TRADING STRATEGY AND SELLING GENERAL AND ADMINISTRATIVE EXPENSE

by

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Abstract

This paper studies the relationship between selling, general and administrative expense(SG&A) of North American public companies and their stock performance. We introduce a measure of corporate governance based on the ratio of SG&A cost over total revenue and find a casual negative relationship between SG&A ratio and stock return. Additionally, we create a long-short trading strategy based on the SG&A ratio.

Keywords: Selling General and Administrative Expense, Governance, Trading Strategy, Abnormal Return

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Table of Contents

List of Figures

List of Tables

1: Introduction

In this paper, we investigate the relationship between stock performance and selling, general and administrative expense (SG&A). SG&A expense is reported in income statement and its importance is increasing as the universe average SG&A to total revenue ratio increased from 23% in 1971 with 3510 observations to 304% in 2018 with 5287 observations (calculated from our data obtained from Compustat).

The traditional fundamental analysis considers SG&A to revenue ratio to be a signal of corporate governance, because it is closely related to the ability and efficiency of the management. A higher ratio may indicate a bad cost control strategy and a lower ratio may indicate that the company is conservative in costs. As the previous governance literature finds a positive relationship between abnormal return and governance (Gompers, Ishii, & Metrick, 2003), firms with lower SG&A to revenue ratios are expected to have higher abnormal returns.

Prior studies also found the "cost stickiness" of SG&A expense, which means SG&A costs tend to be reduced inadequately when demand shrinks (Anderson et al. 2007; Baumgarten et al. 2010). Therefore SG&A costs could be considered more as fixed costs although part of SG&A costs is variable. Firms with higher SG&A to revenue ratio could be deemed to have higher operating leverage. Contrary to governance perspective, the operating leverage perspective would argue that higher SG&A cost is associated with more systematic risk, which can lead to higher raw returns, but is not expected to affect abnormal return (i.e., firm performance).

Our hypothesis is in accordance with the governance perspective; a lower SG&A cost ratio leads to better governance and also better stock performance. We analyse the data within two time periods: from 1970 to 2018 and from 1999 to 2018. The reason for this is to study whether there is any difference between the longer period and the recent 20 years. Our research includes the entire universe of the company data from CRSP and Compustat without bias to any particular industry. Since SG&A Expense as a Percentage of Sales varies by industry sectors, we compare this ratio to the industry average each year. Therefore, the results of this paper can be informative for institutional traders who are interested in a diversified portfolio, which is not industry specific. This approach also makes sense because costs are to a large extent industry related and simply concluding that one industry has better governance than the other because it has a low SG&A ratio is probably an overstatement that is intuitively wrong.

Overall, we find that companies with below industry average SG&A expense over sales ratio (but are not in the bottom 20 percentile) generate the best stock performance. It is applicable to generate trading profits as the abnormal return is statistically significant in a value-weighted calendar time portfolio approach. However, the alphas generated through long-short strategy are not as high as long-only strategy, thus based on the four-factor model, the long-only strategy is more profitable.

This paper proceeds as follows. Literature reviews are included in Section 2 and the data is described in Section 3. Methodology is presented in Section 4 and empirical analysis results are provided in Section 5. Section 6 concludes.

2: Literature Review

The outcome-based accounting performance measures motivate managers to take both revenue-increasing and expenditure-decreasing actions that create shareholder wealth directly, thus they are widely employed these days (Banker, Huang, & Natarajan, 2011). A significant amount of cost within business operations is from Selling, general, and administrative (SG&A) cost. The average SG&A costs to total assets ratio is 27 percent while the research and development (R&D) to total assets ratio is only 3 percent (Banker, Huang, & Natarajan, 2011). Investors start to realize the importance of SG&A cost and look for ways to control SG&A expenditure. As a result, researchers and practitioners try to understand SG&A cost behaviour and the role of managers in adjusting the costs (Chen et al., 2012).

In fundamental analysis, the ratio of SG&A costs to sales has been monitored and interpreted as a measure of operating efficiency and corporate governance in studies(Anderson et al., 2007). An increase in this ratio in a period is perceived as a negative signal, representing the inefficiency and inability of managers to cost control, which results in lower future earnings and lower estimates for firm value (Guenther, 2014). As the previous governance literature finds a positive relationship between abnormal return and governance (Gompers, Ishii & Metrick, 2003), firms with higher SG&A expense ratio will have less abnormal returns. Further, Anderson et al.(2003) found that SG&A expense had “cost stickiness”, which means SG&A costs decreases less than revenue does when demand shrinks. Agency problem is an important reason of “cost stickiness”(Chen et al., 2012), thus SG&A expense is related to agency problem and firm specific risks. Finally, excess returns negatively related to changes to the SG&A ratio of a firm(Lev & Thiagarajan, 1993).

However, according to the empirical findings, cost stickiness may also contribute to an increasing SG&A cost ratio when demand is declining (Anderson et al., 2007; Baumgarten et al., 2010). Consequently, a high SG&A could be representing a high operating leverage. Lev(1974) found that the degree of operating leverage could be a real determinant of beta, thus more related to systematic risk. From operating leverage perspective, high SG&A leads to higher raw returns, but not abnormal return, as SG&A is a systematic risk proxy. Therefore, whether an increase in the ratio of SG&A costs affects abnormal return is questionable.

Market valuation perspective will reach another conclusion. The motivation behind management is to enhance future profitability by investing in SG&A in a way that increases future operating efficiency (Baumgarten et al., 2010). The reduction of the unproductive part of current operating expenditure and the encouragement in activities that create future value are the key in interpreting SG&A cost ratios (Banker, Huang & Natarajan, 2011). In revenue-declining periods, Anderson et al. (2007) finds that abnormal positive returns may be achieved by longing firms with high increases in the SG&A cost ratio and shorting on firms with low increases in the SG&A cost ratio, which can be explained by the market not realizing the immediate benefits of reduction in SG&A. Therefore, managers and boards have recognized the value creation from SG&A expenditures in revenue-declining period, which is also associated with strong equity incentives(Matějka, 2011). Consequently, higher SG&A ratio would be positively related to abnormal return.

3: Data Source

The data is obtained from Wharton Research Data Service (WRDS) and include the entire database across all sectors. The financial statement data and stock return data are obtained from the Fundamentals Annual of North America – Daily within Compustat – Capital IQ from Standard & Poor's. The data of stock price and shares outstanding are extracted from Monthly Stock File within Stock/Security Files on The Center for Research in Security Prices (CRSP). The Fama-French four-factor model related data are downloaded from Factors – Monthly Frequency within Fama French & Liquidity Factors. The sample period includes data from January 1971 to December 2018, yielding a total observation of 576 months (i.e. 48 years). We also conducted analysis within a sub data period from January 1999 to December 2018, which is over the most recent 20 years.

3.1 Firm Data

The XSGA (Selling, General & Administrative Expense) and REVT (Total Revenue) data set has 301,246 observations. We first downloaded 507,989 firm-year observations during the period from 1971 to 2018 from Compustat-Capital IQ, and then we drop 185,833 observations with no XSGA data and 20 observations with no REVT data. As total revenue is the denominator of the SG&A ratio, we exclude the observations with zero revenue. 6,469,144 observations of TRT1M (monthly stock return) data are gained from Compustat-Capital IQ. 3,773,076 observations of PRC (share price) and SHROUT (shares outstanding) are collected from CRSP. We calculated the monthly market value of each stock based on the share price and the shares outstanding on the last trading day of the month.

3.2 Fama-French Four-Factor Model Data

576 observations of RF (risk-free interest rate – one month Treasury Bill rate), MKTRF (excess return on the market), SMB (small-minus-big return), HML (high-minus-low return), and UMD (momentum) are downloaded from Fama French & Liquidity Factors.

3.3 Data Handling from Raw Data

To minimize the influence of company size on SG&A expense, we generate a new variable called SG&A Ratio by dividing the annual SG&A expense by annual total revenue. We also believe that different industries have various level of SG&A expense due to different nature of the business. As a result, we adjust the SG&A ratio to its mean industry level. Since the first 2 digits of sic code corresponds to different industries, we want to compare the difference between the company SG&A ratio and the industry average SG&A ratio. Therefore, we generated two new variables, one represents the difference between the company SG&A ratio and the industry average SG&A ratio, which is called Unnormalized SG&A Ratio. The other one also represents the difference between the company SG&A ratio and the industry average SG&A ratio, but adjusted by the standard deviation, which is called Normalized SG&A ratio of the SG&A ratio of the industry. The calculation methodology is mentioned at 4.1.

After combining all the previous datasets, the final dataset used for analysis has 1,253,228 observations for the period from 1971 to 2018, within which 909,175 observations have market value higher than $50 million. For the period from 1999 to 2018, the number of observations with the market value higher than $50 million is 647,559.

4: Methodology

The firms are screened based on time and market value. Firstly, all listed companies from 1971 to 2018 are included for analysis. Secondly, only companies with market value higher than $50 million from 1971 to 2018 are eligible. Thirdly, we conduct a subperiod analysis of the recent 20 years, so data of companies with market value higher than $50 million from 1999 to 2018 are used.

As we plan to adjust the components of portfolio year by year, annual SG&A expense and annual total return data are obtained from Compustat. We classify firms into five groups by Unnormalized SG&A ratio or Normalized SG&A ratio, forming two sets of five portfolios.

The portfolios are rebalanced annually as their SG&A changes. Portfolio monthly excess returns (return minus the risk-free rate) are calculated based on monthly returns of each firm.

Alpha is calculated based on the Fama French Four factor model (1997). Abnormal return for each portfolio and long-short portfolio are calculated by running regression on market risk premium, SMB, HML and momentum factors.

4.1 Unnormalized SG&A ratio measurement and Normalized SG&A ratio measurement

Two measures are used to classify firms into portfolios. One method is based on Unnormalized SG&A ratio, which is the difference between SG&A/Total Revenue and the industry average, defined as:

$$Unnomalized\ SG\&A\ Ratio_{i,t} = SG\&A\ Ratio_{i,t} - \overline{SG\&A\ Ratio_{ind,t}}$$

Where Unnormalized SG&A $Ratio_{i,t}$ is the industry adjusted SG&A Ratio of firm i at year t; SG&A $Ratio_{i,t}$ is defined as SG&A expenses(Compustat item XSGA) divided by total revenue(Compustat item REVT) of firm i at year t; $\overline{SG\&A\ Ratio_{ind,t}}$ is the average SG&A ratio (equal weighted) of firms within the same industry identified by the first2-digit SIC code in year t.

The other variable used to group firms is Normalized SG&A ratio, which is calculated by dividing Unnormalized SG&A ratio by the standard deviation of the SG&A ratio of the industry. The formula used is as follows:

$$Normalized\ SG\&A\ Ratio_{i,t} = \frac{SG\&A\ Ratio_{i,t} - \overline{SG\&A\ Ratio_{ind,t}}}{\sigma_{ind,t}}$$

Where Normalized SG&A $Ratio_{i,t}$ is the industry adjusted SG&A ratio of firm i at year t; SG&A $Ratio_{i,t}$ and $\overline{SG\&A\ Ratio_{ind,t}}$ have the same meaning as in the Unnormalized SG&A $Ratio_{i,t}$ formula; $\sigma_{ind,t}$ is the standard deviation of the SG&A ratio of the industry in year t.

Firms are then classified into five equal groups according to the value of Unnormalized SG&A ratio and Normalized SG&A ratio across sections. Both of the classification schemes put firms with the lowest values into Group 1, and firms with the highest values into Group 5.

4.2 Calendar-time portfolio and portfolio excess returns

Portfolios are formed on the first trading day in January based on Unnormalized SG&A ratio or Normalized SG&A ratio of last year. Weights of firms within a portfolio will be adjusted at the end of each month, with zero trading costs.

Each month, both value-weighted excess returns and equal-weighted excess returns are calculated for the five portfolios from 1971 to 2018, generating 576 value-weighted excess returns and 576 equal-weighted excess returns in total for each portfolio. The following formula is applied to calculate value-weighted return:

$$Vwret_{p,m} = \sum \frac{MKTV_{i,m-1}}{MVAL_{p,m-1}} \times (r_{i,m} - rf_m)$$

$$MVAL_{p,m} = \sum MKTV_{i,m}$$

Where $Vwret_{p,m}$ represents the value-weighted excess return of portfolio p (p is between 1 and 5) in month m; $MKTV_{i,m-1}$ is the market value of firm i in month m-1; $MVAL_{p,m-1}$ is the total market value of portfolio p in month m-1; $r_{i,m}$ is the raw return of firm i in month m; rf_m is the risk free rate in month m.

Equal-weighted excess return is calculated as follows:

$$Ewret_{p,m} = \frac{\sum(r_{i,m} - rf_m)}{N_p}$$

Where $Ewret_{p,m}$ is the equal-weighted excess return of portfolio p in month m; N_p is the number of firms of portfolio p; $r_{i,m}$ and rf_m mean the same as in Vwret formula.

4.3 Abnormal returns and long-short portfolio

With average returns of portfolios as dependent variable and Fama-French four factors as independent variables, a time-serious regression can be run for each portfolio to get the abnormal return for each portfolio.

$$Vwret_{p,m} = \alpha_p + \beta_1 * MktRf_m + \beta_2 * SMB_m + \beta_3 * HML_m + \beta_4 * UMD_m + e_m$$

$$Ewret_{p,m} = \alpha_p + \beta_1 * MktRf_m + \beta_2 * SMB_m + \beta_3 * HML_m + \beta_4 * UMD_m + e_m$$

Where α_p generated by the regression is the abnormal return of portfolio p; $MktRf_m$ is the market premium, defined as market return deducted by risk free rate, in month m (Fama French Portfolio item MKTRF); SMB_m is calculated by deducting the return of a portfolio only having large firms from the return of a portfolio only having small firms, where the size is based on market values (Fama French Portfolio item SMB) in month m; and HML_m represents the difference of return of portfolio with high book-to-market ratio firms minus return of portfolio with low book-to-market firms; UMD is the momentum factor in month m, representing difference of return of portfolio with firms performing well minus return of portfolio with firms performing bad; e_m is the error term. T statistics test on α_p are conducted to check the statistical significance for each regression.

Based on the abnormal returns of each portfolio, some long-short portfolios are formed to test for strategy returns. Firstly, the differences of excess returns in each month between groups are calculated, as the dependent variable. Secondly, Fama-French four factors are used as independent variables to run the regression. New groups are formed by merging two existing groups, such as Group [1,2]. Excess returns of the merging group are calculated using the previous formulas in 4.2. In this research, 8 long-short portfolios are tested. T statistics test on α are conducted to check the statistical significance for each regression.

5: Empirical Analysis

Panel A and Panel B of Table 1 both employ the same methodology and steps in analysis. The only difference is that Panel A utilizes the Unnormalized SG&A ratio to divide firms into five groups every year, while Panel B utilizes the Normalized SG&A ratio instead. For example, Unnormalized SG&A ratio1 stands for the group below 20th percentile and Unnormalized SG&A ratio 2 stands for the group between 20th and 40th percentile. Moreover, Unnormalized SG&A ratio [1,2] represents the combination of group one and group two, also meaning the group includes firms of the lower 40th percentile based on the ratio. Similarly, Unnormalized SG&A ratio [4,5] means the group between 60th and 100th percentile. The portfolios are regrouped at the end of each year since each company's SG&A data changes every year, thus each company's Unnormalized or Normalized SG&A ratio changes accordingly.

Panel A & B first provide the abnormal returns for each of the seven portfolios under three different conditions. The abnormal return, also called alpha, is the intercept of a regression where the dependent variable is the excess return of the portfolio, and the independent variables include the three Fama and French (1993) and Carhart (1997) momentum factors.

It can be seen from Panel A that portfolio Unnormalized SG&A ratio 2 generates the highest alpha consistently with both equal weighted and value weighted returns and then follows a generally decreasing trend from portfolio Unnormalized SG&A ratio 2 to portfolio Unnormalized SG&A ratio 4. As value weighted return is more practical than equal weighted return to be applied in trading strategies, the long-only portfolio 2 generates over 12.0% annual abnormal return under all three conditions. The alpha for long-short strategy is the intercept of the regression between the difference of long portfolio excess returns and short portfolio excess returns and the three Fama and French (1993) and Carhart (1997) momentum factors. With a long-short strategy, the best combination is to long portfolio Unnormalized SG&A ratio 2 and to short portfolio Unnormalized SG&A ratio 5 with market value above $50 million from 1971 to 2018, which abnormal return is statistically significant.

In Panel B, similarly, all single portfolio abnormal returns are statistically significant. Portfolio Normalized SG&A ratio 2 also generates the highest alpha among all. The best practical result is the 17.04% annual abnormal return from Portfolio Normalized SG&A ratio 2 with value weighted return under condition three. However, the long-short trading strategy using Normalized SG&A ratio to group is not statistically significant under all value weighted return conditions, thus not applicable to employ long-short strategy in Panel B.

Since value-weighted return is more practical in trading strategy to form the portfolio, we use the portfolio value-weighted monthly raw return to graph the growth of the value of a $100 Investment in long-only value-weighted portfolios since its inception under different conditions as mentioned earlier. Comparing the six figures in part 7, we can see that portfolio 2 has the best stock performance under all conditions regardless of the way of calculating the SG&A ratios and the time period.

Moreover, we find that the stock return is much better by using the Normalized SG&A ratio method to group the companies. When $100 investment in 1970 in portfolio Unnormalized SG&A ratio 2 with companies over $50 million market capitalization reached over $165,000 in 2018, the $100 investment in portfolio Normalized SG&A ratio with other conditions identical, surpassed $334,000 in 2018.

6: Conclusion

This study explores the relationship between North American public company's SG&A expense with its stock performance. With the increasing awareness of the importance of good corporate governance practices among investors, we hypothesize that excessive corporate spending on SG&A cost has a negative impact on its stock performance. The purpose of this paper is to test this possibility and explore whether any trading strategy related to this possibility exists. Our research results show that the industry adjusted SG&A cost ratio does have an impact on its stock performance. Among all the groups, the second group has the best stock performance in all cases, which stands for the 20^{th} to 40^{th} percentile of the group.

There is no significant difference in abnormal returns between the equal-weighted and value-weighted portfolios. However, after we exclude the companies with less than $50 million market value, the results become more statistically significant. The normalized SG&A ratio method generates a better raw return over the trading period while the unnormalized SG&A ratio method provides an alternative long-short strategy with the benefit of zero cost engaged.

Overall, our test results provide some support to the hypothesis that we raise. We find that the lower SG&A firms tend to somewhat perform better, which is consistent with SG&A being a governance proxy rather than a fixed-costs/operating leverage proxy. The companies, which spend moderately less than the industry average SG&A cost, generally have the best stock performance.

7: Appendix

Figure 1 The Growth in the Value of a $100 Investment in December 1970 (Whole Universe).

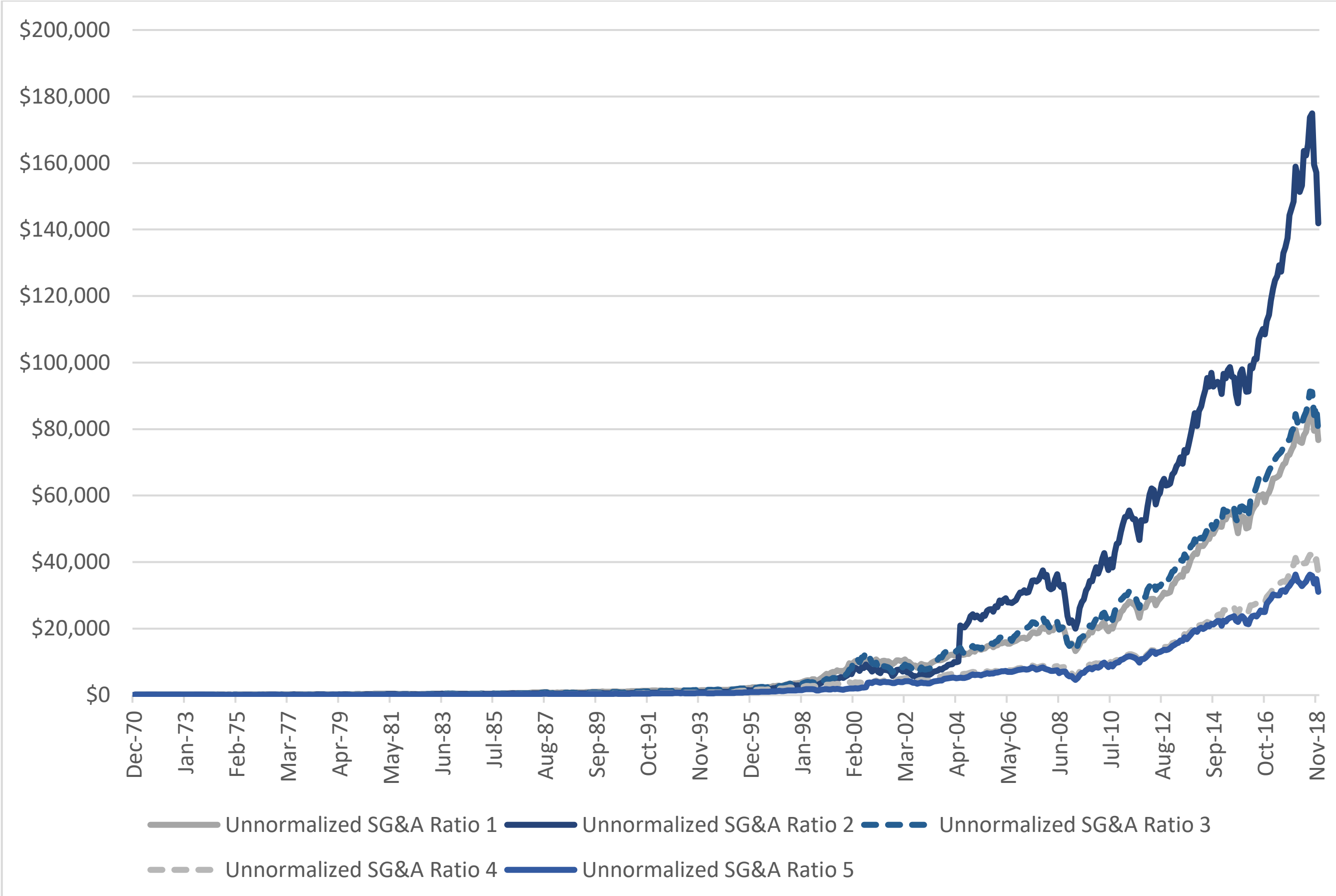

Figure 2 The Growth in the Value of a $100 Investment in December 1970 (Market Value>$50 Million).

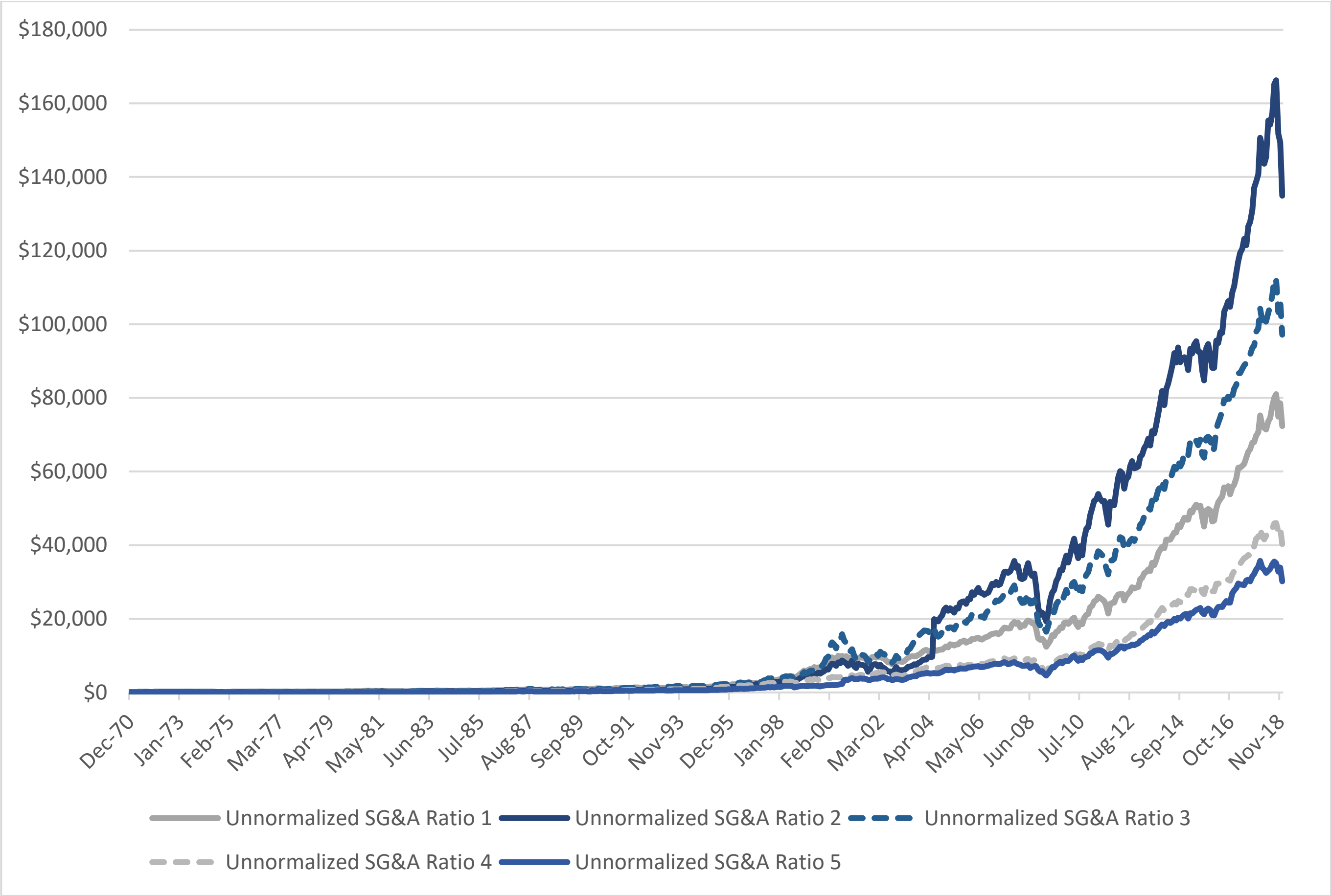

Figure 3 The Growth in the Value of a $100 Investment in December 1998 (Market Value>$50 Million).

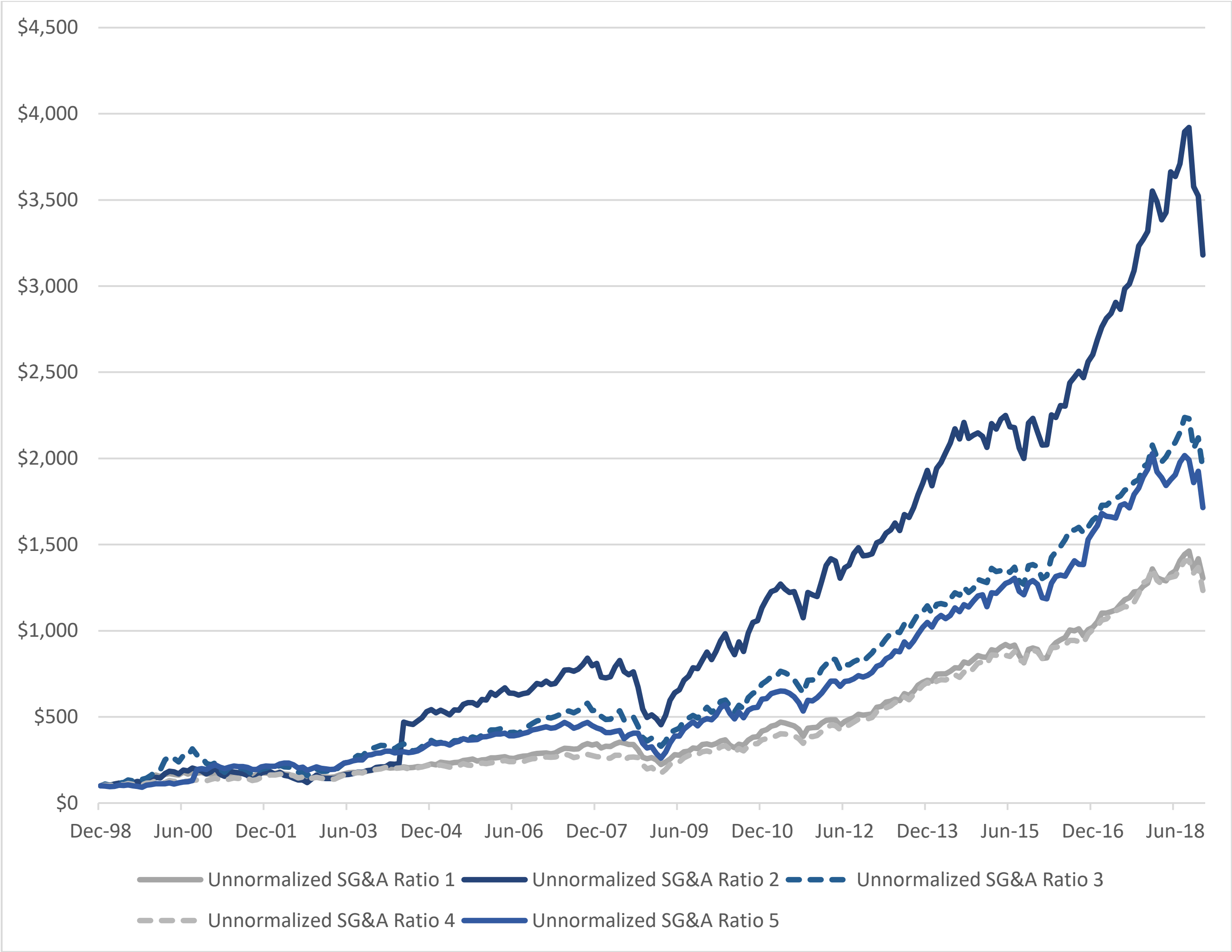

Figure 4 The Growth in the Value of a $100 Investment in December 1970 (Whole Universe).

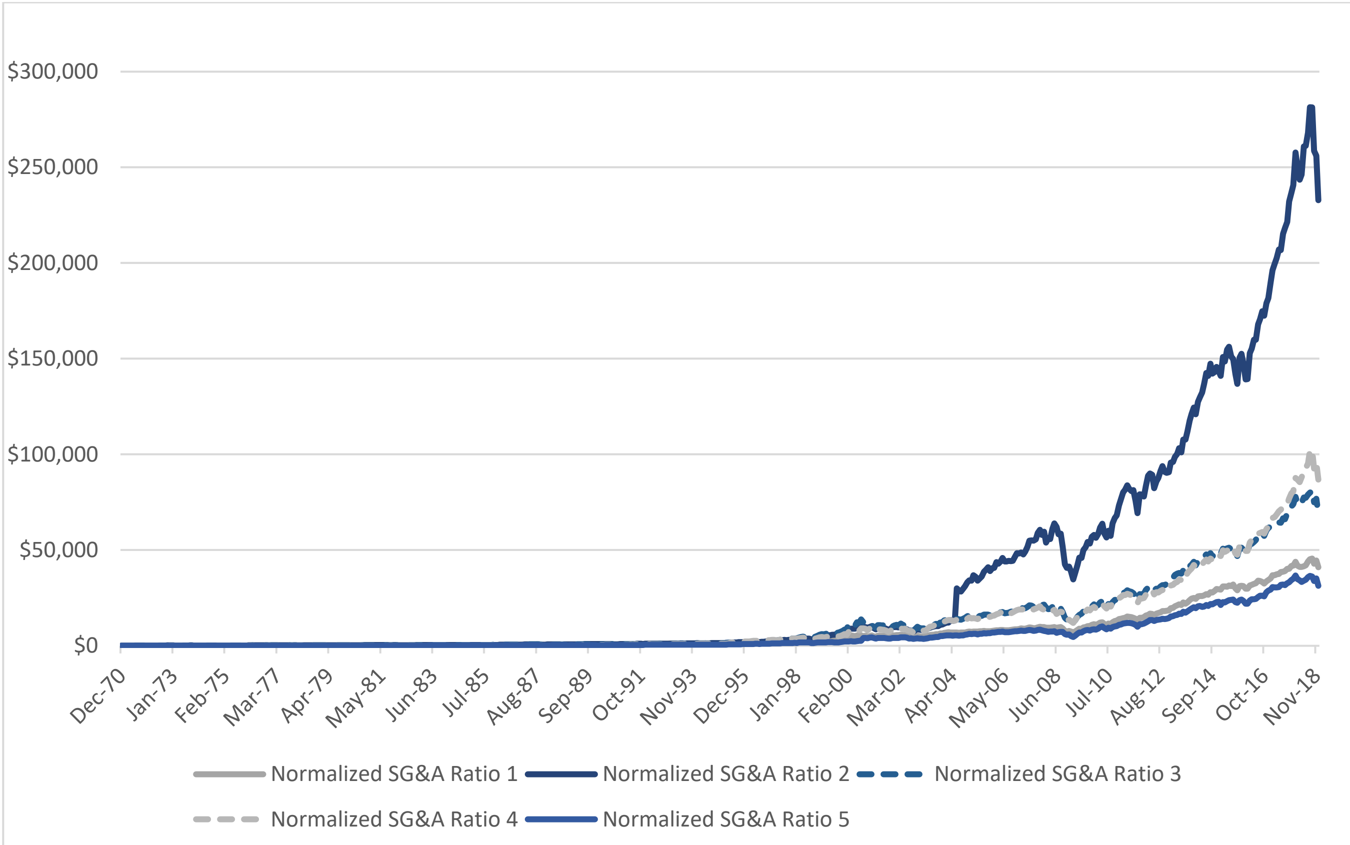

Figure 5 The Growth in the Value of a $100 Investment in December 1970 (Market Value>$50 Million).

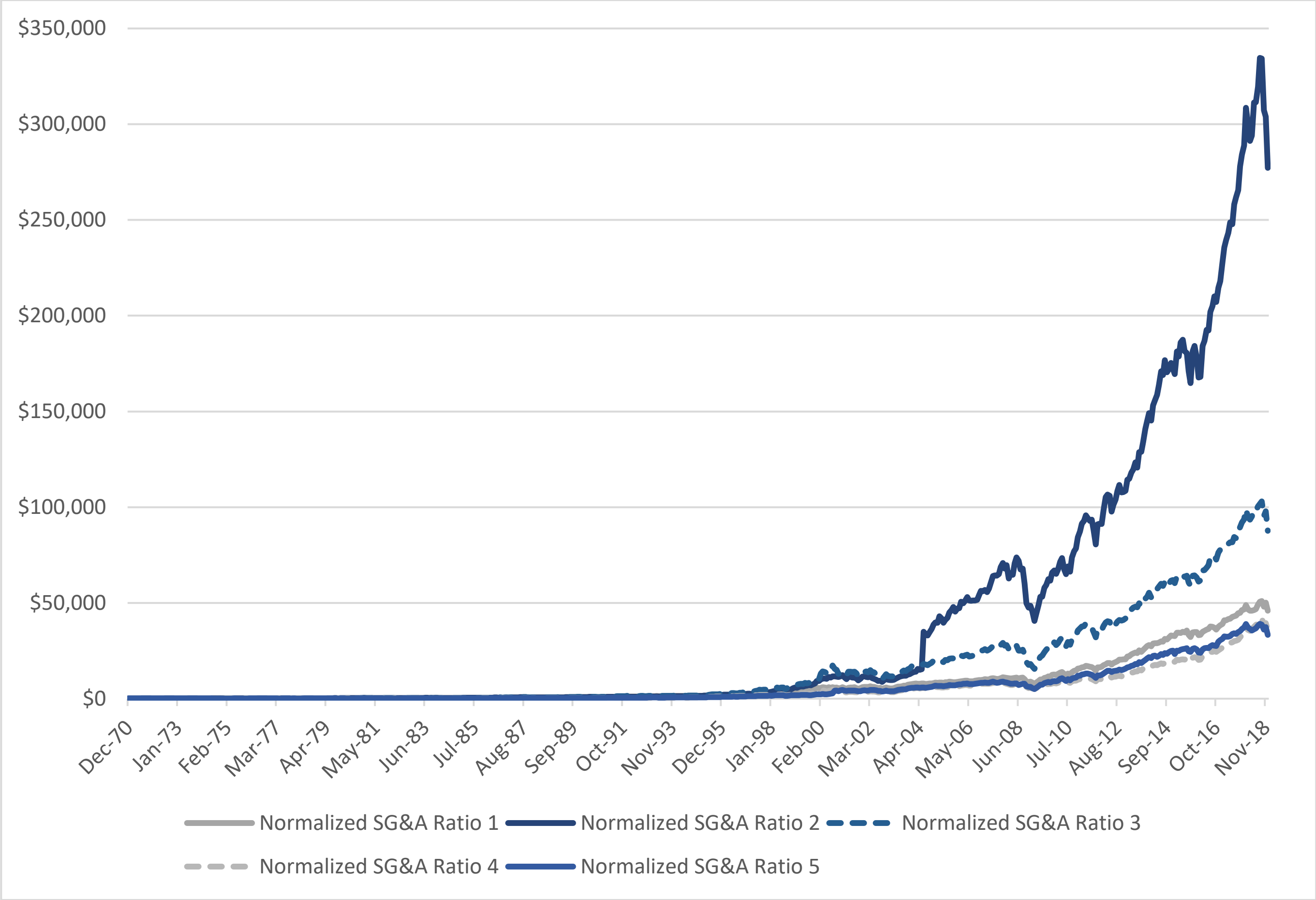

Figure 6 *The Growth in the Value of a $100 Investment in December 1998 (Market Value>$50 Million).*

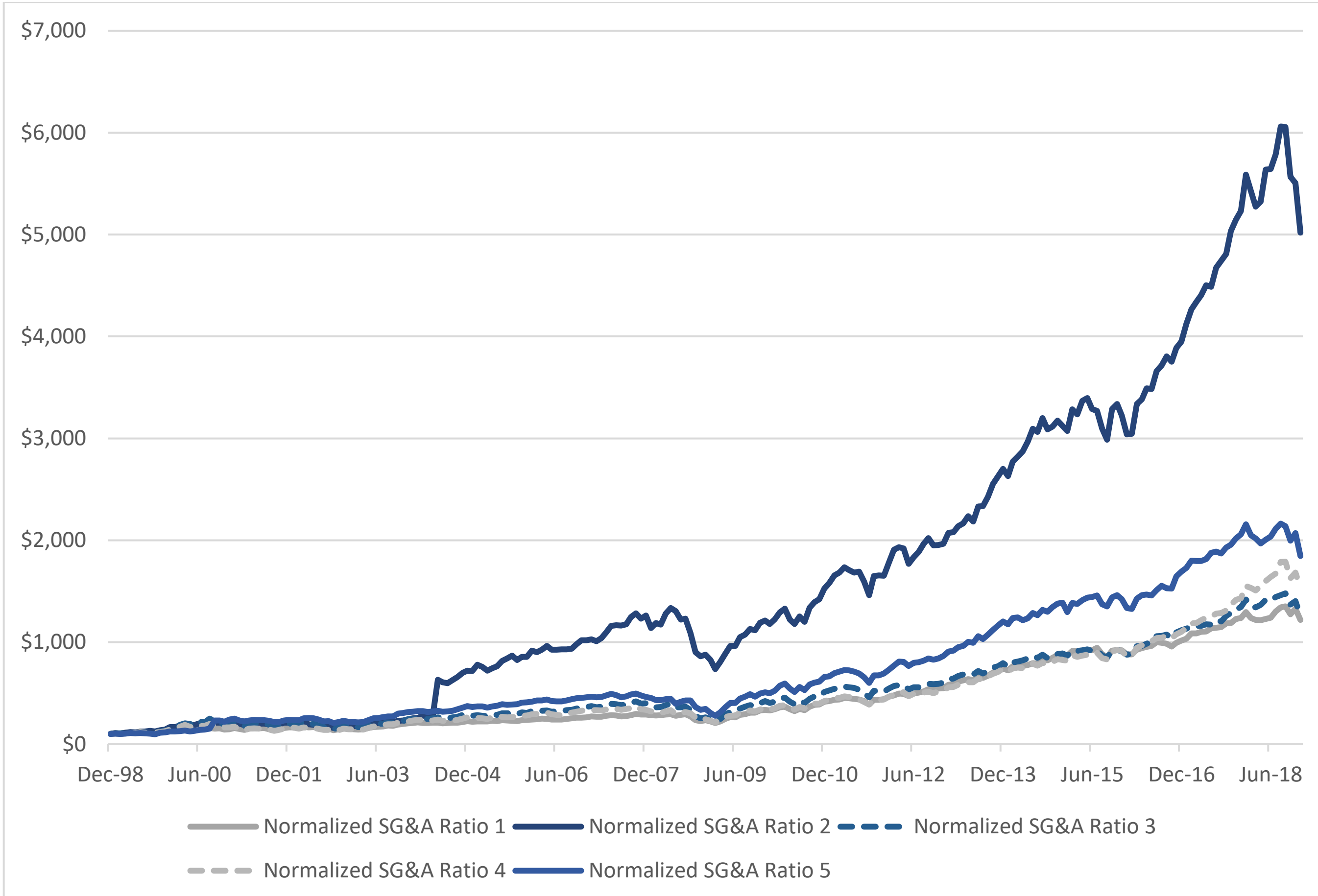

Table 1 SG&A Expenses and Alphas

Panel A provides monthly alphas (%) for portfolios formed based on the values of unnormalized SG&A ratio. Panel B provides monthly alphas (%) for portfolios formed based on the values of normalized SG&A ratio.

In Panels A and B, portfolio excess (of the risk-free rate) returns are regressed on the four Fama and French (1993) factors. Portfolios are rebalanced every year and held for one year. Panels A and B use value- and equal-weighted portfolios, a. s indicated. *, **, and *** indicate significance at the 10%, 5%, and 1% levels, respectively

Panel A. Alpha based on Selling General & Administration Expenses (Grouped by Unnormalized SG&A ratios)

	1971-2018 Universe		1971-2018 Mkt Value Above $50 Million		1999-2018 Mkt Value Above $50 Million	
	576 observations per group		576 observations per group		240 observations per group	
	Equal Weighted	Value Weighted	Equal Weighted	Value Weighted	Equal Weighted	Value Weighted
Unnormalized SG&A Ratio 1	0.62***	0.75***	0.74***	0.72***	0.87***	0.76***
Unnormalized SG&A Ratio 2	0.86***	1.0***	1.11***	1.03***	1.62*	1.23***
Unnormalized SG&A Ratio 3	0.50***	0.82***	0.78***	0.84***	0.73***	0.87***
Unnormalized SG&A Ratio 4	0.32***	0.60***	0.55***	0.62***	0.60***	0.72***
Unnormalized SG&A Ratio 5	0.28	0.60***	0.90***	0.59***	0.89**	0.85***
Unnormalized SG&A Ratio [1,2]	0.84*	1.15**	1.0***	0.90***	1.13***	0.90***
Unnormalized SG&A Ratio [4,5]	0.42	0.64*	0.67***	0.67***	0.66***	0.71***
Long-Short Strategy						
Unnormalized SG&A Ratio [1,2]-[4,5]	0.42	0.51	0.2	0.28*	0.47	0.2
Unnormalized SG&A Ratio [2]-[4,5]	0.44	0.38	0.38	0.44*	0.86	0.45
Unnormalized SG&A Ratio [2]-[4]	0.54*	0.41	0.56	0.41*	1.04	0.5
Unnormalized SG&A Ratio [2]-[5]	0.58	0.41	0.21	0.45*	0.73	0.37
Unnormalized SG&A Ratio [1]-[4]	0.29***	0.15	0.19*	0.1	0.29**	0.04
Unnormalized SG&A Ratio [1]-[5]	0.33*	0.15	-0.17	0.13	-0.02	-0.01
Unnormalized SG&A Ratio [1,2]-[4]	0.52	0.55	0.37*	0.26*	0.65	0.25

Unnormalized SG&A Ratio [1,2]-[5]	0.55	0.54	0.02	0.29	0.34	0.12

Panel B. Alpha based on Selling General & Administration Expenses (Grouped by Normalized SG&A ratios)						
	1971-2018 Universe		1971-2018 Mkt Value Above $50 Million		1999-2018 Mkt Value Above $50 Million	
	576 observations per group		576 observations per group		240 observations per group	
	Equal Weighted	Value Weighted	Equal Weighted	Value Weighted	Equal Weighted	Value Weighted
Normalized SG&A Ratio 1	0.51***	0.67***	0.62***	0.69***	0.71***	0.75***
Normalized SG&A Ratio 2	0.87***	0.94***	1.08***	0.98***	1.67**	1.42***
Normalized SG&A Ratio 3	0.53***	0.79***	0.78***	0.82***	0.79***	0.67***
Normalized SG&A Ratio 4	0.39***	0.83***	0.69***	0.69***	0.61***	0.77***
Normalized SG&A Ratio 5	0.26	0.61***	0.91***	0.61***	0.90**	0.88***
Normalized SG&A Ratio [1,2]	0.69***	0.80***	0.85***	0.82***	1.20***	1.04***
Normalized SG&A Ratio [4,5]	0.33***	0.72***	0.81***	0.65***	0.76***	0.82***
Long-Short Strategy						
Normalized SG&A Ratio [1]-[4]	0.12*	-0.16	-0.08	0	0.1	-0.01
Normalized SG&A Ratio [1]-[5]	0.25	0.06	-0.3	0.08	-0.19	-0.13
Normalized SG&A Ratio [2]-[4]	0.48	0.11	0.39	0.29	1.06	0.65
Normalized SG&A Ratio [2]-[5]	0.61*	0.33	0.17	0.37	0.77	0.54
Normalized SG&A Ratio [2]-[4,5]	0.55*	0.22	0.28	0.33	0.91	0.6
Normalized SG&A Ratio [1,2]-[4]	0.30*	-0.04	0.16	0.13	0.58	0.27
Normalized SG&A Ratio [1,2]-[5]	0.43*	0.19	-0.06	0.2	0.29	0.16
Normalized SG&A Ratio [1,2]-[4,5]	0.37**	0.07	0.04	0.17	0.43	0.21

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