Growth, Corporate Profitability, and Value Creation

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Associating corporate performance and shareholder value creation with growth in earnings (or sales) has been the modus operandi *in the investment industry. It has greatly influenced managerial compensation schemes and portfolio decisions. We shed light on the relationship between growth and performance by addressing two broad questions. First, what is the relationship between corporate profitability metrics, such as economic value added, and the company's earnings or sales growth rate? Second, does maximizing corporate profitability necessarily enhance shareholder value (as measured by Jensen's alpha)? Using multivariate analysis, we show that, although the corporate profitability measures generally rise with earnings and sales growth, an optimal point exists beyond which further growth destroys shareholder value and adversely affects profitability.*

Several years ago, Enron Corporation set out to become the world's largest and most diversified company. Today, it has a more modest goal—survival. Enron's rise and fall is a primer on the dangers of out-of-control growth. The energy and commodity business has always been cyclical, but the company believed that size would insulate it from economic downturns.[1] Enron's story is not unique; rather, it is symptomatic of recurrent consolidations in search of growth opportunities that can enhance shareholder value.

The academic and practitioner literature has intermittently questioned the virtues of "growth for the sake of growth." As Tilles (1963, p. 76) noted:

> Many managers have a view of their company's future that is strikingly analogous to the child's view of himself. When asked what they want their companies to become over the next few years, they reply "bigger."

Associating creation of shareholder value with growth in earnings, sales, or other metrics is commonplace in the investment industry, and the use of such metrics has greatly influenced managerial compensation schemes and thus provided impetus to mergers and acquisitions as well as internal growth.

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In "traditional" incentive schemes—those based on return on equity (ROE), return on investment (ROI), and so on—compensation is often tied to the manager's ability to beat budgeted increases in earnings or sales, but a formal mechanism for determining whether growth activities enhance returns to shareholders is lacking.[2] The modern "value-based approaches" remove this ambiguity; in these approaches, managers' compensation depends on metrics that are consistent with shareholder wealth maximization. Such value-based metrics as economic value added (EVA), market value added (MVA), return on invested capital, and cash flow return on investment—all claim to align management and shareholder interests. For example, EVA has gained wide acceptance, in both the investment community and corporate boardrooms, as a measure that links managerial decisions to shareholder value creation. Whether the value-based performance measures are truly in line with shareholder interests remains an open question.

In this article, we are concerned with two broad questions that are of considerable theoretical and practical interest. First, what is the relationship between earnings (or sales) growth and measures of corporate profitability? Understanding the nature of this relationship will shed light on whether there is an optimal growth rate that maximizes profitability. Moreover, if companies with high earnings (sales) growth also generate high EVA, then either growth rates or EVA can be used in managerial compensation schemes. The second question is: Does maximizing such a performance metric as EVA maximize shareholder wealth? Or stated differently, is there a risk-adjusted premium to investing in the equity of companies that experience high earnings (sales) growth rates and generate positive EVA?

Growth and Performance

We considered the relationship between growth and company performance in two steps. First, we examined the unconditional distribution of several performance metrics across the quartiles of two growth measures. Next, using a common set of data as conditioning variables, we estimated a multivariate regression model for each growth measure.

Our data came from the annual Compustat files on U.S. companies for the period 1990 through 2000 (11 years). Following standard practice, we excluded data for American Depositary Receipts, utilities, and financial, governmental, or unclassifiable institutions; we also excluded companies with annual net sales, total assets, and common equity less than $1 million. To eliminate the potential bias arising from the use of "fixed data points," we removed 432 companies that appeared in the sample only once. Finally, to maximize the size of the data set, we replaced outliers (1 percent percentile cutoffs) and missing values with the corresponding four-digit SIC industry averages. The final sample consisted of approximately 2,156 companies a year (23,720 observations). Appendix A lists the variables used in this study together with the Compustat terminology and calculation.

We considered two broad measures of growth, each of which represents a different view of a company's ability to expand the sales growth rate and the earnings growth rate. *Sales growth* was measured as the average of quarterly sales growth rates over the past 20 quarters. Similarly, *earnings growth* was measured as the average of earnings growth rates over the past 20 quarters.[3] We chose this approach because the use of growth rates facilitates comparisons of companies and because averaging smooths the influence of transitory jumps in sales or earnings. For each calendar year, we sorted the data and assigned companies to quartiles of sales and earnings growth rates, with the first quartile containing companies with the slowest growth rates.

Our first objective was to investigate the link between measures of growth and corporate profitability. We examined ROE and ROI as the two classic measures of corporate profitability.[4] The newer value-based measures we considered are EVA and its variant MVA.[5]

The EVA measure emphasizes the importance of maximizing incremental earnings above capital costs. It is expressed as NOPAT – WACC × Capital, where NOPAT is net operating profit after taxes, WACC is the company's weighted-average cost of capital, and Capital is the amount of cash invested in the business, net of depreciation (interest-bearing debt plus equity). We followed the methodology described by Yook (1999) to calculate EVA. Appendix B provides the details of our EVA calculation.[6]

MVA was introduced to overcome some of the criticism of EVA. For example, EVA does not account for growth opportunities inherent in the companies' investment decisions. To capture this effect, managers need to focus also on market value added, which is calculated as (Number of shares outstanding × Stock price) + Market value of preferred stock + Market value of debt – Total capital.[7] In effect, MVA measures the difference between what investors have put in and what they expect to take out. One disadvantage of MVA is that it may be biased by over- or undervaluation of a company's growth opportunities as reflected in its stock price.

To facilitate comparisons of companies and comparisons over time, we normalized EVA, MVA, and other dollar-denominated variables by the net asset value of the company. NAV is defined as Total assets – Cash and marketable securities.[8] Breaking total assets into liquid and illiquid components is useful because it allows a focus on the influence of each, separately, on performance. As we will argue, it is also a useful normalization for estimation purposes.

These metrics measure performance from a corporate finance perspective rather than the point of view of shareholder wealth creation. Therefore, following Bacidore, Boquist, Milburn, and Thakor (1997), we used Jensen's alpha, which measures "abnormal returns" given the company's systematic risk, to assess the impact of performance on shareholders' wealth.

Univariate Analysis. Table 1 presents a comparison of the financial attributes of companies for the complete sample, the quartiles based on sales and earnings growth rates, and two interesting subsamples based on persistence.[9] The complete sample and quartiles are composed of companies with at least two years of data. Each company in the sample could move from one quartile of sales (earnings) growth to another from year to year. That is, we did not distinguish companies by their ability to retain their growth ranking over subsequent years. To control for this form of performance persistence, we created two sample subsets. The first subset is composed of companies that remained in the same quartile of sales (or earnings) growth for five or more consecutive years. The second subset imposes the

Table 1. Company Characteristics by Sales and Earnings Growth Rates, 1990–2000

		Quartiles of Annual Sales Growth Rate				Quartiles of Annual Earnings Growth Rate				Persistence	
Measure	All Companies	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Five Years or More	Both for Three Years
Sorting variable											
Mean sales growth rate (%)	49.50	–3.36	11.77	26.13	166.51	57.58	40.61	32.02	67.93	37.47	57.35
Standard deviation of sales growth rate (%)	79.05	29.71	29.20	40.21	220.65	92.95	68.98	48.18	106.31	61.12	86.08
Performance measures											
EVA/Net assets	–0.11	–0.11	–0.05	–0.06	–0.23	–0.15	–0.09	–0.06	–0.15	–0.07	–0.07
MVA/Net assets	1.04	0.42	0.70	1.12	1.93	0.85	0.92	1.26	1.11	0.91	1.10
ROE (%)	–1.40	–4.01	5.30	2.54	–9.63	–10.06	1.82	7.21	–4.64	2.86	2.21
ROI (%)	3.42	–1.79	3.27	–1.65	14.11	1.55	0.04	5.85	6.26	2.16	1.73
Financial attributes											
Size (total assets, $ millions)	825.75	1,068.70	1,053.30	751.62	416.94	537.70	1,061.90	1,100.50	600.16	1,099.91	922.75
MV/BV	1.85	1.49	1.71	1.93	2.30	1.75	1.77	2.00	1.90	1.80	1.90
Total debt/Total equity (%)	71.42	77.92	72.07	67.53	68.03	78.36	73.45	61.35	72.57	66.06	69.77
P/E	11.54	9.91	12.70	14.83	8.69	6.85	12.30	16.72	10.28	14.05	13.90
Asset-pricing parameters											
Annualized CAPM alpha (%)	–8.66	–18.81	–8.46	–0.98	–6.23	–6.37	–15.19	–1.32	–11.75	10.13	3.10
CAPM beta	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Idiosyncratic risk	56.39	51.93	47.99	55.87	70.15	67.52	50.29	43.86	63.98	47.55	49.00
Standard deviation of monthly returns	58.16	53.84	50.05	57.59	71.54	69.01	52.23	45.97	65.53	49.44	50.76
Sample size	23,720	5,986	5,992	5,923	5,819	5,920	5,944	5,947	5,909	12,217	2,693

more stringent criterion of remaining in the same quartile for *both* growth measures for at least three consecutive years.[10] Of course, sample size shrank as the more restrictive criterion was imposed. The purpose of this data partitioning was to assess the robustness of our results for each quartile.

We consider each block of results in Table 1 separately. (Although this discussion will focus on the mean, we want to point out that the distribution of these variables—range, variance, and higher moments—is significantly different for the various partitioned groups.) As expected, mean sales growth rate rises dramatically across the quartiles based on sales growth. The standard deviation also rises significantly, indicating that high sales growth rates are accompanied by high volatility. For the sample as a whole, the correlation between sales and earnings growth rates is negative. The negative correlation can be seen for the first three quartiles of earnings but reverses in the fourth quartile. This inverted-U-shaped relationship shows that for a majority of companies, faster earnings growth is not synonymous with faster sales growth. The persistent companies experienced moderate mean and volatility of sales growth.

Next, consider the four performance measures. Somewhat surprisingly, we found that, on average, companies destroyed value, as measured by EVA. Companies in the inner-quartile range, however, had better results. MVA increases monotonically across the quartiles of both measures. This result is not surprising: MVA represents the difference between the market value and book value of the company's capital, and as such, it reflects the market's expectations about the company's future growth prospects. The 1990–2000 period covered one of the longest bull markets in U.S. history. During this period, abnormally high share prices were attributed to the significant growth options associated with the adoption of new technologies. *Ex post*, the view of many market participants (particularly in the technology sector) proved to be speculative. This "irrational exuberance" is reflected in the positive relationship between MVA and growth rate, whereas the inner-quartile EVA is always negative. Persistence appears to have little impact on the ability of companies to enhance EVA or MVA.

The classic measures, ROE and ROI, show a highly nonlinear relationship between growth and performance; on average, companies in the inner quartiles performed better. If we consider ROI in isolation, however, we find the first indication that maximizing growth may lead to maximum performance. Again, persistence is associated with moderate performance as measured by these metrics.

The next group of variables provides a broad picture of the companies' financial attributes by quartile. Company size, as measured by the value of total assets, declines across the quartiles of sales growth but resembles an inverted U across the earnings quartiles. In other words, small companies generated the highest sales growth but not necessarily the highest earnings growth. Interestingly, the largest companies (on average) generated relatively high earnings growth (third quartile) with the lowest mean and standard deviation of sales growth rate. Moreover, persistence is associated with the large companies. This association is consistent with the evidence presented in Perez-Quiros and Timmerman (2000), who found that large and diversified companies are less vulnerable to cyclical market variations than small companies; small companies display a high degree of asymmetry in their riskiness between recession and expansion states.

As we move from the first to the third quartile of sales growth, both company size and the debt-to-equity ratio fall monotonically, but moving from the first to third quartiles of earnings growth is accompanied by an increase in company size and a fall in the debt-to-equity ratio. The ratio reaches its minimum in the third quartile of both partitioning measures, which suggests that these companies are more likely to rely on equity financing. These results are consistent with Myers' 1993 finding that the debt ratio tends to be lower in high-growth industries, even when the need for external capital may be great.

A common measure of whether a company is likely to have projects providing positive net present value (NPV) in the future is the ratio of the market value of the company's assets to the book value of its assets (MV/BV). Because BV does not include future growth potential but MV does, the ratio of the market value to book value is expected to be higher for a company that is perceived to possess many growth opportunities. Given this reasoning, MV/BV is considered a good proxy for the presence of profitable growth options.

Table 1 shows that MV/BV increases monotonically across sales growth quartiles, which suggests that companies with high sales growth rates also possess significant growth opportunities. The ratio is relatively stable across the earnings quartiles, however, with companies in the third quartile having moderately better growth prospects. Persistence is clearly associated with average MV/BV.

The "trailing" P/E reported in Table 1 is also indicative of a company's future growth opportunities and should rise with earnings. This ratio shows an inverted-U-shaped relationship, however, for both partitioning measures; it reaches a maximum in the third quartile and falls in the fourth quartile. In other words, investors are prepared to pay the highest price per dollar of earnings for companies in the inner quartiles. Persistence is associated with a relatively high P/E.

The final panel of Table 1 shows our results for the parameters of the capital asset pricing model for the sample and partitioned portions. To estimate the CAPM alpha and beta parameters, we used the previous 60 months' excess returns for each company and the market (S&P 500 Index) returns over the yield on three-month U.S. T-bills.[11] Because each subsample represents a well-diversified portfolio, Table 1 shows that the average beta for all data partitions is close to unity. The annualized alpha, which once again tends to follow an inverted path across the quartiles, reaches its maximum at the third quartile for both the sales growth and earnings growth groups. Interestingly, the companies in the third quartile of earnings growth have the lowest level of total and idiosyncratic risk. Finally, perhaps the most important result reported in Table 1 is that persistence leads to significant payoffs to shareholders as measured by alpha. This result provides support, again, for the findings in Perez-Quiros and Timmerman.

To summarize, the univariate results point to a complex and often U-shaped relationship between performance and growth. These analyses indicate that company performance improves with sales and earnings growth up to the third quartile and then declines in the fourth quartile. In fact, the companies in the third quartile of both growth measures appear to be the most likely to enhance corporate performance and maximize shareholder wealth. Therefore, we question the prevalent fascination with unbounded sales and earnings growth.

Multivariate Analysis. The multivariate analysis lends support to the conclusions from the univariate analysis. To further investigate the relationship between growth and corporate performance, we estimated the following multivariate regression model:

$$\mathbf{PM} = \mu + \sum_{q=2}^{4} \delta_q D_q + \sum_{y=1990}^{1999} \upsilon_y D_y + \sum_{i=1}^{14} \beta_i C_i + \varepsilon, \quad (1)$$

where

PM = a vector performance measure in which each element represents a company in a particular year (panel data). To save space, we report the regression results for EVA only. Our conclusions were not altered in a material way when we used other performance measures[12]

μ = the regression intercept; it measures the conditional mean of the **PM** for the first quartile in Year 2000

q = a quartile

δ_q = coefficient differentiating the quartiles. It measures difference in performance across quartiles after other factors are controlled for. Our null hypothesis was that companies in the second through the fourth quartiles are no different from companies in the first quartile: $\delta_q = 0$ for $q = 2, 3, 4$

D_q = 1 for companies in the qth quartile of sales (earnings) growth and zero otherwise ($q = 2, 3, 4$).

υ_y = influence of each year on performance

D_y = a dummy variable for the year. $D_y = 1$ when $y = 1990, \ldots, 1999$, and 0 otherwise

β_i = a measure of the ith control variable's impact on performance

C_i = ith control variable

ε = regression error

We assumed elements of ε are independently and identically distributed (i.i.d). The rationale for this assumption is provided later in the discussion.

We used this model to investigate the relationship between growth and performance as measured by EVA. **Table 2** presents mean values for the explanatory variables for the sample and each quartile. Again, the distribution of these variables is significantly different among the data partitions.

The control variables we used have been used in numerous cross-sectional studies of company performance.[13] We briefly describe the company characteristics used as control variables and refer readers to the following papers for additional details and justifications for their use: Philips (1999), Campbell and Shiller (1998), Shin and Stulz (2000), and Opler, Pinkowitz, Stulz, and Williamson (1999).

To measure the impact of growth volatility on EVA, we used the standard deviation of sales growth rate. The value of cash plus other marketable securities was the measure of the liquid holdings of a company. As Opler et al. showed, corporate cash holdings have significant implications for a company's performance and ability to capitalize on growth opportunities. The companies in the fourth quartiles of both growth measures had relatively higher cash holdings than companies in the other quartiles. The logarithm of a company's total assets was used as a proxy for company size.

Modern companies are expected to optimize their business for flexibility and adaptability as well as to lower costs and improve performance. The market-to-book ratio, ratio of research and

Table 2. Means of the Explanatory Variables, 1990–2000

		Quartiles of Annual Sales Growth Rate				Quartiles of Annual Earnings Growth Rate				Persistence	
Variable	All Companies	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Five Years or More	Both for Three Years
Standard deviation of sales growth rate (%)	79.05	29.71	29.20	40.21	220.65	92.95	68.98	48.18	106.31	61.12	86.08
Cash/Net assets (%)	22.38	16.38	17.00	21.31	35.16	23.20	20.13	20.07	26.41	18.09	20.39
Size (logarithm of total assets)	4.79	4.98	5.22	4.79	4.15	4.27	5.06	5.41	4.42	5.22	5.14
MV/BV	1.85	1.49	1.71	1.93	2.30	1.75	1.77	2.00	1.90	1.80	1.90
R&D/Sales (%)	5.50	3.17	2.99	3.99	12.02	5.67	5.22	4.38	6.75	4.21	4.56
Cash flow/Net assets (%)	1.56	1.55	6.92	6.43	–8.89	–1.71	3.61	6.45	–2.12	5.21	4.71
Acquisitions/Net assets (%)	2.04	1.11	1.95	2.60	2.54	1.66	2.12	2.61	1.77	1.97	2.11
Dividend dummy	0.33	0.41	0.46	0.29	0.15	0.19	0.40	0.49	0.24	0.44	0.37
Bond rate dummy	0.10	0.14	0.15	0.09	0.03	0.05	0.14	0.16	0.06	0.15	0.12
P/E	11.54	9.91	12.70	14.83	8.69	6.85	12.30	16.72	10.28	14.05	13.90
Fixed assets/Net assets (%)	1.43	1.50	1.48	1.35	1.37	1.30	1.48	1.57	1.36	1.48	1.51
Sample size	23,720	5,986	5,992	5,923	5,819	5,920	5,944	5,947	5,909	12,217	2,693

development to sales, ratio of acquisitions to net assets, and P/E are various proxies commonly used to measure corporate flexibility and the existence of growth options (i.e., the likelihood that the company will have positive-NPV projects in the future).

The cash flow (current earnings net of interest, dividends, and taxes but before depreciation) divided by net assets measures the influence of cash flow level on a performance measure. To distinguish the effect of companies' dividend payouts, we defined a dummy variable that equals 1 in years when the company paid a dividend and 0 otherwise. To control for the company's access to credit markets, we created a bond rate dummy, which equals 1 if the company's bonds were rated and 0 otherwise. The ratio of fixed assets (property, plant, and equipment, PP&E) to net assets was used as a proxy for a company's operational flexibility (i.e., the existence of "real options").

All dollar-denominated variables were deflated by the value of net assets. This normalization achieved two important objectives. First, because a company's ability to generate future profits is a function of its assets in place (rather than its excess short-term cash holdings), dollar values per unit of net assets provide a more appropriate way of comparing companies than do absolute dollar values. Second, deflating by net assets ensured that the residual, ε, of the regression had a constant variance. Hence, the assumptions underlying our regression model would not be violated, and our results were less likely to be biased.[14]

Results. We estimated the regression model in Equation 1 by using ordinary least squares (OLS) for the whole sample and the two data partitions representing our persistence criterion. **Table 3** provides the estimated coefficients for each sample partition. Before focusing on a specific subset, we note that the majority of the estimated coefficients

Table 3. Regression of EVA by Growth Rates of Sales and Earnings

	Total Sample		Five Years or More		Both for
Variable	Sales	Earnings	Sales	Earnings	Three Years
Q2	1.963***	1.084**	0.269	0.401	2.116***
Q3	2.552***	1.631***	1.487***	0.688**	3.380***
Q4	–0.055	0.729**	–0.455	0.349	2.256***
1990	2.700***	2.688***	2.055***	1.981***	–0.037
1991	4.996***	4.983***	3.392***	3.326***	–0.881
1992	4.999***	4.992***	3.627***	3.566***	1.483
1993	4.940***	4.940***	3.433***	3.381***	0.703
1994	4.230***	4.231***	3.232***	3.211***	0.644
1995	3.077***	3.082***	2.540***	2.544***	–0.218
1996	3.430***	3.443***	2.743***	2.758***	–0.220
1997	1.862***	1.881***	1.827***	1.846***	–0.318
1998	1.543***	1.564***	1.122**	1.142**	–1.557
1999	0.841	0.868*	0.792	0.811	–1.576
Standard deviation of sales growth rate	–0.001*	–0.001***	–0.001*	–0.001**	–0.001**
Cash/Net assets	–0.048***	–0.048***	–0.033***	–0.033***	–0.072***
Size (logarithm of total assets)	1.977***	1.971***	1.460***	1.455***	1.239***
MV/BV	–0.325***	–0.340***	0.204**	0.230***	0.678***
R&D/Sales	–0.335***	–0.338***	–0.232***	–0.193**	–0.114***
Cash flow/Net assets	0.556***	0.559***	0.717***	0.720***	0.651***
Acquisitions/Net assets	0.090***	0.091***	0.075***	0.078***	0.100**
Dividend dummy	1.972***	1.839***	1.566***	1.524***	1.687***
Bond rating dummy	–3.051***	–3.106***	–1.940***	–1.955***	–2.667***
P/E	0.033***	0.033***	0.015***	0.016***	0.014**
Fixed assets/Net assets	–1.753***	–1.844***	–2.051***	–2.092***	–1.425***
Intercept	–20.143***	–19.632***	–17.222***	–17.151***	–16.107***
Sample size	23,720	23,720	12,217	12,217	2,693
Adjusted R^2	0.615	0.614	0.724	0.724	0.719

*Significance level 90–95 percent.
**Significance level 95–99 percent.
***Significance level 99 percent or higher.

are highly statistically significant (above the 99 percent confidence level) and the adjusted R^2 exceeds 61 percent for all regressions. We also performed a number of "diagnostic tests" and were not able to reject the standard OLS assumptions.

The results in Table 3 are simple to interpret. Each set of columns contains the coefficient estimates under one criterion, and persistence plays a greater role as we move across the columns. Our discussion will focus on the coefficients for various growth quartiles, the calendar year dummies, and the explanatory variables.

The regression intercept is an estimate of μ, which is the mean EVA for companies in the first growth quartile in Year 2000. The coefficients on other quartile (year) dummies represent an adjustment to this base value as we move along quartiles (years). Given this interpretation, we can identify a distinct pattern of "decreasing returns" to rapid growth, in that EVA significantly increases as we move to the third quartile of growth and declines in the fourth quartile.

The results for persistence strengthen this finding; inner-quartile coefficients are larger and more significant. The coefficients in the last column indicate that sales and earnings growth rates together apparently best capture the benefits of growth.

Conversely, the year coefficients are insignificant, suggesting that companies that are able to maintain their growth positions (persist) are less likely to experience cyclical fluctuations in their EVA than companies that do not.

Consider next the influence of other company attributes on EVA. Volatility (the standard deviation of the growth) is indicative of operational risks and evidently contributes negatively to managers' ability to enhance EVA. A large corporate cash holding also decreases EVA because most companies realize a lower rate of return on their cash holdings than on other internal or external investment opportunities. This finding is consistent with Jensen's (1986) conjecture that managers with substantial free cash holdings are more likely to engage in "empire building," which destroys shareholder value and hinders performance.

Company size contributes positively to EVA. All else being equal, EVA increases with MV/BV and P/E as well as the company's current cash flow and acquisition expenditures. The ratio of R&D expense to sales, which is a measure of potential financial distress (see Opler et al.), negatively influences EVA. Higher values for the ratio of fixed assets to net assets signify lower flexibility and lower EVA.

As predicted by Myers' financing hierarchy model, small companies (the fourth quartile based on sales growth) need to retain a larger portion of net income than large companies to fund future growth and are thus less likely to pay dividends. The regression coefficients lend support to this hypothesis: Companies that paid dividends or had high net profit margins had higher EVA. Access to credit markets (the bond rate dummy) lowers the cost of debt, which raises long- and short-term debt and, in turn, has a negative impact on EVA (see Appendix B).

To summarize, we identified an inverted-U-shaped relationship between EVA and measures of sales and earnings growth. The estimated coefficients are statistically and economically significant and support the results from the univariate analysis.

■ *Robustness*. We assessed the robustness of these results in a number of ways. First, by imposing the persistence criterion, we eliminated the potential noise that arises from the movement of companies among the growth quartiles. And we found that persistence clearly strengthens the conclusion that maximizing the sales or earnings growth rate does not maximize EVA or other performance measures.

Second, we tested for the possibility that a certain class of companies may overly influence our findings. For example, removing the small companies (total assets less than \$5 million) from the sample and rerunning the tests had no discernible impact on our results.

Finally, we reached identical conclusions when we estimated the regression model for each year as an independent cross-section.[15]

Therefore, we conclude that maximizing growth is not necessarily consistent with maximizing shareholder wealth. That is, shareholder value is a concave function of growth.

Performance and Wealth Creation

How do managers' use of EVA for compensation and resource allocation relate to shareholder value creation? Following Bacidore et al., we posited that shareholders are concerned with abnormal returns measured by alpha. When alpha is positive, shareholders have received compensation above their risk-adjusted opportunity cost of capital. Conversely, when abnormal returns are negative, they have been inadequately compensated for risk. Given this reasoning, we expected alpha to be positively correlated with EVA. To investigate this link, we estimated the regression model proposed by Bacidore et al. but augmented their model to control for growth, company size, and idiosyncratic risk. Our regression equation was as follows:

$$\boldsymbol{\alpha} = \nu + \sum_{q=2}^{4} \varphi_q D_q + \sum_{y=1990}^{1999} \gamma_y D_y + \sum_{i=1}^{3} \kappa_i C_i + \eta, \qquad (2)$$

where

$\boldsymbol{\alpha}$ = a vector with elements representing a company's estimated alpha in a particular year (panel data)

ν = estimate of the conditional mean of alpha; it measures difference in performance across quartiles, after other factors have been controlled for

η = regression error; it is assumed to be i.i.d.

The definition and interpretation of dummy variables for year and growth quartiles, D_q and D_y, and their coefficients, ϕ_q and γ_y, are unchanged; C_i and κ_i are the explanatory variables and their respective regression coefficients.

For each year, we estimated the alpha by using the previous 60-months' excess returns for the company and the market over the three-month T-bill yield. We used three additional explanatory variables to control for variation in alpha across companies—EVA, assets, and standard deviation of the residuals of the CAPM. EVA was included to determine how well this performance measure explains abnormal returns. The logarithm of the company's total assets served as a proxy for size. Finally, to assess the influence of company-specific (idiosyncratic) risk on abnormal returns, we included the standard deviation of the residuals of the CAPM in Equation 2. As Shin and Stulz and others have shown, the value of a company's real options is expected to rise with the level of the company's idiosyncratic risk. A positive and statistically significant coefficient associated with idiosyncratic risk suggests a compensation for assuming company-specific risks. This finding represents a significant departure from the accepted wisdom, which asserts that efficient markets provide no rewards for assuming diversifiable risk.

Table 4 presents the regression results for abnormal returns for the whole sample and the sample partitions associated with the persistence criterion. Our quadrant dummy variables indicate that alpha is significantly different among sales (earnings) growth quartiles. The decrease in performance associated with the fourth quartile of growth is again a significant feature of the results; companies in the third quartile have the highest conditional alpha for both persistence measures. Moreover, the inverted-U-shaped relationship between alpha and growth is similar to that of EVA and growth.

Abnormal returns correlate positively with EVA, company size, and idiosyncratic risk, and the coefficients are economically and statistically significant. Hence, excess returns are clearly a function of performance, company size, and the existence of real options. Note that for companies that consistently met both growth criteria (last column), the association between alpha and EVA is statistically insignificant. Moreover, the dummy variables for years are highly significant, indicating that excess returns are sensitive to market condi-

Table 4. Regression of Alpha by Growth Rate of Sales and Earnings

	Total Sample		Five Years		Both for Three Years
Variable	Sales	Earnings	Sales	Earnings	
Q2	11.103***	0.212	10.672**	–10.042**	–0.972
Q3	14.737***	16.782***	23.095***	14.737***	26.112***
Q4	3.492	–3.353***	–0.941	–6.332	–7.496
1990	161.470***	161.080***	178.960***	1,778.160***	139.150***
1991	179.290***	178.610***	192.280***	191.400***	154.220***
1992	191.600***	191.150***	208.820***	207.930***	180.870***
1993	179.510***	179.150***	195.570***	194.740***	161.690***
1994	175.420***	175.100***	187.200***	186.830***	150.930***
1995	162.250***	162.010***	179.510***	179.530***	143.750***
1996	172.090***	171.870***	195.860***	195.960***	145.340***
1997	160.140***	159.930***	191.080***	191.160***	135.900***
1998	78.142***	77.826***	139.560***	139.520***	67.418***
1999	93.464***	93.130***	115.750***	115.680***	59.816***
EVA/Net assets	0.149***	0.164***	0.209***	0.230***	0.040
Size (logarithm of total assets)	9.090***	8.510***	5.752***	5.445***	6.929***
Residual risk	0.954***	0.961***	0.831***	0.841***	0.609***
Intercept	–246.940***	–240.140***	–232.110***	–227.890***	–193.600***
Adjusted R^2	0.117	0.118	0.102	0.101	0.075

*Significance level 90–95 percent.
**Significance level 95–99 percent.
***Significance level 99 percent or higher.

tions. This result is in stark contrast to how EVA varies over time (see the last column of Table 3) and explains why EVA has no influence on alpha when companies' sales and earnings growth rates persist.

Conclusions

The investment industry demands that managers maximize sales and earnings growth over time. This prescription is based on the presumption that growth is synonymous with shareholder value creation. Our empirical results indicate that maximizing growth does not maximize corporate profitability or shareholder value. On the contrary, companies with moderate growth in sales or earnings show the highest rates of return and value creation for their owners. These results support the warning of Fuller and Jensen (forthcoming 2002) about the dangers of conforming to market pressures for growth.

The analysis we have presented can be extended in a number of quantitative and qualitative directions. Our scheme of partitioning the data into four quartiles and applying OLS to each represents a "low-tech" approach to accounting for nonlinearity. As an alternative, we are pursuing both nonlinear and nonparametric procedures to study the relationship between performance and growth. Also, we used variables controlling for differences in managerial talent and human capital, which clearly influence performance in the different quartiles. In general, however, an important question that deserves further investigation is what additional factors can be used to discriminate among the quartiles in an *ex ante* sense.

The financial press is replete with examples of once rapidly growing companies that have "gone south" (Boston Chicken, Iomega Corporation, Crédit Lyonnais, Enron Corporation, etc.). Recent crises have shown that growth without profitability cannot be sustained. Our empirical results show that corporate managers need to abandon the habit of blindly increasing company size and investors need to carefully consider the drawbacks of diseconomies of scale (see Ghemawat and Ghadar 2000). As noted by Khanna and Palepu (1999), managers need to make a fundamental shift in their strategic orientation from "growth now, profitability later" to "profitable growth now." That is, growth should not be the input to strategic planning but the outcome of a sound investment strategy that is geared to accepting value-creating projects.

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Appendix A. Variables and Compustat Calculations and Terminology

Variable	*Compustat Calculation*
Sales growth rate	[SALEQ–SALEQ(–1)]/SALEQ(–1)
Earnings (revenue) growth rate	[IBQ+DPQ–IBQ(–1)–DPQ(–1)]/[IBQ(–1)+DPQ(–1)]
Monthly return	[PRCCM+DVPSXM–PRCCM(–1)]/PRCCM(–1)
Cash/Net assets	CHE/(AT–CHE)
Total assets (size)	AT
Market/Book	[AT–CEQ+(PRCC*CSHO)]/AT
R&D/Sales	XRD/Sale
Cash flow/Net assets	(EBITDA–XINT–TXT–DVC)/(AT–CHE)
Acquisitions/Net assets	AQC/(AT–CHE)
Dividend dummy	1 if DVC > 0
Bond rate dummy	1 if SPDRM is nonzero
Price/Earnings	PE
Fixed assets/Net assets	PPENTQ/(ATQ–CHEQ)
Return on equity	ROE
Return on investment	ROI
Return on sales	NIQ/SALEQ
Total debt/Total equity	DTEQ
Sales	Sales net of discounts and other credits

Compustat Terminology	*Definition*
Q	Quarterly
M	Monthly
IB & DP	Income before dividends and depreciation
PRCC	Market price of equity per share
DVPSX	Dividends per share by ex date
CHE	Cash and equivalents
CE	Common equity—total
CSHO	Common shares outstanding
AT	Current assets + PP&E + Noncurrent assets
EBITDA	Earnings before interest, taxes, depreciation, and amortization
XINT	Interest expense
DVC	Cash dividends on common stock
AQC	Acquisitions
SPDRM	S&P domestic long-term issuer credit rating
PE	Price (close monthly) divided by 12 months moving earnings
PPENTQ	PP&E (net total)
ROE	Return before extraordinary items divided by common equity
ROI	Return before extraordinary items divided by total invested capital
NIQ	Net income or loss
DTEQ	Total debt divided by stockholders' equity
SALEQ	Average of quarterly sales

Appendix B. EVA Calculation Based on Compustat

EVA = NOPAT– (Capital × WACC)

Calculation of NOPAT (net operating profit after taxes):

Operating profit after depreciation and amortization
+ Increase in LIFO reserve
+ Increase in bad-debt reserve
+ Increase in net capitalized R&D
+ Implied interest expense or operating leases
+ Other operating income (expense)
– Cash operating taxes

Calculation of Capital (economic book value of committed capital):

Book value of common equity
+ Preferred stock
+ Minority interest
+ Interest-bearing short-term debt
+ Long-term debt
+ LIFO reserve
+ Bad-debt reserve
+ Deferred income tax reserve
+ Net capitalized R&D
+ Capitalized lease obligations
+ Present value of noncapitalized leases

Calculation of WACC:

(Weight of debt × After-tax cost of debt)
+ (Weight of equity × Cost of equity)

Notes

1. See, among many other recent articles, the 2002 series in the *Wall Street Journal* on the collapse of Enron.
2. Jensen (1989, 1998) and Murphy (1985) discussed the undesirable consequences of tying executive pay and managerial compensation to measures of corporate growth.
3. We defined earnings as net of interest, dividends, and taxes but before depreciation.
4. ROE is income before extraordinary items divided by common equity. ROI is income before extraordinary items divided by total invested capital, which is the sum of total long-term debt, preferred stock, minority interest, and common equity.
5. The debate regarding the relative merits of EVA as a performance metric is outside the scope of this article. Interested readers are referred to Dillon and Owers (1997), Grant (1996), and numerous other papers in the accounting and finance literature.
6. Stern Stewart and Company considers more than 250 adjustments in calculating EVA (see Stewart 1991). Following Yook, we undertook the most significant adjustments in calculating our EVA. As Yook showed, the Stern Stewart and Yook measures are highly correlated.
7. This definition is the correct way to calculate MVA when the market values of the preferred stock and debt are available. In practice, the market values of these instruments are rarely available, so researchers must use book values, which is what we did.
8. Total assets = Current assets + Net PP&E (net property, plant, and equipment) + Other noncurrent assets (including intangible assets, deferred items, investments, and advances).
9. The quartiles were separately constructed for each year. Consequently, the overall quartile sample sizes are not exactly 25 percent of the total.
10. A different persistence measure would track companies that moved to higher quartiles of growth over time and subsequently retained that ranking.
11. We corrected for first-order autocorrelation when estimating alphas.
12. Regression results for other performance measures are available from the authors upon request.
13. We considered more than 30 potential explanatory variables that have been discussed in the literature and selected those with minimum correlations to avoid the biases arising from multicollinearity. The correlation matrix for all the variables is available from the authors.
14. Without this normalization, the variance of ε will be a function of company size. Statistical tests indicate that after this normalization and with the inclusion of size, the residuals became homoscedastic.
15. The annual cross-sectional regression results are available from the authors.

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