 1988, 1993, 1998 and 2003) I form decile portfolios of firms based on a ranking of RNOA. For the ranking year, and for each of subsequent four years, I compute decile portfolio medians for RNOA, NOPAT, NOA and their components. Non-surviving firms are not replaced in the decile portfolio. Data reported are the medians of the eight decile medians. All of my observations are in ratio form, whether as returns or as income statement and balance sheet accounts as a percentage of sales and, because many ratios can have extreme values due to large numerators and/or small denominators, I present median values for all computations and determine statistical significance using robust statistical tests.

4.2 Reversion of RNOA

I present the median RNOA for each decile in the portfolio formation year (Year 0) and for each of the four subsequent years in Table 6 and graph the medians of those variables in Figure 5. The data and graph illustrate the reversion of RNOA in the periods subsequent to portfolio formation and replicate the findings of prior research. One objective of this study is to explore the behavior of the components of RNOA to investigate whether any insights can be exploited in the prediction of RNOA. The behavior of RNOA and its components is accentuated in the top and bottom deciles of the distribution (highlighted in the graph) as these deciles demonstrate the greatest rates of reversion and, thereby, afford the best opportunity to identify the factors that are associated with the reversion process.

[insert Table 6 and Figure 5]

I present the median RNOA for the top and bottom deciles in the portfolio formation year (Year 0) and for each of the four subsequent years in Table 7. For the top decile, median RNOA declines from 37.2 percent to 19.7 percent in the fourth year following portfolio formation, a 47.1 percent reduction. The year-over-year differences in the median values are reported in the row below the RNOA values, and are all statistically significant at less than <0.0001 based on a Wilcoxon signed rank test. Firms in the top decile lose 16.6 percent of their initial (Year 0) median RNOA value in the first year after portfolio formation, followed by reductions of 14.7 percent, 7.8 percent and 8.0 percent thereafter. Cumulatively, 66.3 percent of the total reduction occurs in the first two years and 83 percent by the end of the third year.

For firms in the bottom decile, median RNOA increases from -15.9 percent to 5.1 percent in the fourth year following portfolio formation, a 131.9 percent increase. All of the year-over-year differences in the median values are all statistically significant at <0.0001 . Firms in the bottom decile recoup 12.7 percentage points of their initial (Year 0) median RNOA value in the first year after portfolio formation, followed by increases of 4.3 percentage points, 2.1 percentage points and 2.0 percentage points thereafter. Firms in the bottom decile recoup 60.4 percent of the initial RNOA in the first year following portfolio formation. Cumulatively, 80.7 percent of the total increase is realized by the end of the second year and 90.6 percent by the end of the third year. These results confirm those of prior studies that the rate of RNOA reversion is greater for firms in the bottom decile.

[insert Table 7]

4.3 Reversion NOPAT and NOA

I present the median net operating profit after tax (NOPAT) and net operating assets (NOA) for the top and bottom deciles in the portfolio formation year (Year 0) and for each of the four subsequent years in Table 8 and graph the medians of those variables in Figure 6. The reversion of RNOA described above is the result of reversions of both the numerator (NOPAT) and the denominator (NOA). It is important to note that the results I report in Table 8 are not the result of an initial ranking of NOPAT and NOA. Rather, they are the median values of NOPAT and NOA for the firms included in the top and bottom deciles based on an initial ranking of their RNOA values in Year 0.

For firms in the top decile, NOPAT declines from an initial value of 10.3 percent to 7.2 percent in the fourth year following portfolio formation, a 3.1 percentage point decrease. The year-over-year differences in the median values (reported in the row below the NOPAT values) are statistically significant at <0.0001 level for the first three years based on a Wilcoxon signed rank test and the fourth year difference is not statistically significant. Firms in the top decile lose 10.2 percent of their initial (Year 0) median NOPAT value in the first year after portfolio formation, followed by reductions of 13.2 percent, 5.2 percent and 1.6 percent thereafter. Cumulatively, 77.6 percent of the total reduction occurs in the first two years and 94.8 percent by the end of the third year.

Firms in the top decile also experience increases in NOA from an initial value of 26.5 percent of sales to 35.5 percent in the four years following portfolio formation, a 9 percentage point increase. The year-over-year differences in the median values are statistically significant at <0.0001 for the first three years based on a Wilcoxon signed rank test and at the .0008 level for the fourth year. Firms in the top decile gain 12.7 percent of their initial (Year 0) median NOA value in the first year after portfolio formation, followed by increases of 11.1 percent, 9.5 percent and 0.8 percent thereafter. Cumulatively, 69.8 percent of the total NOA increase occurs in the first two years and 97.5 percent by the end of the third year.

For firms in the bottom decile, NOPAT increases from an initial value of -9.4 percent to 1.9 percent in the fourth year following portfolio formation, an 11.3 percentage point increase. The year-over-year differences in the median values are statistically significant at <0.0001 for all four years based on a Wilcoxon signed rank test. Firms in the bottom decile recoup 80 percent of their initial (Year 0) median NOPAT value in the first year after portfolio formation, followed by increases of 21.9 percent, 9.8 percent and 8.4 percent thereafter. Cumulatively, 84.9 percent of the total increase occurs in the first two years and 93 percent by the end of the third year.

Firms in the bottom decile also experience decreases in NOA from an initial value of 60.5 percent of sales (over twice the percentage of firms in the top decile) to 42.2 percent in the fourth year following portfolio formation, an 18 percentage point decrease. The year-over-year differences in the median values are statistically significant at less <0.0001 for all four years based on a Wilcoxon signed rank test. Firms in the bottom decile lose 17.8 percent of their initial (Year 0) median NOA value in the first year after portfolio formation, followed by decreases of 5.6 percent, 3.7 percent and 3.2 percent thereafter. Cumulatively, 77.2 percent of the total NOA decrease occurs in the first two years and 89.4 percent by the end of the third year.

Overall, the results suggest that reversions of both NOPAT and NOA contribute to the reversion of RNOA. The results presented above also confirm the greater rate of reversion for firms in the bottom decile and suggest that this is the result of greater reversion rates for both NOPAT and NOA.

[insert Table 8 and Figure 6]

4.4 Reversion of the components of NOPAT (Gross Profit and SG&A) and NOA (Accounts Receivables, Inventories, PPE, Other, Accounts Payable, and Accrued Liabilities)

I present the median the components of NOPAT (Gross Profit and SG&A) and NOA (Accounts Receivables, Inventories, PPE, Other, Accounts Payable, and Accrued Liabilities) for the top and bottom deciles in the portfolio formation year (Year 0) and for each of the four subsequent years in Table 9 and graph the medians of those variables in Figure 7. The results in this table are the medians of the variables for the firms in each decile. They are not as a result of ranking performed on the variables.

Gross Profit as a percentage of sales (Gross Profit Margin) decreases by 1.6 percentage points for firms in the top decile in the four years following portfolio formation (44.7 percent to 43.1 percent). Cumulatively, 57.4 percent of this decline is realized in the first two years and 75.8 percent by the third year. Firms in the bottom decile report an increase in median gross profit as a percentage of sales of 5.5 percentage points (29.7 percent to 32.9 percent). Cumulatively, 67.8 percent of the increase is realized by the second year and 87.9 percent by the third year after portfolio formation.

SG&A expense as a percentage of sales increases for firms in the top decile by 2.4 percentage points (33.4 percent to 35.8 percent), resulting in an overall reduction in NOPAT. Cumulatively, 70.7 percent of the increase is realized by the second year and 82 percent by the third year. For firms in the bottom decile, SG&A expenses decline by 4.4 percentage points (34.7 percent to 33.3 percent). Cumulatively, 59.5 percent of the decline is realized by the second year with the remainder occurring in the fourth year.

Median accounts receivable increase by 1.5 percentage points as a percentage of sales (13.3 percent to 14.8 percent) for firms in the top decile and decrease by 3.7 percentage points (19.8 percent to 16.1 percent) for firms in the bottom decile. A similar pattern is witnessed for inventories which increase by 1 percentage point (9.0 percent to 10.0 percent) for firms in the top decile and decrease by 4.1 percentage points (16.3 percent to 12.2 percent) for firms in the bottom decile. Accounts payable and accrued liabilities remain fairly constant for firms in the top decile (4.6 percent to 4.9 percent and 3.7 to 4.4 percent of sales, respectively), but accounts payable decrease by 2.8 percentage points (9.7 percent to 6.9 percent of sales) and accrued liabilities decrease by .7 percentage points (5.9 percent to 5.3 percent as a percentage of sales) for firms in the bottom decile.

PPE assets report a significant increase for firms in the top decile in the four years following portfolio formation, from 22.7 percent of sales to 29.6 percent of sales, a 6.9 percentage point increase. For firms in the bottom decile, PPE assets decrease by 12.5 percentage points, from 48.1 percent of sales to 35.6 percent of sales. These changes account for a significant proportion of the change in net operating assets as net Other operating assets remain virtually

unchanged over the four years following portfolio formation (.3 percentage point increase for firms in the top decile and no change for firms in the bottom decile).

[insert Table 9 and Figure 7]

4.5 Relative Contribution of NOPAT and NOA and their Components to the Reversion of RNOA

Let $NOPAT_1 = NOPAT_0 + \Delta NOPAT$ and $NOA_1 = NOA_0 + \Delta NOA$. Then, the change in RNOA ($\Delta RNOA$) from period 0 to period 1 is

$$\Delta RNOA = \left(\frac{NOPAT_0 + \Delta NOPAT}{NOA_0 + \Delta NOA} \right) - \left(\frac{NOPAT_0}{NOA_0} \right) = \frac{(NOA_0 \times \Delta NOPAT) - (NOPAT_0 \times \Delta NOA)}{NOA_0 \times NOA_1} \quad 2.3$$

Setting $\Delta NOA (\Delta NOPAT) = 0$, the relative contributions to the change in RNOA from a change in NOPAT and NOA, then, are $\frac{\Delta NOPAT}{NOA_1}$ and $\frac{(NOPAT_0 \times \Delta NOA)}{NOA_0 \times NOA_1}$, respectively. I compute the relative contributions to the change in RNOA from a change in NOPAT and NOA as the absolute values of the variables as a percent of the total absolute value. I report the relative contributions of NOPAT and NOA and their components in Table 10.

I present the relative contributions of changes in NOPAT and NOA to the change in RNOA in Panel A. For firms in the top decile the relative contribution of NOPAT (NOA) to the change in RNOA is 49.2 percent (50.8 percent) in the first year following portfolio formation, and the NOPAT effect increases significantly to 62.5 percent (37.5 percent) in the fourth year. For firms in the bottom decile, the change in RNOA is largely driven by changes in NOPAT as changes in NOA are relatively small in relation to the beginning NOA balance which is over twice that for the firms in the top decile. The relative contribution of the change in NOPAT and NOA to the change in RNOA is 82.4 percent (17.6 percent) in the first year following portfolio formation, and the NOPAT effect decreases slightly to 75.9 percent (24.1 percent) in the fourth year.

I present the relative contributions of gross profit and SG&A to NOPAT in Panel B. These relative contributions are similar between the top and bottom deciles and remain fairly constant in the four years following portfolio formation. For firms in the top decile, the initial proportion of the relative contributions of gross profit and SG&A as a percent of sales (GPM and SGAM) to the change in NOPAT are 54.3 percent (45.7) percent and the relative contribution of GPM increases to 55.1 percent (44.9 percent) in the fourth year. For firms in the bottom decile, the relative contribution of GPM increases from 45.5 percent (54.5 percent) to 49.1 percent (50.9 percent) over the four years following portfolio formation.

Panel C reports the relative contributions of working capital accounts: Accounts Receivable (AR), Inventories (INV), Accounts Payable (AP) and Accrued Liabilities (ACC). The relative contributions of changes of each variable to the total change in NOA are similar between the top and bottom deciles and across the four years after portfolio formation. On balance, relative contributions of changes in receivables and inventories to the change in NOA is about twice that of changes in current liabilities, and this relation remains fairly constant over time.

I report the relative contributions of changes in Property, Plant and Equipment (PPE) and Other assets (OTH) to the change in NOA in Panel D. The effects of changes in long-term assets on changes in RNOA (in the range of 22-30 percent) are much larger than those for changes in working capital accounts, typically 4-10 percent, and exhibit relatively little fluctuation over

time. On balance, changes long-term assets account for a significantly greater proportion of the change in NOA than do changes in working capital accounts.

[insert Table 10]

5. Forecasting RNOA

In this section, I investigate the extent to which the documented reversion of RNOA, its components (NOPAT and NOA), and their sub-components (Gross Profit, SG&A expenses, Accounts Receivables, Inventories, PPE assets, Other assets, Accounts Payable, and Accrued Liabilities) can be used to improve forecasts of RNOA. Since I am forecasting the value of each variable four years from the date of portfolio formation, I require the firm to be in the data set at the end of the forecast horizon. These results, therefore, relate to firms that are going concerns throughout the four-year forecast horizon. I do not require that firms remain in the data set for the entire 1968-2008 sample period, however, only during the four-year forecast horizon.³ All forecast variables are computed in the same manner as the historical variables presented above.

I forecast four years of each variable subsequent to the initial year of portfolio formation using the level of the variable in the initial year of portfolio formation and four subsequent years using the rates of reversion for that variable from the previous 5-year period. Forecasted values of each variable for firm i (X_i) are computed as follows:

$$X_{it+4} = X_{i0} + \left[\text{abs}(X_0) \cdot \text{median} \left(\frac{d_1+d_2+d_3+d_4}{\text{abs}(X_0)} \right) \right] \quad 2.3$$

The forecasted value for each variable is the sum of its initial value and the change from that initial value over the subsequent four years. That change is given by the product of the absolute value of the variable on the date of portfolio formation and the median changes (d_1, d_2, d_3, d_4) in that variable over the 4 years subsequent to portfolio formation as a percentage of the median value of the variable in the year of portfolio formation. The X_{i0} variables are specific to each firm and the medians are for all firms in the top (bottom) deciles for the preceding 5-year period. I use absolute values to compute the change in the initial value of the variable because of the presence of negative initial values of the variables such as Other assets and RNOA and NOPAT for firms in the bottom decile.

The first forecast period is 1978-1983 and my forecasts of RNOA use data from the 1968-1972 period. I, then, forecast RNOA for the 5-year periods beginning in 1983, 1988, 1993, 1998, and 2003 using the same procedure. No data subsequent to the forecast horizon is used in the forecast. The reported results are the medians of the forecasted amounts for all firms in the top and bottom deciles and for the years forecasted.

The following subsections present the results of three forecasting approaches: 1. Using only the reversion of the RNOA ratio, 2. Using reversions of NOPAT and NOA to forecast the RNOA

³ As a test of the sensitivity of the previously reported findings to the exclusion of firms that do not survive during the forecast horizon, I have recomputed the medians of all variables for the year of portfolio formation and the four subsequent years. There is no significant difference in the median rates of reversion of all of the variables reported in Tables 8 and 9 for the sample limited to firms that survive during the forecast horizon.

ratio, and 3. Using forecasts of the components of NOPAT and NOA to forecast those variables and the resulting ratio.

5.1 Forecasting RNOA Using the Historical Reversion of the RNOA Ratio

I present the forecasts of RNOA using only the historical reversion of the RNOA ratio from the preceding 5-year period in Table 11.⁴ The first two columns present the median values of RNOA in the year of portfolio formation ($RNOA_0$) and for the 4th subsequent year ($RNOA_{t+4}$) for the seven forecast periods. The median RNOA for firms in the top decile and for the seven forecast periods is 37 percent for $RNOA_0$ and 19 percent in for $RNOA_{t+4}$. These medians are close to those reported in Table 7 of 37.2 percent and 19.7 percent, respectively. For firms in the bottom decile, the median are -18 percent and 3 percent, respectively, slightly lower than the -16 percent and 5 percent reported in Table 7.

The targets for the forecasts are the $RNOA_{t+4}$ values. For firms in the top decile, the reversion of RNOA ranges from 9 percentage points in the 1979-1983 period to 32 percentage points in 2004-2008 period, and a median reversion of 16 percentage points. For firms in the bottom decile, the reversion of RNOA ranges from 4 percentage points in the 1979-1983 period to 52 percentage points in 1999-2003 period, and a median reversion of 21 percentage points.

The “error” column is the forecasted amount less the actual value of $RNOA_{t+4}$ (the sample median). Forecasts of $RNOA_{t+4}$ using the reversion of the RNOA ratio from the previous 5-year period estimate $RNOA_{t+4}$ with an error of 2 percentage points, on average, for firms in the top decile and with an average error of 28.7 percentage points for firms in the bottom decile. The average error for firms in the bottom decile is influenced significantly by errors of 17, 103 and 37 percentage points for the 1978, 1983 and 1988 forecasting periods, respectively. The relatively poor forecasting performance for firms in the bottom decile is due to small denominators in $RNOA_0$ for 1973, 1978 and 1983 (0.006, -0.004 and 0.012, respectively) that increase the expected change to the initial RNOA value for each firm and the large negative initial value for $RNOA_0$ in 2003. On balance, forecasts of $RNOA_{t+4}$ using only the historical reversion of the RNOA ratio are more effective for firms in the top decile.

[insert Table 11]

5.2 Forecasting RNOA Using the Historical Reversion of NOPAT and NOA

In this section, I forecast $RNOA_{t+4}$ using forecasts of $NOPAT_{t+4}$ and NOA_{t+4} to compute the ratio. I present the results of this approach to forecasting $RNOA_{t+4}$ in Table 12. The first two columns are replicated from Table 11 for ease of reference. The “error” column is the forecasted amount less the actual value of $RNOA_{t+4}$. The “favorable” and “unfavorable” columns are the difference between the forecast error using forecasts of NOPAT and NOA and the forecast error from the base-line approach in Table 11.

For firms in the top decile, the forecast of $RNOA_{t+4}$ using forecasts of $NOPAT_{t+4}$ and NOA_{t+4} yields improvement in six of the seven forecasting years, compared with the base-line approach in Table 11, for an average improvement of 1 percentage point, statistically significant at the 5 percent level based on a Wilcoxon signed rank test in 1998. This approach is less favorable only

⁴ All of the forecasts for both the top and bottom deciles are significantly different from the naïve forecast of no change in RNOA at the 1 percent level of significance based on a Wilcoxon signed rank test.

in 1978 with a forecasting loss of 2 percentage points, significant at the 5 percent level based on a Wilcoxon signed rank test.

For firms in the bottom decile, the use of NOPAT and NOA to compute the RNOA ratio yields improvement relative to initial approach in six of the seven forecast periods, compared with the base-line approach in Table 11, for an average improvement of 6.3 percentage points, statistically significant at the 1 percent level in 1978, 1988, and 2003, based on a Wilcoxon signed rank test. The approach yields one unfavorable forecast error of 37.5 percentage points in the 1974-1978, significant at the 5 percent level. The unfavorable forecast performance in 1983 is the result of a low initial value for $NOPAT_0$ (-0.0016) in 1978 that significantly affects the expected change computation in equation 2.6. On balance, the decomposition of RNOA into NOPAT and NOA yields improvement in the forecast of $RNOA_{t+4}$ for firms in both deciles.

[insert Table 12]

5.3 Forecasting RNOA Using the Historical Reversion of Gross Profit and SG&A expenses (for NOPAT) and Accounts Receivable, Inventories, PPE assets, Other assets, Accounts Payable, and Accrued Liabilities(for NOA) to Compute the RNOA Ratio

In my final forecasting approach, I disaggregate NOPAT into Gross Profit and SG&A Expense and NOA into Accounts Receivable, Inventories, PPE assets, Other assets, Accounts Payable and Accrued liabilities and forecast NOPAT and NOA using forecasted values for their components. I, then, compute forecasted RNOA from forecasted NOPAT and NOA as before. I present the results from this forecasting approach in Table 13.

For firms in the top decile, forecasting RNOA from forecasts of the components of NOPAT and NOA yields improvement over the initial forecasting approach in five of seven years for an average forecasting error of 1.3 percentage points, compared with an average forecasting error of 2 percentage points in the initial forecasting approach. The average favorable forecast error (compared with the base-line forecast of no disaggregation) is 3.1 percentage points and the average unfavorable forecast error (in two years) is 2.9 percentage points. The difference between the forecasting error in the disaggregated approach and the initial approach is statistically significant at the 1 percent level based on a Wilcoxon signed rank test in three years in which improvement is reported and in one of the years with unfavorable forecasting performance.

The forecasting improvement is also significant for firms in the bottom decile with an average forecasting error of 3.3 percentage points, compared with a forecasting error of 29 percentage points in the base-line approach. Favorable forecasting results are reported in five of seven years for an average improvement of 30 percentage points. The forecasting improvement in each of these years is statistically significant at the 1 percent level based on a Wilcoxon signed rank test. Unfavorable forecasting results are reported in 1998 and 2008 (only statistically significant at the 1 percent level in 1998) for an average forecasting error of 1 percentage point.

The components of NOPAT and NOA demonstrate reversion at different rates across components and between firms in the top and bottom deciles. Overall, it appears that the information relating to these differential rates of reversion can be exploited to yield significant improvement in RNOA forecasts.

[insert Table 13]

6. Summary and Conclusions

I provide evidence on the relative reversion rates for RNOA and its components. I find that the income statement and balance sheet components of RNOA exhibit reversion to a mean value over time and that the rates of reversion differ across components and between firms in the top and bottom RNOA deciles. I document these rates of reversion across several business expansions and contractions.

The reversion of RNOA which has been previously documented in the literature is the result of reversion in both its numerator and its denominator. For firms in the top (bottom) deciles ranked on initial RNOA values, NOPAT accounts for 62.5 percent (75.9 percent) of the reversion of RNOA in the four years following initial measurement, about equally divided between the impacts of the reversion of the Gross Profit Margin and the SG&A Margin. For the denominator (NOA), the reversions of current assets accounts for twice the effect of the reversion of current liabilities. On balance, however, changes long-term assets account for a significantly greater proportion of the change in NOA than do changes in working capital accounts. These differences in rates of reversion across components of RNOA can be exploited to significantly improve forecasts of RNOA. Further, this improvement appears to be achievable across a wide spectrum of economic environments.

APPENDIX

Notation and Variables Measurement

The variables I use in this paper are measured using the definitions in Nissim and Penman [2001]. For convenience, I reproduce those definitions in this appendix.

Financial Assets (FA) = cash and short term investments (Compustat #1) plus investments and advances-other (Compustat #32).

Operating Assets (OA) = Total Assets (TA, Compustat #6) minus Financial Assets (FA).

Financial Obligations (FO) = debt in current liabilities (#34) plus long term debt (#9) plus preferred stock (#130) minus preferred treasury stock (#227) and plus preferred dividends in arrears (#242).

Net Financial Obligations (NFO) = Financial Obligations (FO) minus Financial Assets (FA).

Common Equity (CSE) = common equity (#60) plus preferred treasury stock (#227) minus preferred dividends in arrears (#242).

Net Operating Assets (NOA) = Net Financial Obligations (NFO) plus Common Equity (CSE) and plus Minority Interest (MI, #38).

Operating Liabilities (OL) = Operating Assets (OA) minus Net Operating Assets (NOA).

Core Net Financial Expense (Core NFE) = after tax interest expense (#15 * (1- marginal tax rate)) plus preferred dividends (#19) and minus after tax interest income (#62 * (1- marginal tax rate)).

Unusual Financial Expense (UFE) = lag marketable securities adjustment (lag #238) minus marketable securities adjustment (#238).

Net Financial Expense (NFE) = Core Net Financial Expense (Core NFE) plus Unusual Financial Expense (UFE).

Clean Surplus Adjustments to net income (CSA) = marketable securities adjustment (#238) minus lag marketable securities adjustment (lag #238) plus cumulative translation adjustment (#230) and minus lag cumulative translation adjustment (lag #230).

Comprehensive Net Income (CNI) = net income (#172) minus preferred dividends (#19) and plus Clean Surplus Adjustment to net Income (CSA).

Unusual Operating Income (UOI) = after tax nonoperating income (expense) excluding interest and equity in earnings ((#190 - #55) x (1- marginal tax rate)) plus after tax special items (#17 ´ (1- marginal tax rate)) plus extraordinary items & discontinued operations (#48) plus cumulative translation adjustment (#230) and minus lag cumulative translation adjustment (lag #230).

Other Operating Income Items (Other Items) = Equity in earnings (#55).

Operating Income from Sales (OI from Sales) = Operating Income (OI) minus Other Operating Income Items (Other Items).

Core Operating Income from Sales (Core OI from Sales) = Operating Income from Sales (OI from Sales) minus Unusual Operating Income (UOI).

RNOA = Core Operating Income from Sales / Average Net Operating Assets.

Marginal Tax Rate = the statutory federal tax rate plus 2 percent average state tax rate. The federal tax rate was 22 percent in 1963, 28 percent in 1964, 26 percent in 1965-1978, 46 percent in 1979-1987, 34 percent in 1988-1992 and 35 percent in 1993-2008.

Interest on Operating Obligations (io) = the one year risk-free rate at the beginning of the year multiplied by the difference between operating liabilities (OL) and "Deferred Taxes and Investment Tax Credit" (#35).

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Table 1
Variable Definitions

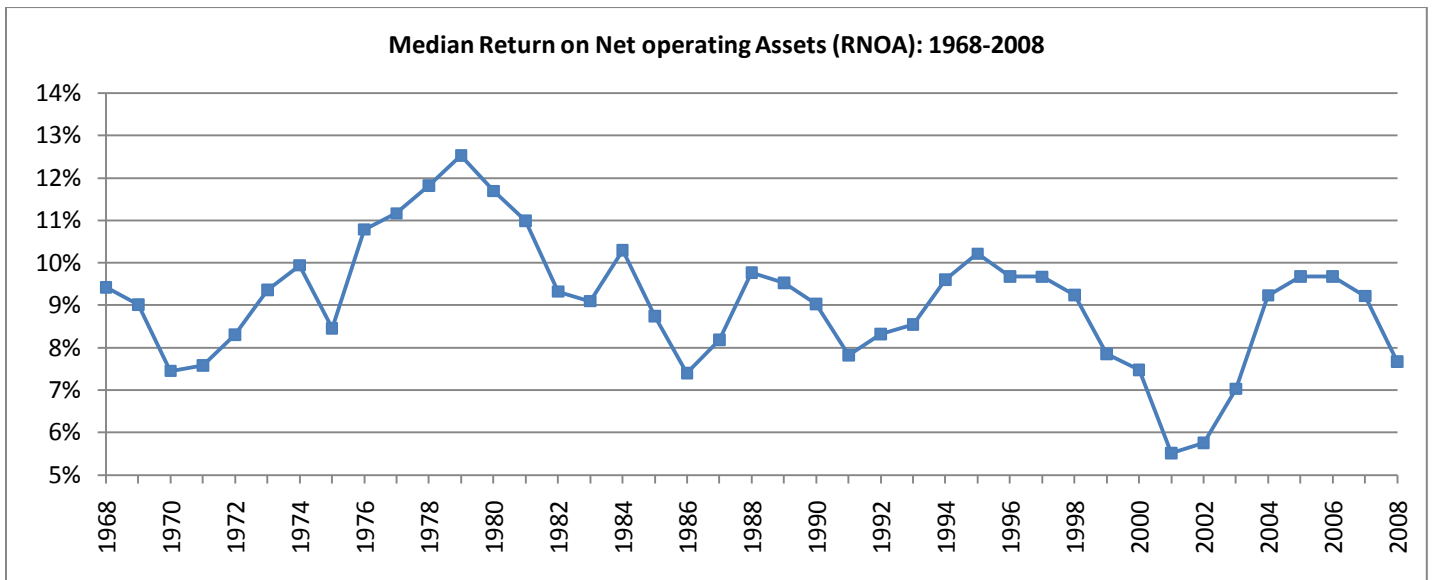
Variable Name	Description	Generic Computation
$NOPAT_t$	Net operating income after tax	Sales - cost of goods sold - operating expenses - taxes on operating income. I exclude unusual (transitory) items, in the computation of $NOPAT_t$.
NOA_t	Net operating Assets	Accounts receivable + inventories + long-term operating assets + other net operating assets – accounts payable – accrued liabilities
$RNOA_t$	Return on net operating assets	$NOPAT / \text{average NOA}$

The return on net operating assets (RNOA) is computed using NOPAT excluding unusual (transitory) items and represents core RNOA. All variables, other than RNOA, are scaled by sales to eliminate size effects and for comparability with ratios commonly cited by analysts.

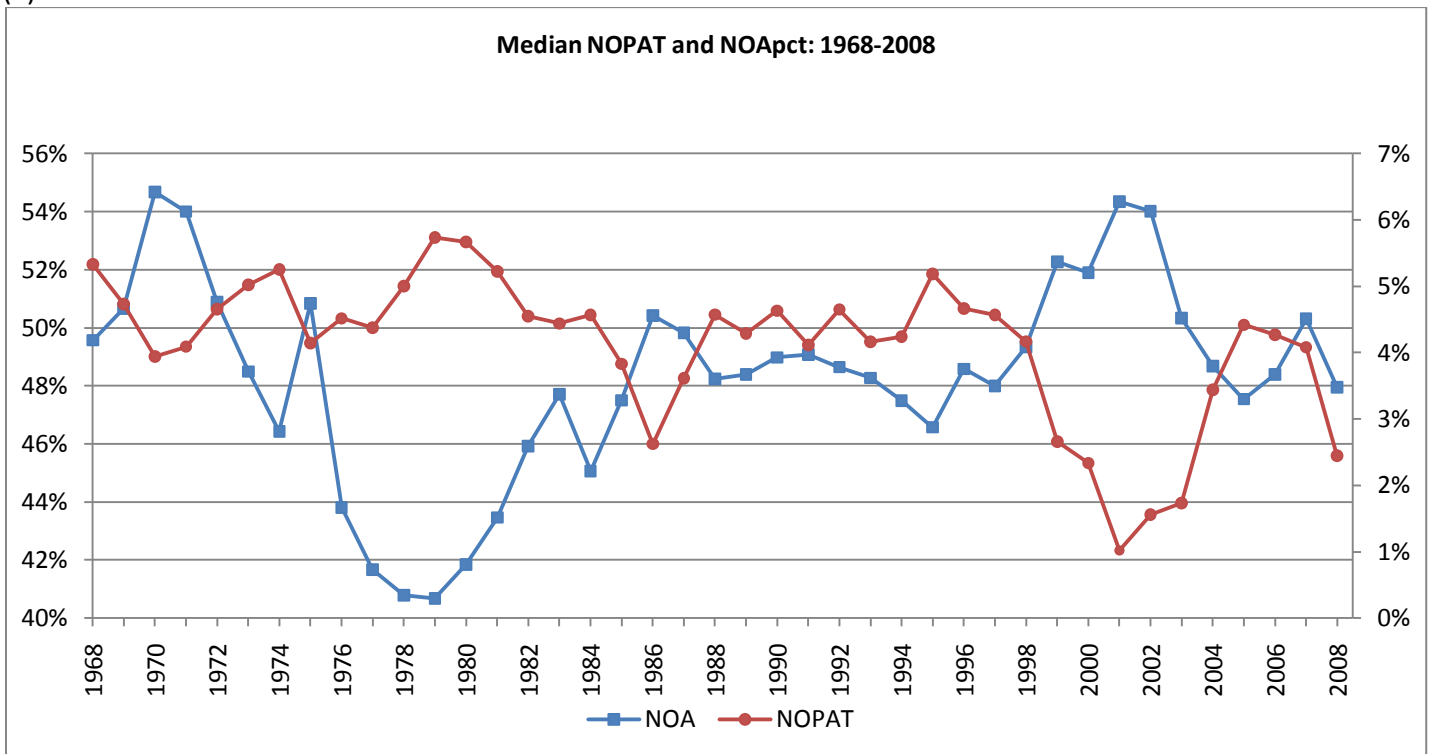
Table 2
RNOA, NOPAT and NOA Quartiles: 1968-2008

year	RNOA			NOPAT			NOA		
	75	50	25	75	50	25	75	50	25
1968	0.144	0.094	0.059	0.080	0.054	0.036	0.773	0.496	0.342
1969	0.139	0.090	0.055	0.079	0.051	0.033	0.753	0.507	0.358
1970	0.122	0.075	0.039	0.072	0.044	0.024	0.799	0.547	0.389
1971	0.119	0.076	0.040	0.071	0.045	0.023	0.785	0.540	0.385
1972	0.128	0.083	0.050	0.076	0.049	0.029	0.747	0.509	0.372
1973	0.141	0.094	0.060	0.081	0.051	0.033	0.689	0.485	0.349
1974	0.147	0.099	0.061	0.079	0.050	0.031	0.631	0.464	0.333
1975	0.135	0.085	0.041	0.077	0.048	0.025	0.748	0.508	0.353
1976	0.157	0.108	0.064	0.080	0.052	0.030	0.615	0.438	0.308
1977	0.163	0.112	0.069	0.080	0.052	0.032	0.581	0.417	0.295
1978	0.169	0.118	0.076	0.085	0.054	0.035	0.553	0.408	0.294
1979	0.181	0.125	0.083	0.091	0.058	0.036	0.547	0.407	0.293
1980	0.169	0.117	0.071	0.090	0.056	0.032	0.566	0.418	0.306
1981	0.166	0.110	0.063	0.093	0.058	0.032	0.618	0.435	0.310
1982	0.150	0.093	0.038	0.084	0.047	0.020	0.668	0.459	0.320
1983	0.156	0.091	0.038	0.090	0.049	0.022	0.756	0.477	0.320
1984	0.170	0.103	0.042	0.092	0.055	0.025	0.739	0.451	0.308
1985	0.156	0.087	0.028	0.087	0.050	0.018	0.744	0.475	0.319
1986	0.138	0.074	0.008	0.085	0.045	0.009	0.848	0.504	0.339
1987	0.145	0.082	0.017	0.093	0.053	0.018	0.827	0.498	0.333
1988	0.163	0.098	0.026	0.095	0.055	0.021	0.775	0.482	0.319
1989	0.163	0.095	0.031	0.095	0.053	0.019	0.755	0.484	0.322
1990	0.153	0.090	0.032	0.096	0.053	0.018	0.766	0.490	0.326
1991	0.146	0.078	0.017	0.085	0.043	0.009	0.788	0.491	0.318
1992	0.152	0.083	0.024	0.081	0.042	0.005	0.796	0.486	0.308
1993	0.158	0.085	0.024	0.080	0.041	0.007	0.801	0.483	0.304
1994	0.173	0.096	0.033	0.089	0.050	0.016	0.773	0.475	0.294
1995	0.176	0.102	0.035	0.094	0.051	0.014	0.758	0.466	0.296
1996	0.174	0.097	0.026	0.096	0.050	0.011	0.817	0.486	0.297
1997	0.174	0.097	0.025	0.089	0.045	0.003	0.781	0.480	0.293
1998	0.169	0.092	0.015	0.085	0.044	-0.008	0.795	0.493	0.297
1999	0.154	0.078	-0.006	0.084	0.040	-0.029	0.891	0.523	0.310
2000	0.156	0.075	-0.026	0.086	0.036	-0.054	0.911	0.519	0.304
2001	0.126	0.055	-0.070	0.067	0.021	-0.111	0.927	0.544	0.319
2002	0.131	0.058	-0.049	0.074	0.024	-0.108	0.933	0.540	0.308
2003	0.149	0.070	-0.016	0.093	0.039	-0.041	0.890	0.503	0.282
2004	0.179	0.092	0.020	0.102	0.048	0.000	0.850	0.487	0.265
2005	0.188	0.097	0.021	0.098	0.047	-0.002	0.828	0.475	0.264
2006	0.189	0.097	0.019	0.109	0.053	-0.001	0.845	0.484	0.262
2007	0.175	0.092	0.009	0.113	0.052	-0.009	0.881	0.503	0.271
2008	0.166	0.077	-0.044	0.082	0.027	-0.096	0.849	0.480	0.267

See Table 1 and the Appendix for variable definitions. NOPAT and NOA are scaled by sales.



(a)



(b)

Figure 1. (a) Median return on net operating assets (RNOA). (b) Median net operating profit after tax (NOPAT) measured in the scale on the right-hand side and median net operating assets (NOA) measured in the scale on the left-hand side. NOPAT and NOA are presented as a percentage of sales.

Table 3*Gross Profit Margin (GPM) and SG&A Margin (SGAM) Quartiles: 1968-2008*

year	Gross Profit Margin (GPM)			SG&A Margin (SGAM)		
	75	50	25	75	50	25
1968	0.388	0.291	0.217	0.315	0.237	0.172
1969	0.387	0.288	0.216	0.318	0.240	0.175
1970	0.379	0.281	0.205	0.321	0.241	0.177
1971	0.380	0.283	0.208	0.323	0.242	0.179
1972	0.382	0.288	0.212	0.319	0.242	0.178
1973	0.383	0.286	0.215	0.315	0.236	0.175
1974	0.385	0.285	0.209	0.313	0.233	0.170
1975	0.382	0.283	0.209	0.328	0.241	0.176
1976	0.392	0.289	0.213	0.332	0.243	0.177
1977	0.399	0.286	0.212	0.338	0.242	0.174
1978	0.404	0.293	0.215	0.335	0.243	0.176
1979	0.408	0.297	0.215	0.331	0.240	0.170
1980	0.415	0.299	0.216	0.335	0.242	0.172
1981	0.420	0.302	0.216	0.345	0.250	0.175
1982	0.428	0.307	0.216	0.368	0.262	0.187
1983	0.445	0.317	0.223	0.391	0.273	0.194
1984	0.451	0.321	0.225	0.401	0.276	0.188
1985	0.449	0.318	0.222	0.408	0.280	0.196
1986	0.460	0.324	0.220	0.439	0.297	0.201
1987	0.475	0.333	0.226	0.436	0.297	0.201
1988	0.481	0.336	0.227	0.440	0.290	0.192
1989	0.486	0.334	0.228	0.437	0.291	0.189
1990	0.484	0.334	0.219	0.438	0.287	0.186
1991	0.490	0.335	0.216	0.446	0.294	0.189
1992	0.495	0.341	0.214	0.452	0.294	0.188
1993	0.492	0.342	0.218	0.457	0.300	0.189
1994	0.492	0.343	0.220	0.446	0.301	0.187
1995	0.505	0.350	0.223	0.444	0.299	0.189
1996	0.511	0.353	0.223	0.458	0.306	0.191
1997	0.520	0.357	0.224	0.472	0.311	0.193
1998	0.522	0.358	0.221	0.494	0.316	0.198
1999	0.536	0.364	0.224	0.531	0.338	0.212
2000	0.538	0.368	0.219	0.543	0.345	0.212
2001	0.537	0.362	0.219	0.578	0.352	0.217
2002	0.544	0.362	0.222	0.580	0.347	0.215
2003	0.554	0.368	0.224	0.556	0.351	0.214
2004	0.558	0.371	0.224	0.526	0.336	0.201
2005	0.563	0.374	0.226	0.524	0.330	0.198
2006	0.564	0.375	0.230	0.530	0.333	0.196
2007	0.563	0.370	0.224	0.539	0.329	0.190
2008	0.545	0.357	0.210	0.537	0.332	0.195

See table 1 and the Appendix for variable definitions. Gross profit and SG&A Margins are Gross Profit and SG&A Expenses scaled by sales.

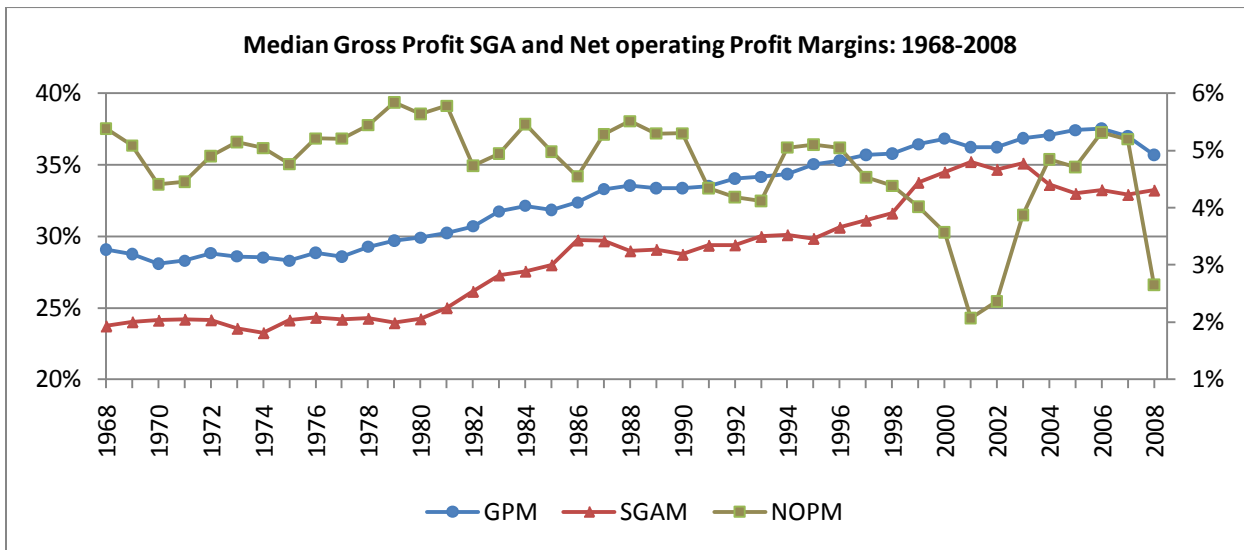


Figure 2. Median gross profit margin, SG&A margin, and net operating profit margins. Gross profit, SG&A and Net operating profit margins are Gross Profit, SG&A Expenses and Net Operating Profit (Gross profit less SG&A Expenses) scaled by sales. The gross profit margin SG&A margin are reported in the scale on the left-hand side and the net operating profit margin is reported in the scale on the right-hand side.

Table 4

*Accounts Receivable (AR), Inventories (INV), Accounts Payable (AP) and Accrued Liabilities (ACC) Quartiles:
1968-2008*

year	Accounts Receivable (AR)			Inventories (INV)			Accounts Payable (AP)			Accrued Liabilities (ACC)		
	75	50	25	75	50	25	75	50	25	75	50	25
1968	0.188	0.136	0.096	0.228	0.157	0.092	0.061	0.018	0.022	0.020	0.012	0.011
1969	0.192	0.143	0.101	0.238	0.165	0.096	0.069	0.040	0.025	0.024	0.014	0.011
1970	0.202	0.152	0.108	0.250	0.172	0.096	0.088	0.058	0.040	0.043	0.026	0.012
1971	0.200	0.153	0.108	0.251	0.171	0.093	0.085	0.058	0.042	0.046	0.029	0.014
1972	0.195	0.150	0.106	0.234	0.162	0.089	0.083	0.057	0.041	0.046	0.029	0.015
1973	0.193	0.147	0.106	0.229	0.158	0.086	0.087	0.060	0.043	0.046	0.029	0.015
1974	0.186	0.141	0.099	0.239	0.166	0.084	0.085	0.060	0.044	0.045	0.029	0.016
1975	0.211	0.151	0.107	0.271	0.183	0.097	0.097	0.063	0.045	0.054	0.033	0.018
1976	0.182	0.135	0.095	0.231	0.158	0.082	0.079	0.055	0.040	0.049	0.031	0.017
1977	0.180	0.135	0.095	0.219	0.152	0.078	0.079	0.055	0.039	0.050	0.031	0.017
1978	0.181	0.136	0.095	0.213	0.149	0.078	0.079	0.056	0.041	0.051	0.032	0.018
1979	0.182	0.139	0.098	0.212	0.147	0.075	0.080	0.058	0.042	0.051	0.033	0.018
1980	0.185	0.144	0.102	0.217	0.149	0.076	0.083	0.060	0.044	0.054	0.035	0.019
1981	0.194	0.146	0.104	0.224	0.150	0.074	0.084	0.061	0.044	0.058	0.037	0.019
1982	0.204	0.153	0.106	0.227	0.149	0.071	0.085	0.060	0.043	0.063	0.039	0.020
1983	0.217	0.155	0.108	0.226	0.143	0.066	0.089	0.061	0.044	0.068	0.042	0.022
1984	0.214	0.154	0.108	0.214	0.139	0.059	0.091	0.060	0.044	0.068	0.042	0.022
1985	0.220	0.158	0.109	0.213	0.137	0.056	0.093	0.061	0.044	0.068	0.043	0.022
1986	0.237	0.164	0.113	0.222	0.137	0.056	0.099	0.064	0.044	0.075	0.046	0.022
1987	0.238	0.162	0.111	0.211	0.132	0.053	0.100	0.065	0.045	0.076	0.045	0.020
1988	0.224	0.160	0.111	0.199	0.123	0.046	0.095	0.065	0.044	0.071	0.043	0.020
1989	0.222	0.160	0.112	0.196	0.121	0.043	0.093	0.064	0.043	0.071	0.044	0.021
1990	0.220	0.158	0.112	0.190	0.117	0.037	0.092	0.063	0.043	0.073	0.045	0.021
1991	0.221	0.159	0.114	0.190	0.119	0.035	0.095	0.063	0.043	0.079	0.047	0.022
1992	0.221	0.157	0.110	0.191	0.115	0.033	0.095	0.063	0.042	0.082	0.050	0.024
1993	0.222	0.157	0.108	0.187	0.110	0.033	0.097	0.064	0.043	0.087	0.051	0.025
1994	0.216	0.154	0.107	0.180	0.107	0.030	0.099	0.064	0.043	0.085	0.050	0.025
1995	0.219	0.154	0.103	0.179	0.104	0.027	0.099	0.065	0.044	0.085	0.050	0.025
1996	0.227	0.159	0.108	0.183	0.103	0.023	0.103	0.066	0.045	0.090	0.054	0.027
1997	0.222	0.157	0.105	0.175	0.095	0.016	0.101	0.065	0.043	0.090	0.054	0.027
1998	0.221	0.159	0.106	0.171	0.092	0.013	0.097	0.064	0.043	0.091	0.056	0.028
1999	0.238	0.164	0.110	0.180	0.092	0.012	0.106	0.067	0.045	0.100	0.059	0.029
2000	0.225	0.160	0.110	0.168	0.084	0.007	0.103	0.067	0.043	0.099	0.058	0.029
2001	0.221	0.161	0.104	0.175	0.086	0.007	0.102	0.066	0.042	0.103	0.059	0.029
2002	0.209	0.154	0.100	0.172	0.084	0.008	0.099	0.064	0.040	0.107	0.062	0.031
2003	0.198	0.148	0.099	0.158	0.081	0.007	0.095	0.062	0.038	0.106	0.062	0.031
2004	0.195	0.144	0.094	0.150	0.077	0.007	0.095	0.060	0.037	0.101	0.060	0.032
2005	0.193	0.144	0.095	0.145	0.076	0.007	0.094	0.061	0.038	0.099	0.059	0.030
2006	0.196	0.144	0.097	0.148	0.076	0.008	0.095	0.061	0.038	0.100	0.059	0.031
2007	0.199	0.146	0.096	0.148	0.078	0.008	0.098	0.063	0.039	0.100	0.060	0.031
2008	0.190	0.139	0.087	0.150	0.076	0.007	0.092	0.060	0.038	0.094	0.058	0.030

See table 1 and the Appendix for variable definitions. Accounts Receivable (AR), Inventories (INV), Accounts Payable (AP) and Accrued Liabilities (ACC) are scaled by sales.

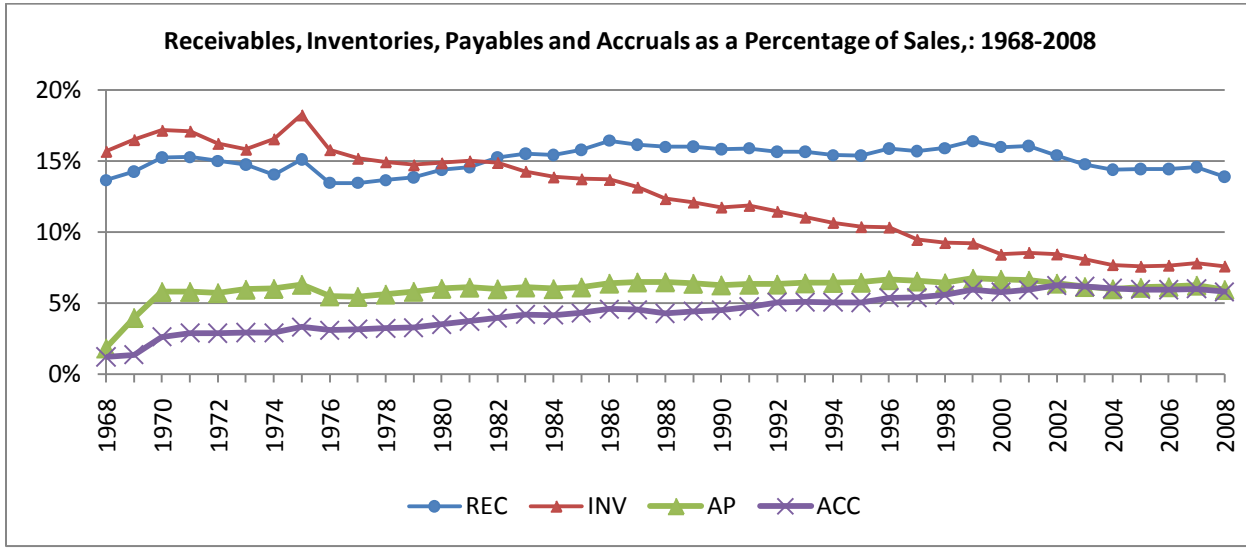


Figure 3. Median accounts receivable (AR), inventories (INV), accounts payable (AP) and accrued liabilities (ACC) scaled by sales.

Table 5*Property, Plant & Equipment (PPE) and net Other (OTH) Assets Percentiles: 1968-2008*

year	Property, Plant & Equipment (PPE)			Other (OTH)		
	75	50	25	75	50	25
1968	0.815	0.396	0.221	-0.113	-0.209	-0.380
1969	0.776	0.391	0.227	-0.087	-0.174	-0.328
1970	0.771	0.413	0.243	-0.061	-0.145	-0.284
1971	0.754	0.411	0.240	-0.055	-0.144	-0.286
1972	0.720	0.394	0.229	-0.051	-0.138	-0.284
1973	0.663	0.355	0.211	-0.046	-0.129	-0.253
1974	0.555	0.326	0.197	-0.046	-0.122	-0.227
1975	0.756	0.372	0.219	-0.055	-0.139	-0.278
1976	0.561	0.327	0.196	-0.058	-0.134	-0.244
1977	0.541	0.318	0.191	-0.062	-0.134	-0.242
1978	0.519	0.315	0.188	-0.063	-0.131	-0.236
1979	0.497	0.305	0.189	-0.062	-0.127	-0.229
1980	0.530	0.318	0.198	-0.063	-0.127	-0.236
1981	0.581	0.343	0.202	-0.064	-0.133	-0.252
1982	0.659	0.376	0.222	-0.067	-0.144	-0.277
1983	0.746	0.399	0.231	-0.068	-0.151	-0.296
1984	0.729	0.384	0.222	-0.061	-0.142	-0.279
1985	0.724	0.391	0.224	-0.058	-0.141	-0.281
1986	0.852	0.425	0.238	-0.047	-0.144	-0.304
1987	0.802	0.412	0.224	-0.034	-0.136	-0.297
1988	0.770	0.394	0.211	-0.029	-0.124	-0.292
1989	0.756	0.389	0.213	-0.024	-0.119	-0.293
1990	0.756	0.401	0.219	-0.022	-0.126	-0.301
1991	0.810	0.410	0.223	-0.018	-0.131	-0.323
1992	0.838	0.421	0.223	-0.018	-0.132	-0.329
1993	0.866	0.417	0.210	-0.010	-0.132	-0.336
1994	0.826	0.404	0.202	-0.002	-0.118	-0.314
1995	0.780	0.388	0.194	0.005	-0.105	-0.291
1996	0.845	0.390	0.192	0.021	-0.094	-0.287
1997	0.768	0.370	0.186	0.025	-0.086	-0.259
1998	0.745	0.366	0.186	0.048	-0.075	-0.243
1999	0.820	0.383	0.190	0.083	-0.064	-0.253
2000	0.768	0.365	0.192	0.113	-0.047	-0.226
2001	0.768	0.388	0.209	0.117	-0.053	-0.246
2002	0.832	0.409	0.227	0.103	-0.077	-0.284
2003	0.829	0.409	0.222	0.090	-0.085	-0.320
2004	0.800	0.387	0.204	0.109	-0.078	-0.296
2005	0.758	0.371	0.194	0.128	-0.068	-0.278
2006	0.734	0.350	0.188	0.142	-0.059	-0.270
2007	0.732	0.347	0.184	0.165	-0.055	-0.263
2008	0.708	0.345	0.183	0.128	-0.064	-0.276

See table 1 and the Appendix for variable definitions. Property, Plant & Equipment (PPE) and net Other (OTH) assets are scaled by sales.

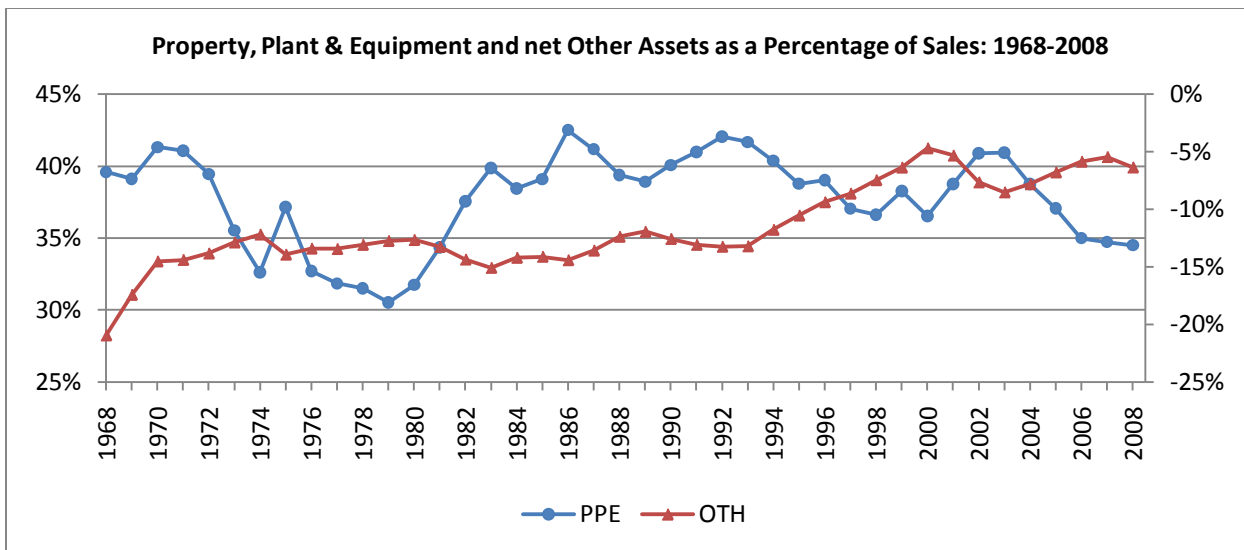


Figure 4. Median property, plant & equipment (PPE) reported in the left-hand scale and net other (OTH) assets reported in the right-hand scale. Both variables are scaled by sales.

Table 6

Median RNOA Deciles for Years Relative to Portfolio Formation: 1968-1988

Years	Deciles									
	10	9	8	7	6	5	4	3	2	1
0	0.372	0.228	0.173	0.138	0.110	0.088	0.069	0.041	-0.001	-0.159
1	0.310	0.193	0.148	0.124	0.102	0.085	0.063	0.049	0.025	-0.032
2	0.256	0.155	0.133	0.118	0.100	0.083	0.066	0.052	0.038	0.010
3	0.226	0.145	0.120	0.110	0.097	0.081	0.068	0.062	0.054	0.031
4	0.197	0.143	0.116	0.108	0.094	0.085	0.078	0.069	0.065	0.051

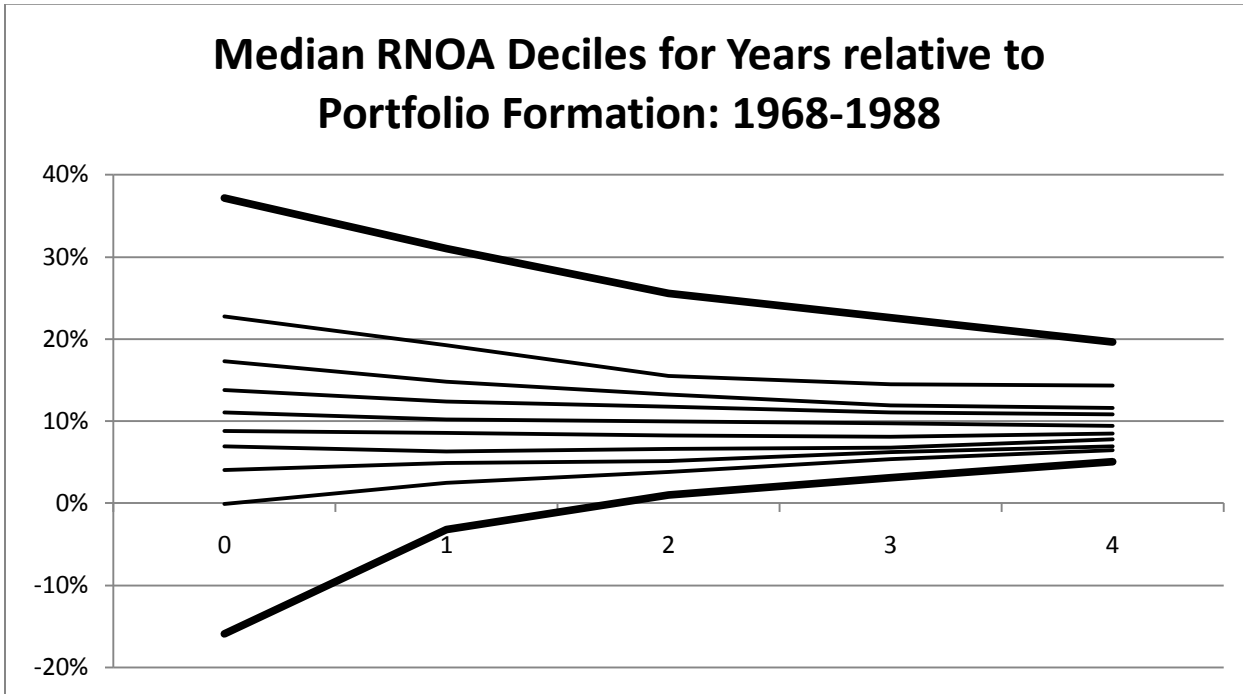


Figure 5. Median RNOA deciles for years relative to portfolio formation.

Table 7

Median RNOA for the Top and Bottom Deciles and for Years Relative to Portfolio Formation: 1968-1988

Years	Top Decile					Bottom Decile				
	0	1	2	3	4	0	1	2	3	4
RNOA	0.372	0.310	0.256	0.226	0.197	-0.159	-0.032	0.010	0.031	0.051
change		-0.062	-0.055	-0.029	-0.030		0.127	0.043	0.021	0.020
p-Value	<.0001	<.0001	<.0001	<.0001		<.0001	<.0001	<.0001	<.0001	<.0001
percentYear0		0.166	0.147	0.078	0.080		0.796	0.268	0.131	0.124
cum percent		0.352	0.663	0.830	1.000		0.604	0.807	0.906	1.000

See table 1 and the Appendix for variable definitions. Tests of differences in medians are based on a Wilcoxon signed rank test.

Table 8
Median NOPAT and NOA as a Percentage of Sales for the Top and Bottom
Deciles
and for Years Relative to Portfolio Formation: 1968-1988

Years	Top Decile					Bottom Decile				
	0	1	2	3	4	0	1	2	3	4
NOPAT	0.103	0.093	0.079	0.074	0.072	-0.094	-0.019	0.002	0.011	0.019
change		-0.010	-0.014	-0.005	-0.002		0.075	0.021	0.009	0.008
p-Value	<.0001	<.0001	<.0001	0.4010		<.0001	<.0001	<.0001	<.0001	<.0001
percentYear0		0.102	0.132	0.052	0.016		0.800	0.219	0.098	0.084
cum percent		0.337	0.776	0.948	1.000		0.666	0.849	0.930	1.000
NOA	0.265	0.298	0.328	0.353	0.355	0.605	0.498	0.464	0.441	0.422
change		0.034	0.030	0.025	0.002		-0.107	-0.034	-0.022	-0.019
p-Value	<.0001	<.0001	<.0001	0.0008		<.0001	<.0001	<.0001	<.0001	<.0001
percentYear0		0.127	0.111	0.095	0.008		0.178	0.056	0.037	0.032
cum percent		0.371	0.698	0.975	1.000		0.587	0.772	0.894	1.000

See table 1 and the Appendix for variable definitions. Net operating profit after tax (NOPAT) and net operating assets (NOA) are expressed as a percentage of sales. Tests of differences in medians are based on a Wilcoxon signed rank test.

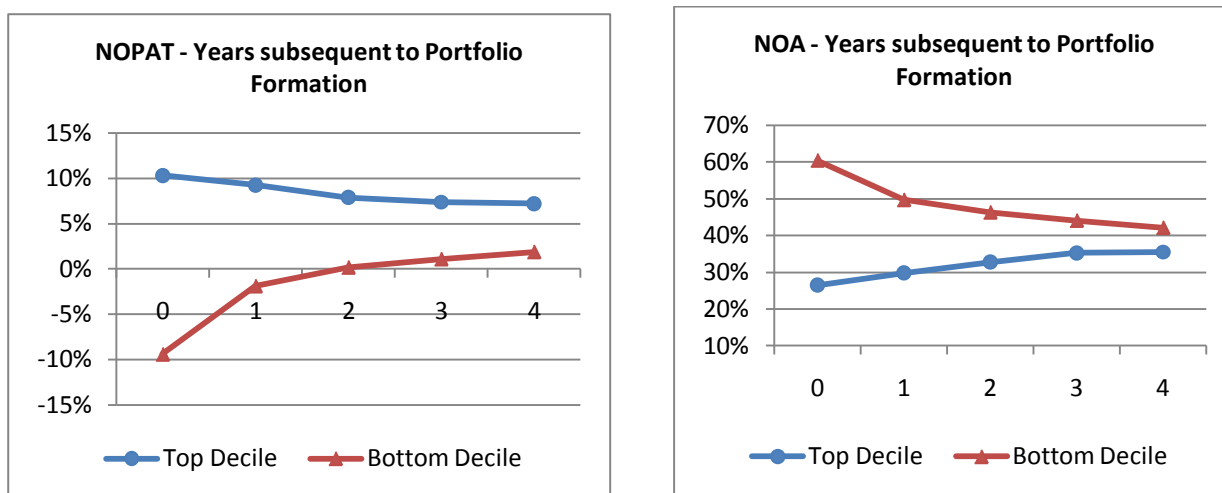


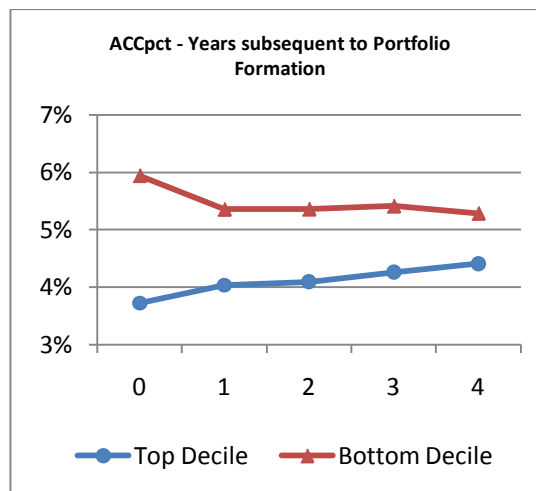
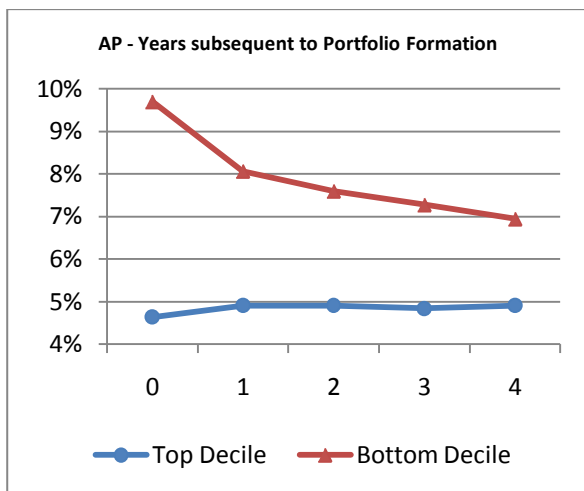
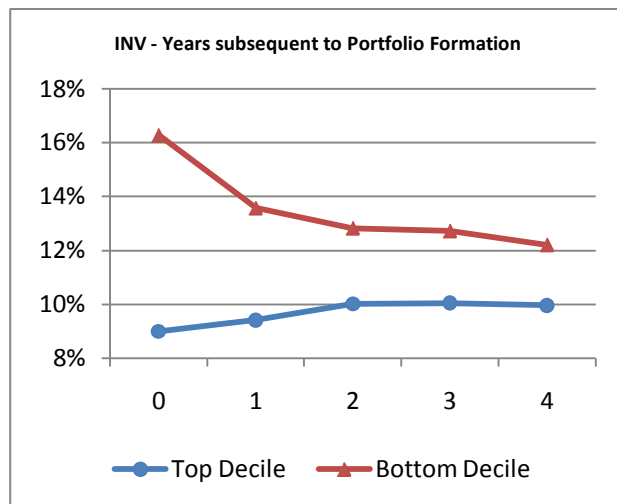
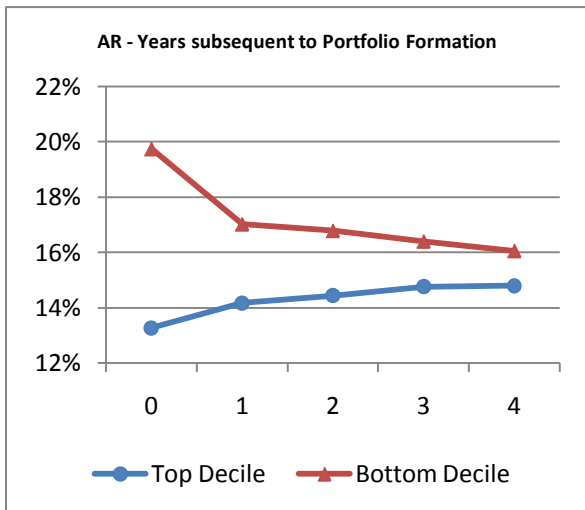
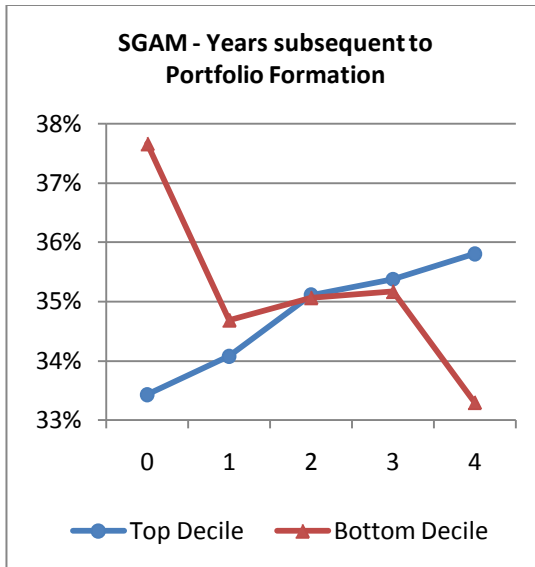
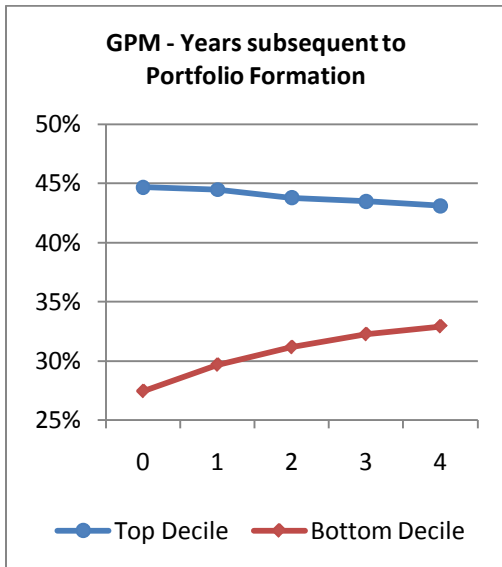
Figure 6. Median NOPAT and NOA scaled by Sales for top and Bottom Deciles and for Years Relative to Portfolio Formation.

Table 9

Medians of the Components of NOPAT and NOA as a Percentage of Sales for the Top and Bottom Deciles and for Years Relative to Portfolio Formation: 1968-1988

Years	Top Decile					Chg.	Bottom Decile					Chg.
	0	1	2	3	4		0	1	2	3	4	
GPM	0.447	0.445	0.438	0.435	0.431	-0.016	0.274	0.297	0.311	0.322	0.329	0.055
change		-0.002	-0.007	-0.003	-0.004			0.022	0.015	0.011	0.007	
p-Value		<.0001	<.0001	0.049	0.498			<.0001	<.0001	<.0001	<.0001	
percentYear0		-0.005	-0.016	-0.006	-0.009	-0.035		0.081	0.054	0.040	0.024	0.200
cum percent		0.132	0.574	0.758	1.000			0.407	0.678	0.879	1.000	
SGAM	0.334	0.341	0.351	0.354	0.358	0.024	0.377	0.347	0.351	0.352	0.333	-0.044
change		0.006	0.010	0.003	0.004			-0.030	0.004	0.001	-0.019	
p-Value		<.0001	<.0001	0.001	0.129			<.0001	0.020	<.0001	0.000	
percentYear0		0.019	0.031	0.008	0.013	0.071		-0.079	0.010	0.003	-0.050	-0.116
cum percent		0.272	0.707	0.820	1.000			0.681	0.595	0.571	1.000	
AR	0.133	0.142	0.144	0.148	0.148	0.015	0.198	0.170	0.168	0.164	0.161	-0.037
change		0.009	0.003	0.003	0.000			-0.027	-0.002	-0.004	-0.003	
p-Value		<.0001	<.0001	0.000	0.295			<.0001	0.015	<.0001	0.163	
percentYear0		0.068	0.020	0.024	0.003	0.115		-0.138	-0.012	-0.019	-0.017	-0.187
cum percent		0.591	0.767	0.976	1.000			0.738	0.802	0.907	1.000	
INV	0.090	0.094	0.100	0.100	0.100	0.010	0.163	0.136	0.128	0.127	0.122	-0.041
change		0.004	0.006	0.000	-0.001			-0.027	-0.007	-0.001	-0.005	
p-Value		<.0001	<.0001	0.211	0.701			<.0001	<.0001	<.0001	<.0001	
percentYear0		0.047	0.066	0.003	-0.009	0.107		-0.166	-0.046	-0.006	-0.032	-0.250
cum percent		0.436	1.055	1.085	1.000			0.664	0.848	0.873	1.000	
PPE	0.227	0.240	0.263	0.287	0.296	0.069	0.481	0.393	0.381	0.362	0.356	-0.125
change		0.013	0.022	0.025	0.009			-0.089	-0.012	-0.018	-0.006	
p-Value		<.0001	<.0001	<.0001	<.0001			<.0001	0.000	0.000	0.002	
percentYear0		0.059	0.099	0.108	0.040	0.306		-0.184	-0.025	-0.038	-0.013	-0.260
cum percent		0.194	0.517	0.870	1.000			0.710	0.804	0.951	1.000	
OTH	-0.104	-0.096	-0.095	-0.096	-0.101	0.003	-0.134	-0.118	-0.128	-0.134	-0.134	0.000
change		0.008	0.001	-0.001	-0.005			0.016	-0.010	-0.007	0.000	
p-Value		<.0001	0.006	0.111	<.0001			0.164	<.0001	<.0001	0.585	
percentYear0		-0.080	-0.005	0.008	0.052	-0.025		-0.121	0.072	0.050	-0.001	-0.001
cum percent		3.246	3.458	3.119	1.000			233.000	95.286	-0.286	1.000	
AP	0.046	0.049	0.049	0.048	0.049	0.003	0.097	0.081	0.076	0.073	0.069	-0.028
change		0.003	0.000	-0.001	0.001			-0.016	-0.005	-0.003	-0.003	
p-Value		0.005	0.735	0.543	0.053			<.0001	<.0001	<.0001	0.013	
percentYear0		0.059	0.001	-0.016	0.015	0.058		-0.168	-0.048	-0.033	-0.034	-0.284
cum percent		1.010	1.021	0.746	1.000			0.593	0.763	0.880	1.000	
ACC	0.037	0.040	0.041	0.043	0.044	0.007	0.059	0.054	0.054	0.054	0.053	-0.007
change		0.003	0.001	0.002	0.002			-0.006	0.000	0.001	-0.001	
p-Value		<.0001	0.001	<.0001	<.0001			0.001	0.438	0.342	0.308	
percentYear0		0.084	0.015	0.045	0.041	0.184		-0.098	0.001	0.009	-0.021	-0.110
cum percent		0.456	0.537	0.780	1.000			0.893	0.888	0.809	1.000	

See table 1 and the Appendix for variable definitions. Tests of differences in medians are based on a Wilcoxon signed rank test.



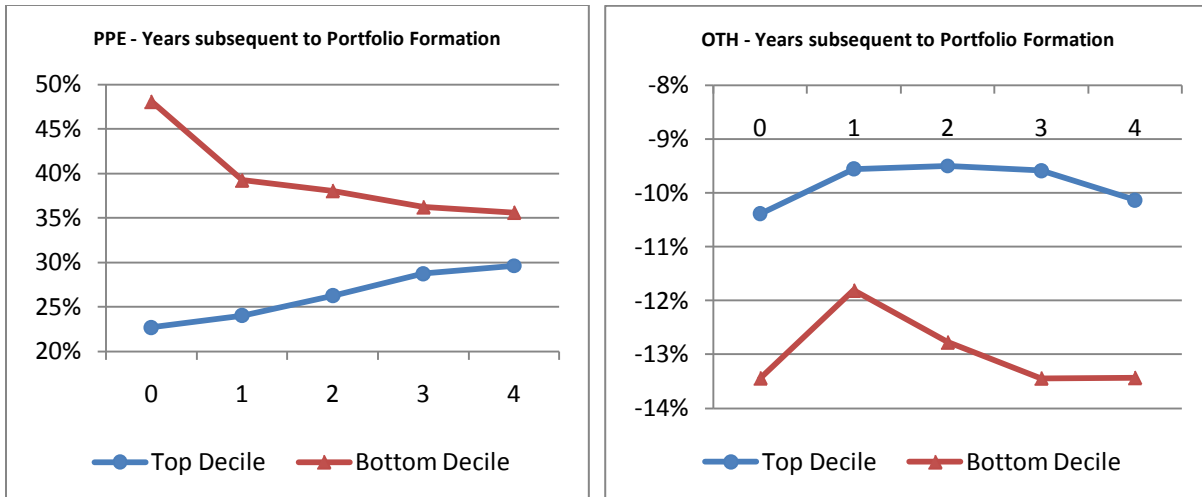


Figure 7. Median Components of NOPAT and NOA for top and Bottom Deciles and for Years Relative to Portfolio Formation. Variables are gross profit margin (GPM), SG&A margin (SGAM), accounts receivable (AR), inventories (INV), accounts payable (AP) and accrued liabilities (ACC), property, plant and equipment (PPE) and other assets (OTH) all scaled by sales.

Table 10
*Relative contributions to the change in RNOA from a change in NOPAT and NOA
and their Components*

Years	Top Decile				Bottom Decile			
	1	2	3	4	1	2	3	4
Panel A - Income Statement Accounts:								
percent NOPAT	49.2 %	53.2 %	59.4 %	62.5 %	82.4 %	79.7 %	78.0 %	75.9 %
percent NOA	50.8 %	46.8 %	40.6 %	37.5 %	17.6 %	20.3 %	22.0 %	24.1 %
Panel B - NOPAT Components:								
percent GPM	54.3 %	55.4 %	53.7 %	55.1 %	45.5 %	51.0 %	48.0 %	49.1 %
percentSGAM	45.7 %	44.6 %	46.3 %	44.9 %	54.5 %	49.0 %	52.0 %	50.9 %
Panel C - Working Capital Accounts:								
percentAR	10.8 %	11.2 %	11.0 %	11.2 %	10.6 %	9.8 %	9.8 %	9.7 %
percentINV	8.8 %	8.6 %	8.2 %	8.1 %	9.2 %	8.6 %	8.2 %	8.0 %
percentAP	6.2 %	5.6 %	5.5 %	5.3 %	6.4 %	6.2 %	6.0 %	6.2 %
percentACC	4.1 %	4.2 %	4.0 %	4.1 %	3.7 %	3.6 %	4.0 %	4.0 %
Panel D - Long-term Assets:								
percentPPE	27.1 %	29.8 %	28.1 %	28.4 %	29.7 %	28.9 %	29.5 %	29.8 %
percentOTH	23.3 %	21.8 %	22.8 %	23.6 %	22.5 %	22.5 %	24.0 %	25.3 %

See table 1 and the Appendix for variable definitions. The sum of the NOPAT and NOA effects does not equal the change in RNOA as I compute the effects from the medians I report in previous tables to maintain consistency in the reported values.

Table 11
Forecasts of RNOA for Top and Bottom Deciles
Using the Historical Reversion of the RNOA Ratio

year	Top Decile				Bottom Decile			
	RNOA ₀	RNOA _{t+4}	Forecasted RNOA _{t+4}	error	RNOA ₀	RNOA _{t+4}	Forecasted RNOA _{t+4}	error
1973	0.28311	0.19277	0.21901	0.02624	0.00108	0.10428	0.27959	0.17531
1978	0.31979	0.15526	0.21453	0.05927	0.01656	0.06113	1.09999	1.03886
1983	0.34122	0.17516	0.16205	-0.01311	-0.13209	0.06284	0.43494	0.37210
1988	0.36456	0.24642	0.19544	-0.05098	-0.17891	0.03206	0.08634	0.05428
1993	0.41566	0.18976	0.28070	0.09094	-0.29820	0.02235	0.05185	0.02950
1998	0.42891	0.19316	0.19095	-0.00221	-0.83210	-0.31218	-0.00371	0.30847
2003	0.51147	0.19331	0.22624	<u>0.03293</u>	-0.58486	-0.24705	-0.21581	<u>0.03124</u>
average				0.02044				0.28711

See table 1 and the Appendix for variable definitions. Forecasts of RNOA are performed using the historical reversion of the RNOA Ratio. All of the forecasts for both the top and bottom deciles are significantly different from the naïve forecast of no change in RNOA at the 1 percent level of significance based on a Wilcoxon signed rank test.

Table 12
Forecasts of RNOA for Top and Bottom Deciles
Using the Historical Reversion of NOPAT and NOA to Compute the RNOA Ratio

year	Top Decile						Bottom Decile						
	RNOA ₀	RNOA _{t+4}	Forecasted RNOA _{t+4}	error	favorable	Unfavorable	RNOA ₀	RNOA _{t+4}	Forecasted RNOA _{t+4}	error	favorable	unfavorable	
1973	0.28311	0.19277	0.23994	0.04717	**	0.02093	0.00108	0.10428	0.05603	-0.04825	***	0.12706	
1978	0.31979	0.15526	0.20598	0.05072		0.00855	0.01656	0.06113	1.47542	1.41429	**	0.37543	
1983	0.34122	0.17516	0.16905	-0.00611		0.00700	-0.13209	0.06284	0.25430	0.19146	***	0.18064	
1988	0.36456	0.24642	0.20265	-0.04377		0.00721	-0.17891	0.03206	0.07036	0.03830		0.01598	
1993	0.41566	0.18976	0.25885	0.06909	**	0.02185	-0.29820	0.02235	0.04411	0.02176		0.00774	
1998	0.42891	0.19316	0.19262	-0.00054		0.00167	-0.83210	-0.31218	-0.03058	0.28160	***	0.02687	
2003	0.51147	0.19331	0.21020	0.01689		0.01604	-0.58486	-0.24705	-0.23597	0.01108		0.02016	
average				0.01906		0.01039				0.27289		0.06308	0.37543

See table 1 and the Appendix for variable definitions. Forecasts of RNOA are performed using the historical reversion of NOPAT and NOA to compute the RNOA Ratio. The Favorable and Unfavorable columns present the difference between the forecast error using NOPAT and NOA compared with the forecast error using the historical reversion of the RNOA ratio reported in Table 11. Statistical significance compared with median values reported in Table 11 is denoted by *** (**) for 1 percent (5 percent) based on a Wilcoxon signed rank test.

Table 13

Forecasts of RNOA for Top and Bottom Deciles Using the Historical Reversion of Gross Profit and SG&A expenses (for NOPAT) and Accounts Receivable, Inventories, PPE assets, Other assets, Accounts Payable, and Accrued Liabilities (for NOA) to Compute the RNOA Ratio

year	Top Decile							Bottom Decile						
	RNOA ₀	RNOA _{t+4}	Forecasted RNOA _{t+4}	error	stat. sig.	favorable	unfavorable	RNOA ₀	RNOA _{t+4}	Forecasted RNOA _{t+4}	error	stat. sig.	favorable	unfavorable
1973	0.28311	0.19277	0.21227	0.01950		0.00674		0.00108	0.10428	0.06970	-0.03458	***	0.14073	
1978	0.31979	0.15526	0.12789	-0.02737	***	0.03190		0.01656	0.06113	0.14522	0.08409	***	0.95477	
1983	0.34122	0.17516	0.12477	-0.05039	***		0.03728	-0.13209	0.06284	-0.15359	-0.21643	***	0.15567	
1988	0.36456	0.24642	0.20310	-0.04332		0.00766		-0.17891	0.03206	0.06307	0.03101	***	0.02327	
1993	0.41566	0.18976	0.19138	0.00162	***	0.08932		-0.29820	0.02235	-0.02556	-0.04791	***		0.01841
1998	0.42891	0.19316	0.21519	0.02203			0.01982	-0.83210	-0.31218	-0.39206	-0.07988	***	0.22859	
2003	0.51147	0.19331	0.17999	-0.01332	***	0.01961		-0.58486	-0.24705	-0.21253	0.03452			0.00328
average				-0.01304		0.03105	0.02855				-0.03274		0.30061	0.01085

See table 1 and the Appendix for variable definitions. Forecasts of RNOA are performed using the historical reversion of the components of NOPAT and NOA to compute NOPAT and NOA and the RNOA Ratio. The Favorable and Unfavorable columns present the difference between the forecast error using the *components* of NOPAT and NOA compared with the forecast error using the historical reversion of the RNOA ratio reported in Table 11. Statistical significance compared with median values reported in Table 11 is denoted by *** (**) for 1 percent (5 percent) based on a Wilcoxon signed rank test.