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Operational Performance of Firms Added to the S&P 500 Index

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Abstract

Although some studies have documented that there is a price increase for firms added to the S&P 500 Index other studies show mixed results. A more recent research suggests that managers are under greater scrutiny once they are added to the S&P500, and work harder to improve firm performance. They examine the earnings performance of the firms included in the S&P500 Index. We examine whether operational performance measured by net operating profits, cost of capital, and capital invested improves for these firms. Our findings show that net operating profits increases while cost of capital decreases over the same period, and capital invested increases significantly. The results imply that firms do improve operational performance; however, the outcome of the capital invested could be positive or negative, perhaps, explaining the mixed results from past studies.

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1. Introduction

While some studies have documented price increases for firms that are added to the S&P 500 Index others have shown that the results are mixed. Harris and Gurel (1986), Shleifer (1986), Jain (1987), Dhillon and Johnson (1991), Beneish and Whaley (1996), Lynch and Mendenhall (1997), and Wurgler and Zhuravskaya (2002) examine firms added to the S&P 500 Index, and they find that increased prices are associated with being included in the Index. However, Harris and Gurel find that the initial announcement period price increase related to the Index inclusion is reversed over the subsequent 30 days. Denis, McConnell, Ovtchinnikov and Yu (2003) also find statistically significant excess returns during the announcement period, but the cumulative excess return after 30 days is close to zero (0.04%). The implication of these past studies is that the S&P500 Index committee might be selecting firms with superior market valuation to be included in the S&P500 Index. Moreover, being added to the S&P500 will mean that mutual funds that mimic the Index must purchase shares, thereby increasing demand. However, this explanation contradicts the S&P committee's statement that a firm is selected to be included in the index such that the index is more representative of the economy and that the firm does not necessarily have "investment merit."

In light of these weak results, Denis et al also suggest that the causality could go in the reverse direction. They argue that managers are under greater scrutiny once they are added to the S&P 500 Index and are motivated to improve their performance. Hence, the Standard & Poor's announcement on firm inclusion (in the S&P500 Index) might lead to improvement in the firm's earnings and operating performance. They examine analysts forecasts and actual earnings per share to determine whether the firms' future prospects are better after they are included in the index. To test this conjecture further Denis et al determine whether the likelihood is greater for these firms included in the index to exhibit higher EPS as compared to a matched sample as well as all other firms. They find support for the likelihood of higher forecast for firms added to the index; their earnings are greater (52.2%) as compared to the matched sample (44.73%) and for all other firms (39.8%) after the inclusion announcement. The researchers conclude that firms added to the S&P500 Index lead to higher earnings, and therefore, stronger operating performance.

While Denis, et al suggest that improved earnings are a leading indicator of firm performance it can be manipulated by using smoothing or under/over reporting methods. To examine whether managers are motivated to improve their performance we analyze three variables: (1) the firm's after-tax operating profitability (NOPAT), (2) its cost of capital (K), and (3) the firm's capital invested (CAP). Examining after-tax operating profits provide a better measure of managerial performance absent of commingling financing and operating costs embedded in earnings per share as well as accounting methods that obscure the numbers. Additionally, by incorporating the cost of capital as well as the capital invested we attempt to provide a more complete picture of managerial performance and valuation. Together, the variables will provide another perspective of firm performance when examining companies added to the S&P 500 Index. Finally, we use economic value-added (EVA) as a summary of the three variables, net operating profits, cost of capital, and capital invested, in a regression analysis.

We examine firms added to the S&P500 between 1990 and 2000, and use an event study methodology where Year 0 is defined as the year in which a firm is added to the index. Average EVAs for five years prior (Year -5) to the S&P500 Index addition announcement year, and five years after it (Year +5) are reviewed. Our study documents a sharp drop in the average EVA in contrast to past studies that reported positive permanent increase in excess stock returns. Further investigation of net operating profits after taxes (NOPAT), weighted average cost of capital (K), and capital invested (Capital) indicates that NOPAT rises, K declines, and Capital invested increases. The results imply that firms' operating performance is increasing, and the decreasing K enhances firm value. Moreover, we find that EVA decreased due to increases in capital investment, and not due to decreasing NOPAT. The positive correlation between EVA/TA to market-to-book ratio suggests that investors believe the firms included in the S&P500 Index are growth firms.

The rest of the study provides data description and methodology is provided in Section 2, and empirical results are presented in Section 3. Finally, summary and conclusions are given in Section 4.

2. Data and Methodology

Economic Value Added (EVA), weighted average cost of capital (K), and Capital invested (Capital) are obtained from the Stern Stewart & Co's 2004 Top 1,000 M. EVA is computed annually by Stern Stewart & Co using a proprietary method that includes adjustments. The general definition is EVA is:

$$EVA_t = NOPAT_t - k * CAP_t +/- \text{Adjustments}, \quad (1)$$

where:

NOPAT_t is the after-tax net operating profits or (1-tax rate)EBIT in year t;

K is the weighted-average cost of capital in year t;

CAP is the amount of capital invested between time t and t-1

Adjustments are proprietary calculations made by Stern Stewart & Co.

Our sample includes all firms that were included in the S&P500 Index between 1990 and 2000. For these identified firms data are extracted from the Stern Stewart database for five years prior to being added to the S&P 500, and five years after it.

Figure 1. EVA of Firms Added to the S&P500 Index (entire sample)

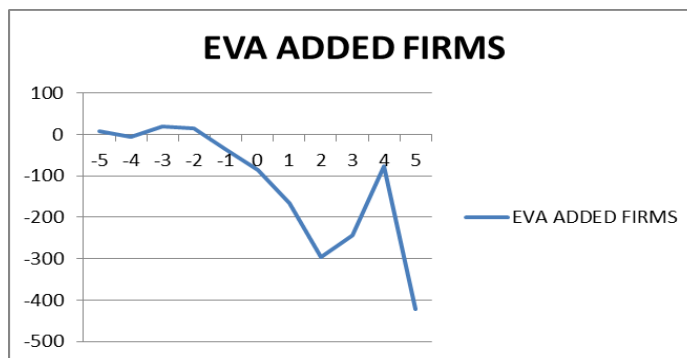


Table I provides EVA data for firms added to the S&P 500 index and Figure 1 displays the results graphically. The average EVA equals 7.404 five years prior to being added to the S&P500 Index and remains positive up to two years before its addition. One year prior to being included it averages -34.783 and equals -85.551 for the year it announces its inclusion to the index. Thereafter, it remains negative with the largest negative EVA (-421.239) five years after being included in the index. Therefore, the general trend of firms being added to the S&P500 Index results in negative average EVAs, contradicting the results of Denis et al. While Denis et al suggest that firms being scrutinized after its inclusion to the S&P500 makes the managers perform better, our study suggest that firm performance declines rather than improves when measured with EVA.

Table I. EVA of Firms Added to the S&P 500 Index (Entire Sample)^a

This table reports EVA averages for firms added to the S&P 500 Index for Stern Stewart & Co's 2004 Top 1000 firms sample.

	Year -5	Year -4	Year -3	Year -2	Year -1	Year 0	Year +1	Year +2	Year +3	Year +4	Year +5
EVA	7.404	-5.239	18.528	14.203	-34.783	-85.551	- 166.057	-295.979	-243.245	-75.841	-421.239
N	24	25	30	31	36	40	44	44	44	29	25

^a(EVA data in thousands of dollars)

However, we decompose the EVA data in order to examine each component for more details. The three components are: (1) net operating profits after taxes (NOPAT), (2) cost of capital (K), and (3) capital invested (CAP). Table II reports, on average, NOPAT performance improves after the firms are added to the S&P500 Index. It increases from \$149.54 five years prior to its addition to \$364.43 in its year of addition (Year 0), and continues to improve thereafter. It increases from \$414.80 in Year +1 to \$879.90 in Year 5, before declining in Year 5 to \$432.40, implying that firm performance improves, on average, when firms are added to the S&P500 Index.

Table II. NOPAT, Cost of Capital (K), and Capital Invested (CAP) of Firms Added to the S&P500 Index^a

This table reports net operating profits after taxes (NOPAT), cost of capital (K), and capital invested (CAP) averages of the Stern Stewart & Co's 2004 Top 1000 firms added to the S&P 500 Index.

	Year -5	Year -4	Year -3	Year -2	Year -1	Year 0	Year +1	Year +2	Year +3	Year +4	Year +5
NOPAT	149.54	159.17	184.74	323.17	401.10	364.43	414.80	397.02	573.82	879.90	432.40
K	0.1073	0.1037	0.1050	0.0988	0.0984	0.0969	0.0937	0.0913	0.0884	0.0879	0.0845
CAP	1701.32	1664.03	1896.13	2828.86	4064.28	5108.02	6827.86	7673.18	10,134.68	11,488.07	9207.16
N	24	25	30	31	36	40	44	44	44	29	25

^a(NOPAT and CAP data in thousands of dollars)

The average cost of capital (K) declines over Year -5 (0.1073) to Year 0 (0.0969), and continues to decline in Year 5 (0.0845) which would result in increased firm value. Additionally, the average capital invested (CAP) increase from Year -5 (\$1,701.32) to Year 0 (\$5,108.02) and continues to increase, peaking in Year 4 at \$11,488.07. With decreasing cost of capital and increasing NOPAT the firm performance, on average, are improving consistent with Denis et al. Moreover, the CAP data suggest that the average EVA declined due to its large investment in capital rather than poor performance. These results are consistent with past research by Harris and Gurel (1986), Shleifer (1986), Jain (1987), Dhillon and Johnson (1991), Beneish and Whaley (1996), Lynch and Mendenhall (1997), and Wurgler and Zhuravskaya (2002) that found positive stock returns after its announcement of being included in the S&P500 Index.

Our results using EVA provide some insights into the reasons for the mixed results. If data consisted of firms that invested large capital shortly after being included in the S&P500 Index their performance may be impacted by the outcome of the projects. If the capital investment paid off, it resulted in positive excess returns while poor investment outcomes would result in negative excess returns. Therefore, it appears that managers are more likely to make investments to improve firm performance, but its outcome is less predictable.

Next, we merge the sample we extracted from the Stern Stewart database with COMPUSTAT in order to obtain accounting variables that may impact variables of EVA. Our objective is to determine whether other accounting variables that relates to firm value and may drive the EVA data using time series-cross sectional panel data. To test this relationship the following regression equation is utilized:

$$\frac{EVA_t}{TA_t} = \beta_0 + \beta_1 AFTER_t + \beta_2 GPM_t + \beta_3 LR_t + \beta_4 DR_t + \beta_5 MTB_t + \beta_6 CAPR_t + \varepsilon_t \quad (2)$$

where:

AFTER is a dummy variable 1.0 if year t is the year after the firm was added to the S&P500 Index or zero otherwise.

GPM is the gross profit margin or (Sales – Cost of Goods Sold)/Sales, in year t;

LR is the liquidity ratio or Cash/Total Assets in year t;

DR is the debt ratio (DR) or (Total Debt/Total Assets) in year t;

MTB equals the market-to-book ratio or (market value of equity/book value of equity) in year t; and

CAPR is the capital ratio or (Stern Stewart's Capital Invested/Total Assets) in year t.

If other accounting variables drive the EVA relationship rather than NOPAT, the cost of capital, or capital invested, it should be correlated to EVA. We use EVA/TA for the dependent variable to control for size variation in the sample.

3. Results

After merging the Stern Stewart & Co's database with COMPUSTAT we re-examine the data to ensure that the same pattern persists. Table III displays the results, indicating that EVAs, on average, are negative from Year -1 and continues to decline.

Table III. EVA of Firms Added to the S&P500 Index (Restricted Sample)^a

This table reports EVA averages for firms added to the S&P 500 Index for merged Stern Stewart & Co's 2004 Top 1000 and COMPUSTAT sample.

	Year -5	Year -4	Year -3	Year -2	Year -1	Year 0	Year +1	Year +2	Year +3	Year +4	Year +5
EVA	3.89	-11.65	6.82	1.46	-34.07	-23.36	-60.22	-68.06	-36.53	-96.76	-507.48
N	19	20	22	24	29	33	36	36	36	25	21

^a(EVA data in thousands of dollars)

Next, we report the correlation coefficients between the independent variables and dependent variable, EVA/TA in Table IV. The results show that EVA is negatively correlated to the dummy variable (AFTER), gross profit margin (GPM), liquidity ratio (LR), market-to-book ratio (MTB), and capital invested ratio (CAPR) with values of -0.12, -0.15, -0.10, -0.19, and -0.70, respectively. EVA is positively correlated to the debt ratio (DR) at +0.05. Other notable correlations are between MTB and GPM (+0.25) and between MTB and LR (+0.32), and between MTB and CAPR (+0.44). These results imply that high market-to-book firms (or growth firms) are more likely to have high gross profit margin, high liquidity, and greater capital investments.

Table IV. Correlation Coefficients

This table reports correlation coefficients between the independent variables and dependent variable, EVA/TA.

	EVA	AFTER	GPM	LR	DR	MTB	CAPR
EVA	1.0						
AFTER	-0.12	1.0					
GPM	-0.15	0.00	1.0				
LR	-0.10	-0.06	0.29	1.0			
DR	0.05	0.10	0.01	-0.25	1.0		
MTB	-0.19	-0.11	0.25	0.32	-0.15	1.0	
CAPR	-0.70	0.030	0.15	0.08	0.02	0.44	1.0

The panel data regression analysis results are reported in Table V. The regression analysis are applied to two time periods – a 6-year period using Year -3 to Year +3 and three years prior to and after being included in the index and a 10-year period using Year -5 to Year +5. The R-squared for the 6-year subperiod equals 51.81% while the 10-year period equals 47.64%, both displaying a relatively strong relationship to EVA/TA.

The 6-year subperiod and the 10-year period relationship are similar. Both regressions show that AFTER is negatively and statistically significantly associated to EVA/TA at -0.0254 and -0.0267, respectively. Also, CAPR is negatively and significantly correlated to the dependent variable at -0.1534 for the 6-year subperiod and -0.1440 for the 10-year period. The results suggest that firms added to the S&P500 Index exhibit lower EVA/TA after the inclusion and its greater capital investment negatively affects the firm's EVA. In contrast, the results show that MTB is positively significantly related to EVA/TA, indicating that higher MTB (or growth firms) are associated with

higher EVA values. The coefficients are +0.0028 for the 6-year subperiod and +0.0026 for the 10-year period.

Our findings show that firms added to the S&P500 Index are generally high growth firms supported by high MTB ratios and its positive association with EVA/TA. We may find evidence that managers feel scrutinized after being added to the index as they invest more capital with expectations of improving firm performance. We find that the negative relationship between the dummy variable after being included to the S&P500 Index and EVA/TA is a result of more capital investment rather than poor (negative) profitability. The implication is that the market participants expect the investments to pay off as they are positively and significantly correlated to MTB ratios (or growth firms) even though EVA/TAs are currently declining.

Table V. Panel Regression Results

The table provides results for the regression equation:

$$\frac{EVA_t}{TA_t} = \beta_0 + \beta_1 AFTER_t + \beta_2 GPM_t + \beta_3 LR_t + \beta_4 DR_t + \beta_5 MTB_t + \beta_6 CAPR_t + \varepsilon_t$$

where AFTER is a dummy variable 1.0 if year t is the year after the firm was added to the S&P500 Index or zero otherwise; GPM is the gross profit margin or (Sales – Cost of Goods Sold)/Sales, in year t; LR is the liquidity ratio or Cash/Total Assets in year t; DR is the debt ratio (DR) or (Total Debt/Total Assets) in year t; MTB equals the market-to-book ratio or (market value of equity/book value of equity) in year t; and CAPR is the capital ratio or (Stern Stewart's Capital Invested/Total Assets) in year t.

	+/- 3-year subperiod		+/- 5-year period	
	Coefficient	p-value	Coefficient	p-value
Intercept	0.1314	<0.0001	0.1191	<0.0001
AFTER	-0.0254	0.0410	-0.0267	0.0071
GPM	-0.3071	0.1843	-0.0144	0.5070
LR	-0.0882	0.1980	-0.0854	0.1381
DR	0.0489	0.2882	0.0410	0.2682
MTB	0.0028	0.0030	0.0026	0.0018
CAPR	-0.1534	<0.0001	-0.1440	<0.0001
Adj R-sq		0.5181		0.4764
N		207		292

However, the univariate analysis on the decomposed EVA data shed some light regarding the continuously decreasing EVA after the firm is added to the S&P500. We find that the firms added to the index have positive and increasing NOPAT after being included, and decreasing cost of capital during the same period. The main reason for the negative EVA is attributed to the greater capital invested; in particular, after the inclusion announcement year. Therefore, we can surmise that the managers have improved performance after being added to the index as NOPAT increases and K declines. The scrutiny to do better may prompt managers to make larger capital investments, leading to lower (and larger negative) EVAs.

In summary, the results of this study support Denis et al's work that manager performance appears to improve as they work harder in the spot light of being included in the S&P500 Index. They improve net operating profits, decrease cost of capital, and invest greater capital, presumably to generate greater value. However, the EVA measure

fails to capture the increasing operating earnings as well as the declining K that will increase firm value. The EVA measure, however, does significantly correlate negatively to the investment amount, showing that larger investments lead to lower EVAs.

4. Summary and Conclusion

The study examines firms that are included into the S&P500 Index between 1990 and 2000. Using an event study methodology we set Year 0 as the year in which a firm is added to the index, and Year -5 as five years prior to the addition year while Year +5 represents five years after being added.

Based on Denis et al study we examine the firms' operational performance after being included to the S&P500 Index to determine whether greater scrutiny of the firm translates to better performance or not. We utilize the EVA metric instead of firm earnings per share used by Denis et al because managers can control earnings by income smoothing and/or earnings management. However, the components of EVA, net operating profits after taxes (NOPAT), weighted average cost of capital (K), and capital invested (CAP), are more difficult to alter.

Our analysis shows that NOPAT increases during the same period while K declines. Moreover, CAP increases significantly causing EVAs, on average, to be negative. Therefore, even if EVA is negative, we find evidence that the firm performance, measured by NOPAT, improves after being added to the index. Also, a decreasing K will increase firm value. The firm managers appear to invest significantly in capital after being added to the S&P500. It is possible that the greater scrutiny drives them to increase their likelihood to invest, knowing that their performance is under greater observation by the investment community at large.

The regression analysis supports the evidence as it shows a significant negative relationship between the dummy variable representing firms after YEAR 0 and EVA/TA, implying EVAs decline after the firm's inclusion to the index. Moreover the capital invested is significant and negatively related to EVA/TA, implying higher investments lead to lower negative EVAs. Finally, market-to-book ratio is positively related to EVA/TA, showing that firms added to the index are growth firms. The study adds to the literature by providing additional evidence that managers feel scrutinized when included in the index, and their operational performance improves. Finally, the mixed results found in past studies could be related to the uncertain outcome of the large investments as some will generate positive returns while others will not.

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