

## OPERATING RETURN TRENDS

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### ABSTRACT

This study examines the operating returns, margins and turnovers of non-financial S&P 500 companies from 1982-1999. At the aggregate level, operating return remains relatively stable during the time period and exhibits no trend. However, asset turnover displays a steady decrease, which is offset by increasing profit margins. The cross-sectional analysis indicates that although margin and turnover both contribute to superior return, margin is more highly correlated to return. Consistent with economic theory for a competitive equilibrium environment, margin and turnover are negatively correlated with each other in both the cross-sectional and time-series analyses. Operating returns do not exhibit a trend but they vary cyclically with changes in GDP.

### INTRODUCTION

Cash flows from financial investments ultimately are tied to the cash flows produced by the underlying assets. Returns that firms can generate from their assets drive the returns available to the providers of capital. As the Internet bubble of the late 1990s demonstrated, short-term financial returns are possible without cash flows on the underlying real assets, but these returns are not sustainable in the long run. Return on assets (ROA) consists of two components: profit margin, which is the mark-up of price above cost; and asset turnover, which is the sales revenue generated by a dollar of assets. The ability of financial assets to generate higher returns for investors depends upon the increased profitability of assets, which in turn, depends upon increases in either profit margin or asset turnover.

This paper examines operating returns and its components for non-financial S&P 500 companies from 1982-1999 to determine trends in profitability and implications for returns on investment. Two levels of analysis are performed. First, using firm-specific cross-sectional data, return, margin and turnover are analyzed. Second, annual averages for return, margin and turnover are calculated for the sample and the intertemporal results are studied. Equity investors received a historically high return during the period 1982-1999. This study tests whether operational profitability increased during this period, and if so, whether margins or turnover were responsible for the increase.

I find that aggregate average operating returns have remained relatively constant over the sample period. However, the stability of returns masks changes in its components. Average operating margin has increased, while average asset turnover has decreased. I also find that margin and turnover are negatively correlated, indicating that firms with higher margins generally have lower turnover. Although negatively correlated with each other, margin and turnover each are positively correlated with returns,

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demonstrating that both contribute to superior profitability. Margins exhibit more inter-firm variability than asset turnover and are more highly correlated with returns.

## LITERATURE REVIEW

In a competitive, general equilibrium framework, industry profitability should trend to an economy-wide, long-run average (Fama & French, 2000; Scherer, 1980). Absent barriers to entry, industries with higher returns will attract competition, eliminating excess returns. However, firms within industries that have significant barriers to entry and a non-competitive market structure may be able to earn excess returns. The persistence of profitability and the sources of above average profitability have been extensively studied since Bain's (1951) seminal work. Using Compustat financial data, Mueller (1977) estimated a set of firm specific regressions with profit rates as the dependent variable and a deterministic, decaying time trend as the independent variable. The majority of firms with above average profit rates at the beginning of the sample period had negative coefficients, indicating decay in the profit rate. The majority of firms with below average profit rates at the beginning of the sample period had positive coefficients. These findings indicate that profit rates converge over time due to competitive pressures. However, for a significant number of firms, coefficients were either small or of the wrong sign, indicating that convergence may take place slowly or not at all.

Later work by Mueller (1986) used a stochastic time series model which estimated profit persistence using a first order autoregressive equation. This model has formed the basis of much subsequent research, including Mueller (1990), Geroski (1990) and Goddard and Wilson (1996). These studies have shown that for a typical firm, profits converge fairly quickly to the firm's long run equilibrium rate but that the long run rates of return differ significantly across firms. Fama and French (2000), using a partial adjustment model, estimate a 38 percent annual rate of mean reversion in profitability. Both firm and industry characteristics are important in explaining the persistence of profits. McGahan (1999), studying U.S. profit performance from 1981-1994, found that firm effects were more important in determining profitability than industry effects but that industry effects were more persistent.

Although profit persistence is widely studied, less attention has been focused on the components of operating profit. Most finance textbooks cover the method of disaggregating ROA into profit margin and asset turnover components. The disaggregation, attributed to F. Donaldson Brown of the DuPont Powder Company, allows an analyst to identify whether abnormal profitability is due to profit margin or asset utilization. Profit margin measures the proportion of sales dollars realized as net income. Asset turnover measures the ability of each dollar of assets to generate a dollar in sales. Increasing either turnover or margin increases ROA.

In a competitive, general-equilibrium framework, risk-adjusted ROA trends to an economy-wide constant, implying that profit margin and asset turnover are inversely related. In fact, if all firms earned the same return, profit margin and asset turnover would be perfectly negatively correlated with each other and uncorrelated with ROA. As previously cited empirical studies have demonstrated, profitability rates differ between industries and between firms within industries. Although the general equilibrium

assumption of equal profitability may be simplistic, many segments of the U.S. economy experience significant competitive pressures that eliminate long-run economic profits, and therefore, profit margin and asset turnover should be inversely correlated.

In their seminal study, Selling and Stickney (1989) documented inter-industry variation in profit margin and asset turnover using Compustat financial data from 1977 to 1986. As expected in competitive markets, they found a significant negative correlation between profit margin and asset turnover; industries with high (low) profit margin usually have low (high) asset turnover. Selling and Stickney (1989) found that firms with above average profit performance have higher profit margin and/or higher asset turnover than the typical firm. They attribute the high margins to two factors. First, firms with high asset requirements need to have a sufficient return to attract capital. It follows from the accounting identity, that firms with low turnover need to have higher margins to achieve the same return as firms with higher turnover. Even with no barriers to entry, industries with large capital requirements will have higher profit margins in order to achieve an average return. Since profit margin for the unleveraged firm is the percentage of sales revenue that flows back to the providers of capital and capital-intensive production processes use more capital relative to other inputs, the providers of capital should claim a larger share of revenue. Capital intensity, in this context, refers to the amount of assets needed to support sales, the reciprocal of total asset turnover, and includes fixed, current and intangible assets.

Selling and Stickney (1989) identified lack of competition as the second reason why low turnover industries achieve higher margins. Capital intensity may create barriers to entry that allow capital-intensive firms to earn superior margins. Much of the profit persistence literature examines competition and abnormal profitability, but most studies generally use concentration as a proxy for competition. Waring (1986) used both concentration and capital intensity in a profit persistence regression. Concentration was found to be positively related to persistence, while capital intensity was found to be negatively related to persistence.

Qualls (1974) and Selling and Stickney (1990) note that leverage lowers ROA because interest payments reduce net income. Therefore, ROA commingles operational performance with capital structure decisions. Researchers studying profitability have added interest payments back to net income (Geroski 1990, Mueller 1977, 1986, Qualls 1974) or have used earnings before interest and taxes (EBIT) as the numerator (McGahan 1999, Blaine 1993) of ROA to neutralize the effects of financing decisions upon operating performance.

Since this study is concerned with the operational performance of firms and not with financing or tax management strategies, I follow McGahan (1999) and Blaine (1993) by using operating margin (EBIT/Sales) to measure profit margin and basic earning power (BEP), which is also operating return (EBIT/Assets), to measure ROA. The modified Dupont relationship for operational profitability becomes:

$$\text{BEP} = \text{EBIT margin} \times \text{Asset Turnover} = \text{EBIT/Assets} \quad (1)$$

**DATA AND RESULTS:**

Data were collected from the Compustat Active and Research files for non-financial members of the S&P 500. The S&P 500 companies were chosen instead of a broader set because of the impact that outliers would have on correlations using the margin and return ratios. To reduce survivor bias, a company is included in the data set for all years if it was a member of the S&P 500 at any point during the sample period. For example, ACF Industries was a member of the S&P 500 from December 1981 through June 1984, but data for the company are included for the entire sample period. This results in more than 500 observations per year. The equally-weighted averages, medians, standard deviations, and coefficients of variation (CV) for turnover, margin and return for 1982-1999 are given in Table 1.

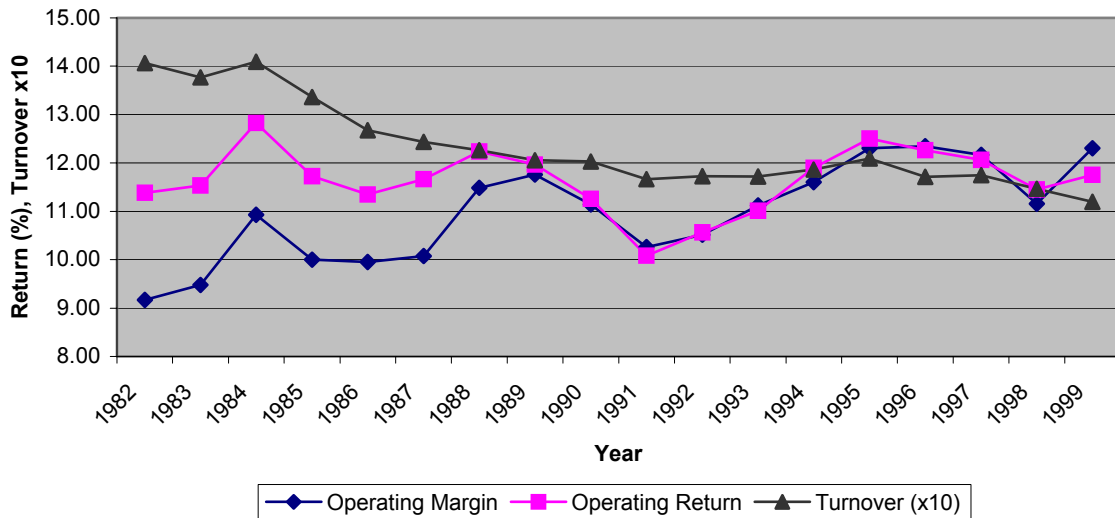
**Table 1: Asset Turnover, Operating Margin and Operating Returns for S&P 500 Members**

Year	Firms	Asset Turnover			Operating Margin			Operating Return on Assets					
		Mean	Median	Sigma	CV	Mean	Median	Sigma	CV	Mean	Median	Sigma	CV
1982	662	1.41	1.24	0.95	0.68	9.17	8.43	12.98	1.42	11.38	10.89	8.99	0.79
1983	661	1.38	1.18	0.98	0.71	9.48	9.03	16.26	1.72	11.53	11.03	8.65	0.75
1984	643	1.41	1.25	0.95	0.68	10.93	10.07	11.32	1.04	12.83	11.85	8.74	0.68
1985	640	1.34	1.18	0.90	0.67	10.00	9.36	11.90	1.19	11.73	10.59	9.81	0.84
1986	636	1.27	1.11	0.86	0.68	9.95	9.13	12.14	1.22	11.35	10.46	10.60	0.93
1987	629	1.24	1.08	0.84	0.67	10.08	10.20	17.99	1.78	11.66	10.75	9.68	0.83
1988	625	1.23	1.07	0.81	0.66	11.48	10.49	10.51	0.92	12.24	11.01	9.39	0.77
1989	614	1.21	1.08	0.80	0.67	11.76	10.69	8.96	0.76	11.97	10.37	9.07	0.76
1990	607	1.20	1.07	0.80	0.67	11.14	9.91	10.02	0.90	11.26	9.65	8.64	0.77
1991	606	1.17	1.03	0.79	0.68	10.26	8.83	10.10	0.98	10.08	8.92	8.96	0.89
1992	617	1.17	1.04	0.78	0.66	10.52	9.16	10.20	0.97	10.56	9.09	9.03	0.85
1993	617	1.17	1.01	0.80	0.68	11.12	9.70	10.70	0.96	11.01	9.49	9.03	0.82
1994	612	1.19	1.05	0.79	0.67	11.60	10.53	12.74	1.10	11.90	10.23	9.32	0.78
1995	599	1.21	1.06	0.79	0.65	12.31	11.56	12.73	1.03	12.50	11.04	9.45	0.76
1996	598	1.17	1.07	0.75	0.64	12.35	11.30	13.70	1.11	12.26	10.95	9.40	0.77
1997	584	1.17	1.01	0.76	0.65	12.17	11.38	12.72	1.05	12.06	11.07	9.41	0.78
1998	564	1.15	0.99	0.77	0.67	11.15	10.88	15.05	1.35	11.45	10.77	9.53	0.83
1999	534	1.12	0.95	0.78	0.70	12.31	11.49	11.75	0.95	11.75	10.44	9.45	0.80

Note that although return (BEP) is the product of margin (EBITM) and asset turnover, mean BEP does not equal the product of mean EBITM and mean asset turnover because the average of the products does not equal the product of the averages. The number of observations exceeds 500 for all years since data include firms that were members of the S&P 500 between the years 1982 and 1999.

The operating margins are consistent with those reported by Blaine (1993) using the Disclosure/Worldscope data base. As depicted in Figure 1, operating margin appears to be increasing, asset turnover decreasing and operating return appears trendless.

**Figure 1**  
**Mean Operating Return, Margin & Asset Turnover**



The summary data were regressed against time to indicate whether statistically significant trends exist. The following regression equation was estimated for average EBIT margin, asset turnover and BEP:

$$Y_t = \beta_0 + \beta_1 t + \varepsilon_t \quad (2)$$

The null hypothesis of  $\beta_1=0$  implies a stationary, or trendless series. A significant  $\beta_1$  results in a rejection of the null hypothesis. A positive  $\beta_1$  indicates an increasing trend; a negative coefficient indicates a decreasing trend. The results for each of the regressions appear in Table 2.

**Table 2: Time Trend Regression for mean values 1982-1999.**

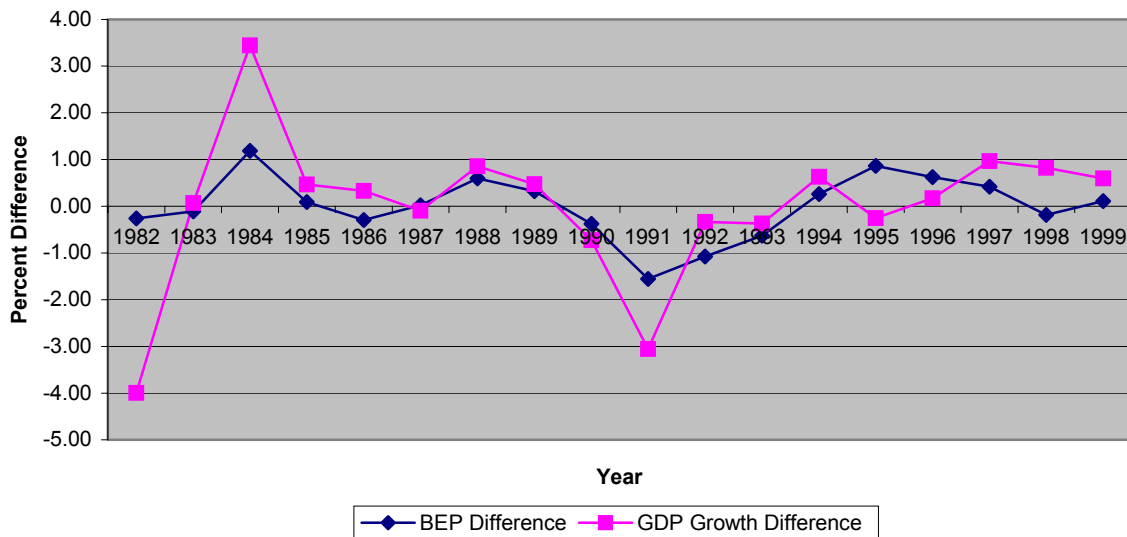
	EBITM	AT	BEP
Coefficient	0.150	-0.015	0.002
Standard Error	0.028	0.002	0.031
t Stat	5.29	-7.788	0.511
P-value	0.00	0.000	0.960
Multiple R	0.797	0.890	0.013
R Square	0.636	0.791	0.000
Adjusted R Square	0.614	0.778	-0.062
Standard Error	0.640	0.042	0.689

The coefficient for BEP is not statistically significant and the regression has an  $R^2$  of nearly zero. The regression indicates that the operational return on assets (BEP) has remained trendless during the sample period. The nominal return available to the government, debt providers and stockholders has

remained relatively constant over the sample period, which is surprising considering the diversity of economic conditions from 1982-1999.

Operating returns exhibit obvious cyclical variation, which becomes evident from graphing the difference between annual returns and the average annual return (11.4 percent). Figure 2 graphs this difference along with the difference between annual GDP growth and its average for the period (2.37 percent). As expected, operating returns are closely linked to GDP growth, but surprisingly, they vary less than GDP growth.

**Figure 2**  
**Difference Between BEP and GDP from Average Values**



While total return has remained fairly constant, its components have changed. EBIT margin has a statistically significant, positive coefficient and asset turnover has a statistically significant negative coefficient. Both regressions have very high  $R^2$  values, the  $R^2$  for turnover being higher because of the greater cyclical variation in operating margin. The competitive market explanation for the trends is that asset requirements have increased, per dollar of sales, and therefore a larger share of sales revenue flows to the providers of capital, resulting in a higher operating profit margin. An alternative, although probably less likely, explanation is that increasing profit margins create slack which allows firms to partake in wasteful expenditures. A 1941 note by Kaldor and Robinson (2000) identify this as a problem with high profit margins but it would seem that this problem would be more likely to occur within a particular industry than across the economy as a whole.

Although the data indicate that asset requirements for sales have increased, anecdotal evidence shows that asset requirements are subject to opposing forces. On the one hand, capital deepening would contribute to increased asset requirements. On the other hand; capital productivity increases should reduce asset requirements. As Oliner and Sichel (2000) indicate, capital deepening from 1970 to 1999 has resulted in an annual increase in labor productivity of between 0.62 to 1.10 percent. American

workers, from physicians to retail clerks to teachers, have more tools available to them. Capital deepening increases the assets necessary to generate sales, resulting in a decrease in asset turnover.

Capital productivity increases, which can take the form of improved equipment or improved processes that increase the utilization of assets, offset capital deepening. The 1982-1999 period witnessed a cornucopia of both types of innovations. Advances in computer circuitry reduced the cost of information technology, which led to improvements in a variety of equipment. Information technology advances also supported improved processes, which changed the way that firms conducted their business (Brynjolfsson & Hitt 2000). Examples include just in time production (JIT) and consolidated zero-balance accounts. Both innovations decrease current asset requirements: JIT through inventory and consolidated zero-balance accounts through cash and equivalents.

A study of individual industries would probably reveal that some industries have increased capital requirements, while others have lower capital requirements, depending upon the relative strength of capital deepening versus capital productivity. Overall, for this sample, asset turnover has steadily decreased. In fact, with an  $R^2$  of 0.791, the time trend regression indicates a very strong and persistent decrease in asset turnover.

Table 3 shows the correlation of average margin, turnover and return for each year (1982-1999).

**Table 3: Correlation for Annual Averages (1982-1999)**

	<i>EBITM</i>	<i>AT</i>	<i>BEP</i>
<b>EBITM</b>	1.000		
<b>AT</b>	-0.667	1.000	
<b>BEP</b>	0.486	0.256	1.000

The strong negative correlation between margins and turnover (-0.6617) far exceeds the -0.213 average of the cross-sectional correlations, listed in the first column of Table 4. Two factors account for the disparity between the cross-sectional and time-series correlations. First, cross-sectional correlations are lower because superior firms achieve above average profitability through higher margins and/or higher turnover. Second, the intertemporal stability of returns leads to a substantial negative correlation among the time series because the increase in margin is accompanied by a decrease in turnover. Operating profitability fluctuates around 11.6 percent, despite increasing margins. It would be interesting to determine whether increased margins bring about greater asset intensity, and thus lower turnover, or whether greater asset intensity gives rise to higher margins. Alternatively, since equally-weighted averages are used, and the set of firms is not constant, the results could be due to an increase in the number of high margin, low turnover firms relative to the number of low margin, low turnover firms. This last explanation can be ruled out because similar results were obtained when the analysis was conducted with the 304 firms that had complete data for the 1982-1999 period. Turnover increased and margin decreased by roughly the same magnitude, while the composition of firms remained constant. Although

beyond the scope of this study, National Income and Product Account data could conclusively test whether asset intensity has increased economy wide or only for the S&P 500 set of firms.

**Table 4. Correlation Between Margin, Turnover and Return**

<b>Year</b>	<b>EBITM AT</b>	<b>EBITM BEP</b>	<b>AT BEP</b>
1982	-0.168	0.569	0.284
1983	-0.092*	0.478	0.321
1984	-0.207	0.560	0.272
1985	-0.171	0.559	0.335
1986	-0.150*	0.641	0.320
1987	-0.066	0.558	0.281
1988	-0.209	0.632	0.269
1989	-0.308	0.635	0.252
1990	-0.366	0.627	0.237
1991	-0.241	0.682	0.242
1992	-0.281	0.665	0.254
1993	-0.241	0.620	0.258
1994	-0.202	0.545	0.252
1995	-0.254	0.572	0.197
1996	-0.220	0.588	0.188
1997	-0.237	0.691	0.160
1998	-0.188	0.707	0.223
1999	-0.266	0.643	0.257

All correlations are significant at the 0.01 significance level except for \*.

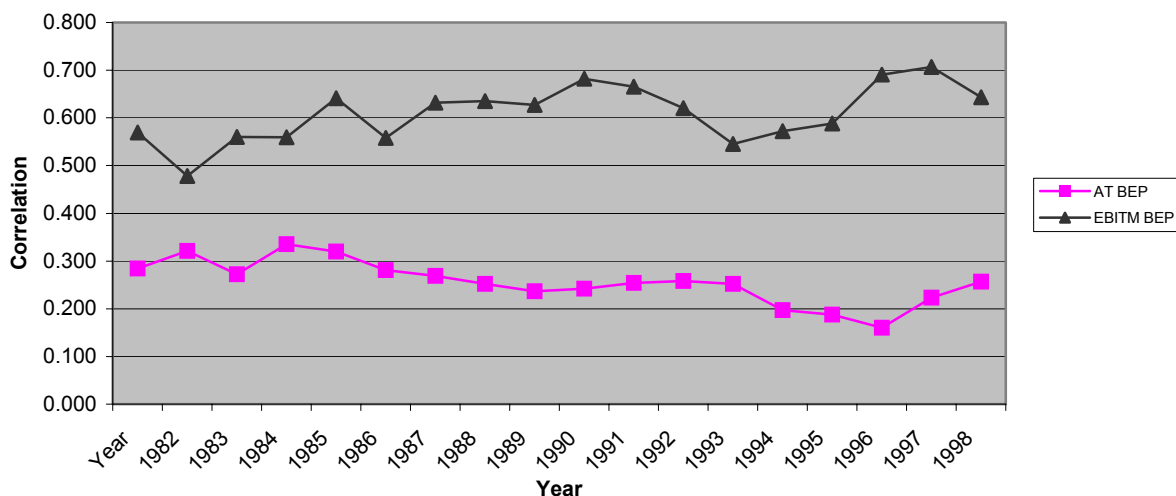
In a competitive environment, firms with more intensive capital requirements per dollar in sales should, *ceteris paribus*, have higher margins. Conversely, lower capital requirements should correspond to lower margins. Table 4 presents the cross-sectional correlation between margins (EBITM), turnover (AT), and return (BEP) for each year in the study period. As expected, margins and turnover are negatively correlated. The correlations are significant at the 0.01 level except for the 1983 and 1986 EBITM x AT correlation. In general, firms with higher (lower) turnover have lower (higher) margins, which is most likely explained by an industry effect. As noted by Selling and Stickney (1989), industries with high capital requirements generally have higher margin. The -0.21 average of the cross-sectional margin:turnover correlations, is significantly different from the -1.0 correlation that would occur if firms earned the same operating return.

The positive correlation between both margin and turnover and return supports the conclusion that superior performance is based upon either higher margin or higher turnover. The correlations are significant for all years at the 0.01 level. Returns are more highly correlated with margins, which may indicate that pursuing a high margin strategy is more successful than a high turnover strategy. The



higher correlation may also indicate that industries with high capital requirements earn a higher return than those with lower capital levels. Alternatively, the strong correlation between return and margin may simply reflect the larger variability of margins, which have nearly twice the CV of turnover. However, examining the graph of annual correlations in Figure 3, one notices that not only is the return correlation approximately twice as large, but that the correlation shows an increasing trend, even though the CV of operating return is decreasing. If the stronger correlation with returns was due to the higher variability of margins, one would expect that the correlation would fall as the CV of margins fell.

**Figure 3**  
Annual Correlations: Operating Return vs. Margin & Turnover



**CONCLUSION**

This study found a steady decrease in asset turnover from 1982 through 1999 has been offset by an increase in operating margin, resulting in no significant trend in operating return. More assets are necessary to support sales but return on assets is maintained through higher margins. Further research could ascertain the motivating force behind these trends. Does an increase in asset requirements lead to higher margins or do higher margins allow lower turnover? Or is the trend due to changes in accounting or tax regulations? If the trend exists because of economic forces, should we expect a continued increase in margins and decrease in turnover?

This study also found that profit margin and asset turnover jointly contribute to operational profitability. Profit margin is more highly correlated with returns than turnover and the strength of the correlation increased during the sample period. Further research should explore whether these results hold for a more comprehensive sample of firms. Additional research could also determine whether the results are consistent across sectors or whether some sectors have increased asset turnover.

Further work should also identify the extent of systematic and non-systematic factors affecting margins and turnover. This study showed that operating returns are highly correlated with changes in GDP growth, but other factors, such as inflation and interest rates, should also prove significant. Since operating returns provide the foundation for financial asset returns, analyzing sources of operating profitability presents rich research possibilities.