Why Do Firms With Diversification Discounts Have Higher Expected Returns?

Todd Mitton and Keith Vorkink*

Brigham Young University

ABSTRACT

A diversified firm can trade at a discount to a matched portfolio of single-segment firms if the diversified firm has either lower expected cash flows or higher expected returns than the single-segment firms. We study whether firms with diversification discounts have higher expected returns in order to compensate investors for offering less upside potential (or skewness exposure) than focused firms. Our empirical tests support this hypothesis. First, we find that focused firms offer greater skewness exposure than diversified firms. Second, we find that diversified firms have significantly larger discounts when the diversified firm offers less skewness than matched single-segment firms. Finally, we find that up to 53% of the excess returns received on diversification-discount firms relative to diversification-premium firms can be explained by differences in exposure to skewness.

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What causes a diversified firm to trade at a discount relative to a comparable matched portfolio of single-segment firms?[1] Lamont and Polk (2001) point out that, fundamentally, a diversification discount must be attributed to differences in expected *cash flows* or to differences in expected *returns* between diversified firms and focused firms. Empirically, Lamont and Polk (2001) show that roughly half of the cross-sectional variation in excess values of diversified firms relative to focused firms is due to variation in expected cash flows, whereas the other half is explained by variation in expected returns and covariation between cash flows and returns. A complete understanding of the valuation effects of corporate diversification requires taking into account both the "cash-flow portion" and the "expected-return portion" of the diversification discount.

A large literature has been devoted to understanding the cash-flow portion of the diversification discount. One explanation is that diversification could lead to dissipation of cash flows if managers of conglomerates inefficiently allocate capital across divisions, perhaps by subsidizing poorly performing divisions with cash flows from profitable divisions [e.g., Lamont (1997), Shin and Stulz (1998), Rajan, Servaes, and Zingales (2000), Scharfstein and Stein (2000), Whited (2001), and Maksimovic and Phillips (2002)]. A second explanation is that the diversified firms dissipate cash flows because managers of diversified firms engage in self-interested, wasteful, or other suboptimal behaviors [e.g., Morck, Shleifer, and Vishny (1990), Servaes (1996), Denis, Denis, and Sarin (1997), and Schoar (2002)]. A third explanation suggests that diversification doesn't *cause* cash flow dissipation, but that expected cash flows are lower in diversified firms because conglomerates are often created through mergers of already-inefficient firms [e.g., Graham, Lemmon, and Wolf (2002), and Chevalier (2004)].

[1] Our paper does not directly address the question of whether diversified firms trade at a discount on average – a point on which the literature disagrees [for a partial sample of views, see Lang and Stulz (1994), Berger and Ofek (1995), Lins and Servaes (1999), Mansi and Reeb (2002), Campa and Kedia (2002), Graham, Lemmon, and Wolf (2002), and Villalonga (2004a, 20004b)]. We address the question of why many diversified firms trade at a discount and why we observe cross-sectional variation in excess values of diversified firms.

In contrast to the cash-flow portion, the expected-return portion of the diversification discount has received relatively little attention from researchers. Lamont and Polk (2001) note that factors explaining expected returns on firms with diversification discounts could include risk, mispricing, taxes, and liquidity. They find limited evidence for the risk explanation, showing that a small part of the differential returns on diversification-discount firms relative to diversification-premium firms can be explained by a Fama and French (1993) three-factor model. They find even less support for explanations based on liquidity and mispricing.[2]

In this paper, we seek to add to our understanding of why firms with diversification discounts have higher expected returns. We consider an explanation based on the return distributions of the stocks of diversified firms relative to single-segment firms. Specifically, we consider whether investors pay a premium for single-segment firms because the return distributions of single-segment firms have higher upside potential (positive skewness) than do the return distributions of diversified firms. If investors have a preference for stocks with positive skewness, then stocks of diversified firms may have to offer higher returns in order to compensate investors for a lack of upside potential.

The assumption that investors would place a premium on stocks with greater skewness exposure is grounded in theory. Arditti (1967) and Scott and Horvath (1980) demonstrate that investors with typical preferences demonstrate a preference for positive skewness in return distributions. Kraus and Litzenberger (1976) and Harvey and Siddique (2000) build on these results to develop asset-pricing relationships in a representative agent framework, and find that an asset's coskewness with the market portfolio should be priced. Other research shows that even idiosyncratic skewness may be a priced component of stock returns. Barberis and Huang (2005) show that when investors have

[2]Another line of research deals with informational problems associated with conglomerates. Although this research does not directly test the effect of informational problems on expected returns, it is possible that information asymmetries could lead to higher expected returns for diversified firms [see Krishnaswami and Subramaniam (1999), Hadlock, Ryngaert, and Thomas (2001), and Gilson et al. (2001)].

preferences based on cumulative prospect theory, stocks with greater idiosyncratic skewness may command a pricing premium. Mitton and Vorkink (2006), in a model incorporating heterogeneous investor preference for skewness, also predict a pricing premium for stocks with idiosyncratic skewness. The optimal expectations model of Brunnermeier and Parker (2005) produces qualitatively similar asset-pricing implications for skewness as Barberis and Huang (2005) and Mitton and Vorkink (2006).

If investors place a premium on return skewness then, for example, a diversified firm with three divisions (and a single stock) could trade at a discount to a comparable portfolio of the stocks of three matched firms, even if the three matched firms generate expected cash flows identical to the expected cash flows of the diversified firm. The difference is that holders of the diversified firm's stock are unable to capture the potential skewness exposure that each of the separate divisions would otherwise offer. In order to capture greater skewness exposure, investors must remain underdiversified. Skewness exposure is rapidly eroded by diversification [Simkowitz and Beedles (1978)], and thus in the presence of skewed returns, investors may optimally choose to remain underdiversified [Conine and Tamarkin (1981)]. Barberis and Huang (2005), Brunnermeier and Parker (2005), and Mitton and Vorkink (2006) all show that, even in equilibrium, investors may remain underdiversified to capture return skewness. But diversified firms *force* diversification on investors, thereby removing the possibility of capturing skewness from investors that would underdiversify in order to do so. In the process, diversified firms may erase any pricing premium that otherwise would have been attached to divisions with potential skewness exposure.

The results of our empirical tests are consistent with a skewness-based explanation for the expected-return portion of the diversification discount. First, we study how stock return distributions vary according to the degree of corporate diversification of the firm. We find that the return distributions of focused firms are more positively skewed than the return distributions of diversified firms. Single-segment firms, on average, offer skewness exposure more than double that of the most-diversified firms. The difference in skewness exposure persists when we compare diversified firms with an industry-matched portfolio of single-segment firms. To do this, we compute a measure of "excess skewness" for each diversified firm, which is analogous to measures of "excess value" used previously in the literature for computing diversification discounts. We find that, on average, the excess skewness of diversified firms is negative and significant, indicating that diversified firms erode skewness exposure relative to their single-segment comparables.

Second, we explore whether the skewness exposure of diversified firms is cross-sectionally related to the valuation of diversified firms. We estimate regressions of excess value on excess skewness and find that diversification discounts are significantly greater in firms that have less skewness exposure relative to single-segment comparables. In other words, investors tend to discount diversified firms when the diversification is associated with a loss of upside potential for that firm's stock. This result persists when we include in the regression proxies for existing cash-flow-based explanations for the diversification discount.

In our third set of tests we directly confront the question of why firms with diversification discounts have higher expected returns. We study whether exposure to skewness helps explain the excess returns of discount firms relative to premium firms, as documented by Lamont and Polk (2001). To do so, we create an "excess-skewness factor" that captures the differences in return skewness between discount firms and premium firms. We find that the differential return between discount firms and premium firms loads significantly on this excess-skewness factor. We find that differences in skewness exposure can explain a substantial portion of the return differential between discount firms and premium firms. The excess-skewness factor alone reduces pricing errors of the return differential portfolio by up to 53 percent. In contrast, the Fama-French (1993) three-factor model reduces pricing errors by 23 percent at the most. In short, skewness exposure appears to have a first-order effect in explaining why firms with diversification discounts have higher expected returns.

The paper proceeds as follows. Section I describes the data used for our empirical tests. Section II explores how corporate diversification affects investors' exposure to skewness. Section III studies whether diversification discounts are cross-sectionally related to differences in skewness exposure. Section IV reports results on whether skewness exposure explains excess returns on discount firms relative to premium firms. Section V concludes.

I. The Sample

Our sample consists of all firms in the Compustat database between 1977 and 2003. We begin with 1977 because this is the first year for which Compustat's segment data are available. Compustat's segment data identify the different business segments in which a firm operates, where segments are defined at the four-digit SIC-code level. In addition, the data report the proportion of a firm's sales and assets that are attributable to each segment. We define a firm as diversified in a given year if it reports more than one segment in Compustat for that year. We combine the Compustat segment data with stock return data from the CRSP database.

For consistency with previous literature [e.g., Lamont and Polk (2001)], we exclude some observations from this sample. We exclude firm-year observations for which we do not have accompanying stock return data from the CRSP database. Our focus is on monthly stock returns, and, at a minimum, we require that the firm have stock return data for at least ten of the twelve months in the calendar year subsequent to the date of the accompanying Compustat segment data. We eliminate financial firms from the sample by excluding any firm-year observation in which one or more of the firm's segments has an SIC code between 6000 and 6999. We also exclude any firm-year observations for which data on sales or assets are missing for any of the firm's segments, in which the sum of sales reported for the firm's segments is not within one percent of total reported sales for the firm, or in which annual sales for the firm are less than $20 million. After these exclusions we have an average of 2,623 observations (including diversified and single-segment firms) for each year from 1977 to 2003.

II. Diversification's Effect on Return Skewness

In this section we study the relationship between the level of corporate diversification in a firm and the return distribution of its stock. At this point in the analysis we do not yet consider whether diversified firms trade at a discount, we simply want to understand whether corporate diversification leads to a loss of skewness exposure in general. Simkowitz and Beedles (1978) show that *portfolio* diversification leads to a loss of skewness exposure, with the majority of skewness exposure being eroded with the addition of just a small number of securities to the portfolio. Diversification into unrelated businesses at the corporate level might also be expected to erode skewness exposure of the firm's stock, but the degree to which this occurs is not well understood.

To study the effect of corporate diversification on return skewness, we calculate return statistics for each sample firm in each year. We calculate the mean monthly return and the variance of monthly returns in the twelve months subsequent to the date of the Compustat segment data. Our primary return statistic of interest is the skewness of stock returns, which we measure as the skewness coefficient,

$$S = \frac{\frac{1}{12}\sum_{t=1}^{12}(r_t - \mu)^3}{\hat{\sigma}^3}, \quad (1)$$

where the coefficient is calculated from the twelve-month window of monthly returns and $\hat{\sigma}^3$ is the cube of the estimated return standard deviation. An important feature of the skewness coefficient is that it is scaled by the variance of returns. Thus, equation (1) adjusts for the fact that variance and skewness are positively correlated, i.e., we are measuring the incremental skewness over what would be expected given the level of variance in returns.

A. Return Skewness by Level of Diversification

Table I reports the return statistics of all firm-year observations in the sample sorted by the diversification level of the firm. We define the number of operating segments for the firm as the number of unique four-digit SIC codes in which the firm operates. Table I shows that 72 percent (51,288) of the firm-year observations are identified as single-segment firms, with the remaining 28 percent being diversified into two or more segments. Table I reports the average return statistics for each level of diversification. Diversified firms, generally speaking, are shown to have higher average returns than single-segment firms. This difference in average returns hints of the finding in Lamont and Polk (2001) that diversification-discount firms have higher expected returns, but at this stage of the analysis we do not yet identify which multiple-segment firms trade at a discount. Table I also shows that single-segment firms have a higher variance of returns than do diversified firms.

The final column of Table I reports our primary statistic of interest, the skewness of returns, S. On average, the skewness coefficient for single-segment firms is 0.31, the highest among all categories of diversification and statistically distinguishable from all other multi-segment firm skewness estimates of Table I. As the number of operating segments increases, the average skewness coefficient decreases monotonically. Diversified firms with seven or more operating segments have an average skewness coefficient of only 0.10, which, given the relatively low number of observations, is not statistically distinguishable from 0. The higher skewness of undiversified firms indicates that an investor holding the stock of a single-segment firm is much more likely to experience extreme positive returns than is an investor holding the stock of a diversified firm.

To give some intuition of what higher skewness coefficients mean, in practical terms, we consider the outcomes that would be attained by investors in single-segment versus diversified firms. We rank the firm-year observations from Table I according to the annual return achieved and consider the set of firms with the highest annual returns – those in the top one percent of all annual returns during the 27-year sample period. We find that this set of "extreme winners", which consists of stocks with annual returns above 280 percent, is dominated by single-segment firms. Whereas single-segment firms make up 72 percent of the sample as a whole, single-segment firms comprise 87 percent of the set of extreme winners.[3] (Single-segment firms dominate the set of extreme winners despite the fact that they have lower average returns than diversified firms, as shown in Table I.) Investors seeking strong upside potential may rightly be attracted to the stocks of single-segment firms.

B. Excess Skewness of Diversified Firms

Table I shows that corporate diversification is associated with less skewness exposure, but it does not take into account possible differences in the industries in which firms operate. It is possible, for example, that single-segment firms tend to operate in industries that inherently offer more return skewness. To further assess to what degree skewness is eroded through corporate diversification, we create a measure of "excess skewness" for each diversified firm in our sample. Our measure of excess skewness is analogous to the measure of excess value that is used in previous literature on the diversification discount to assess the loss of firm value associated with diversification. Whereas excess value compares the *value* of a diversified firm to the value of a comparable portfolio of

[3] Of course, single-segment firms are also found disproportionately among the *lowest* one percent of performers, but investors should recognize that among the lowest performers losses are capped at -100 percent, whereas the highest single-segment annual returns are above 3,000 percent.

single-segment firms, our measure of excess skewness compares the *return skewness* of a diversified firm to the return skewness of comparable single-segment firms, reflecting the skewness alternatives investors face.[4]

To calculate excess skewness, we begin with all diversified firms in the sample. For each diversified firm (in each year) we calculate return skewness as in equation (1) for the 12 months subsequent to the reporting date of segment data in the Compustat database. In order to compare the skewness of diversified firms to single-segment firms, we calculate comparable skewness measures for each segment of each diversified firm based on the skewness of single-segment firms that operate in similar SIC codes. If at least five single-segment firms are available for the year that match the four-digit SIC code of the diversified-firm segment, then the average (or median) skewness of those single-segment firms is used as the comparable skewness measure. If fewer than five single-segment firms match at the four-digit SIC level, then we proceed to the three-digit SIC level, and to the two-digit SIC level if necessary, until at least five single-segment matches are found. If five or more matches are not found at the two-digit SIC level, then the observation is excluded. We calculate the comparable skewness for each diversified segment as the average (or median) of the skewness measures of the set of matching firms. We then define the "imputed" skewness of each diversified firm, denoted $S_{imputed}$, as the weighted average of the comparable skewness measures from each segment. In calculating imputed skewness, weighting is done by the proportion of sales or assets attributable to each diversified segment of the firm. Formally, imputed skewness measures for a diversified firm with n segments are defined as:

[4] We acknowledge that our excess-skewness measure may be a rough proxy for the tradeoff a skewness-preferring investor faces when choosing stocks. To this end, we construct alternative measures of excess skewness, such as comparing the skewness of the diversified firm relative to varying percentiles of ranked segment skewness estimates. We find no significant changes to our results using alternative skewness measures. We also vary the sample length for constructing skewness estimates and use daily data to construct skewness estimates. In all of these cases we find qualitatively similar results.

$$S_{imputed(Asset\ weighted,\ Mean)} = \sum_{j=1}^{n} wa_j \left(\frac{1}{N_j} \sum_{i=1}^{N_j} S_i \right), \quad (2)$$

$$S_{imputed(Asset\ weighted,\ Med)} = \sum_{j=1}^{n} wa_j \left(median \left(S_1, S_2, ..., S_{N_j} \right) \right), \quad (3)$$

$$S_{imputed(Sales\ weighted,\ Mean)} = \sum_{j=1}^{n} ws_j \left(\frac{1}{N_j} \sum_{i=1}^{N_j} S_i \right), \quad (4)$$

$$S_{imputed(Sales\ weighted,\ Med)} = \sum_{j=1}^{n} ws_j \left(median \left(S_1, S_2, ..., S_{N_j} \right) \right), \quad (5)$$

where wa_j (ws_j) is the fraction of the diversified firm's assets (sales) in segment j, N_j is the number of single-segment comparable firms in segment j of the diversified firm, and S_i is the skewness estimate of single-segment firm i.

Excess skewness for each diversified firm, denoted *ES*, is then calculated as the firm's actual skewness minus its imputed skewness: $ES = S$ - $S_{imputed}$. Thus, excess skewness reflects the incremental return skewness achieved by the firm above that achieved by comparable single-segment firms. A negative *ES* measure would imply that the diversified firm has eroded skewness exposure relative to the average skewness offered by the firm's individual segments.

Table II reports summary statistics for the measures of excess skewness. The first row shows that the mean return skewness for diversified firms is 0.23, with a median of 0.21. The next four rows report measures of imputed skewness. The four different measures correspond to the four methods for constructing imputed skewness as defined in equations (2), (3), (4), and (5), respectively. Similar statistics are reported for each of the four calculation methods. The mean imputed skewness is between 0.27 and 0.30, and median imputed skewness is between 0.29 and 0.32. By any of the four measures, imputed skewness is higher than the actual return skewness of diversified firms. This finding is verified in the last four rows of Table II, which report excess skewness. Mean excess skewness ranges from -0.04 to -0.07 (depending on the calculation method) and median excess skewness ranges from -0.07 to -0.10, indicating that, on average, diversified firms offer substantially less skewness than comparable industry-matched single-segment firms. Each of the four excess skewness estimates have robust t-statistics (not reported) greater than four when testing if the estimates are different from zero. Because the results in Table II effectively control for differences in the industries in which firms operate, they imply that corporate diversification erodes skewness exposure for the firm's stock.

III. Excess Skewness and Excess Value

In this section we study whether the magnitude of diversification discounts is cross-sectionally related to excess skewness. To do so, we first calculate excess values (relative to single-segment firms) for each diversified firm in the Compustat segment database between 1977 and 2003. Our procedure follows from the work of Berger and Ofek (1995), Lamont and Polk (2001), and others. Our two measures of value are Q and M, where Q is the market-to-book ratio (total market value over total book assets) and M is the market-to-sales ratio (total market value over annual sales). We calculate Q and M for all firms in the sample, whether diversified (defined as having two or more segments in the Compustat database) or single segment.

To compare the value of diversified firms to single-segment firms, we calculate comparable Q and M measures for each segment of each diversified firm (in each year) based on the value measures of single-segment firms that operate in similar SIC codes. If a minimum of five single-segment firms are available for the year that match the four-digit SIC code of the diversified-firm segment, then the value measures of those single-segment firms are used as the comparable measures. If fewer than five single-segment firms match at the four-digit SIC level, then we proceed to the three-digit SIC level, and to the two-digit SIC level if necessary, until at least five single-segment matches are found. If five or more matches are not found at the two-digit SIC level, then the observation is excluded. We calculate the comparable Q (M) for each diversified segment as the average or median of the Q (M) measures of the set of matching firms. We then define the "imputed" Q (M) of each diversified firm, denoted as $Q_{imputed}$ $(M_{imputed})$, as the weighted average of the comparable Q (M) measures from each segment. In calculating $Q_{imputed}$, weighting is done by the proportion of assets in each diversified segment of the firm, and $M_{imputed}$ uses the proportion of sales in each diversified segment of the firm. Analogous to equations (2), (3), (4), and (5), we define the imputed values measures for a diversified firm with n segments as

$$Q_{imputed(Mean)} = \sum_{j=1}^{n} wa_j \left(\frac{1}{N_j} \sum_{i=1}^{N_j} Q_i \right), \tag{6}$$

$$Q_{imputed(Med)} = \sum_{j=1}^{n} wa_j \left(median \left(Q_1, Q_2, ..., Q_{N_j} \right) \right), \tag{7}$$

$$M_{imputed(Mean)} = \sum_{j=1}^{n} ws_j \left(\frac{1}{N_j} \sum_{i=1}^{N_j} M_i \right), \tag{8}$$

$$M_{imputed(Med)} = \sum_{j=1}^{n} ws_j \left(median \left(M_1, M_2, ..., M_{N_j} \right) \right), \tag{9}$$

where Q_i (M_i) represents the market-to-book (market-to-sales) ratio of single-segment comparable firm i. Excess value for each diversified firm, denoted as EV_Q or EV_M, is then calculated as the natural logarithm of the ratio of the value measure to its imputed value, i.e., $EV_Q = \log(Q/Q_{imputed})$ and $EV_M = \log(M/M_{imputed})$.

Table III reports summary statistics for value ratios, imputed value ratios, and excess values. The data consist of all firm-year observations for diversified firms between 1977 and 2003. Table III shows that, on average, diversified firms trade at a discount to comparable portfolios of single-segment firms. Four measures of excess value are reported in Table III, using either Q or M as the value measure and using either means or medians of comparable firms' value measures to compute imputed values. The mean excess value for each of the four measures is negative, ranging from -6 percent to -37 percent. Median excess values for the four measures range from -7 percent to -32 percent. These mean and median excess values are similar in magnitude to those found in Lamont and Polk (2001), even though our sample covers a longer time period. The final column of Table III reports the fraction of firms that have positive values for each measure. Consistent with Lamont and Polk (2001), a minority of diversified firms have positive excess values, with the percentage positive ranging from 26 percent (for EV_Q based on the comparables' mean) to 41 percent (for EV_M based on the comparables' median).

We conduct a regression analysis of the relationship between excess values and excess skewness that will allow us to control for other factors that determine a firm's excess value. In particular we estimate the following panel regression:

$$EV_{i,t} = \beta_0 + \beta_1 ES_{i,t} + \boldsymbol{\theta} \mathbf{x}_{i,t} + \varepsilon_{i,t}, \tag{10}$$

where $EV_{i,t}$ is one of four measures of excess value of firm i for year t, $ES_{i,t}$ is a measure of firm i's excess skewness for year t, and $\mathbf{x}_{i,t}$ is a vector of instruments that may include firm, industry, and/or market-wide variables. We construct $ES_{i,t}$ based on equation (1) using returns from date t through 12 months forward. We construct $ES_{i,t}$ in this manner to reflect investors' expectations of skewness for the firm's equity over the future. However, this measure is not known at time t. To construct a time t measure of forecasted skewness, we run a preliminary estimation that regresses $ES_{i,t}$ on a set of $t-1$ variables and define the predicted values of this regression as $ES^*_{i,t}$. We use these predicted values as the explanatory variable in equation (10). Formally, we estimate both the skewness forecast regression and equation (10) as a system of equations using two-stage least squares. Our use of a two-stage estimation approach to equation

(10) can also be motivated based on the potential endogeneity of our excess-skewness measure. Chen, Hong, and Stein (2001) find that price is a strong predictor of skewness; consequently, $ES_{i,t}$ and $\varepsilon_{i,t}$ in equation (1) are likely to be correlated, leading to biased coefficient estimates. Two-stage estimation of $ES^*_{i,t}$ and equation (10) will correct for the endogeneity as long as instruments can be found that are correlated with excess skewness but uncorrelated with $\varepsilon_{i,t}$. We use lagged values of firm return, variance, and skewness, as well as month and industry dummy variables as instruments to predict excess skewness. Following Chen, Hong, and Stein (2001) we also include the portion of a firm's stock held by insiders and, based on Diether, Malloy, and Scherbina (2002), we include the standard deviation of analysts' earnings forecasts as a measure of difference of opinion. All of these instruments are known at time t to the investor making the first-stage predicted value, $ES^*_{i,t}$, a feasible estimate of expected skewness at time t.

Table IV reports estimated coefficients and standard errors for equation (1) using our four measures of excess value for two different sets of $\mathbf{x}_{i,t}$. We estimate a "simple" model in which we regress excess values on $ES^*_{i,t}$ and the variable $prank$, the lagged quintile of a firm's stock price. The variable $prank$ is included to control for the strong negative relationship between price and skewness as documented in Chen, Hong, and Stein (2001). The results of the simple model are reported in the first, third, fifth, and seventh columns. We also estimate a "full" model in which we also include regressors that have been used in the diversification discount literature to capture cash flow explanations for variations in excess values. Following Berger and Ofek (1995) we include the variable $numsic$, which is the number of 2-digit SIC codes associated with the diversified firm. To control for firm size [see Berger and Ofek (1995), Rajan, Servaes, and Zingales (2000), and Lang and Stulz (1994)] we include the variable $size$, which is measured by the natural log of sales for the asset-weighted regressions and natural log of assets for the sales-weighted regressions. We also include $profit$, a profitability measure constructed as EBIT divided by firm sales [see Berger and Ofek (1995)]; $r\&d$, as measured by annual research and development expenditures divided by the firm's book value of assets [see Lang and Stulz

(1994)]; and $capex$, as measured by capital expenditures divided by firm sales [see Berger and Ofek (1995)]. Finally, following Rajan, Servaes and Zingales (2000), we control for diversity in investment opportunities among the segments of a firm. To do so, we use the variable div, which we calculate as the standard deviation of Q values attributable to the firm's segments.

The results of estimating equation (1) support our hypothesis that excess skewness is positively related to excess value. In all cases reported, the estimated β_1 coefficients are positive, and in all cases but one (median values of asset-weighted benchmarks) the β_1 coefficients are statistically significant at standard levels. Values of β_1 become even more positive and statistically significant as the additional cash-flow regressors are added to the base model for all of the different weighting schemes, suggesting that the excess-skewness measure does not proxy for cash flow explanations of variations in excess values. The relationship between excess value and excess skewness is strongest for the sales-weighted (M) regressions relative to the asset-weighted (Q) regressions, and for the mean-constructed benchmarks relative to the median-constructed benchmarks.

Estimated values of the cash-flow regressors in the full model are generally consistent with prior work and intuition. The diversity measures, div and $numsic$, are negative and strongly significant in all cases, consistent with the hypothesis that firms operating in many segments ($numsic$) and in segments with differing investment opportunities (div) will be discounted. The profitability measure, $profit$, is positive and significant in all cases. The other variables do not take consistent values across all regressions or lack the consistent statistical significance of the aforementioned cash flow variables. Our intention for including these variables is solely to control for cash flow explanations for variations in excess values and to see if excess skewness is able to explain residual variations.

We conduct a number of robustness checks to determine the sensitivity of our results to our model specifications. Our robustness checks include adding other variables to equation (10) including a time trend, monthly dummies, a dummy variable for the fiscal year-end month of a particular firm, lagged firm and benchmark returns, variances, and skewness measures.[5] We also treat *prank* as endogenous and construct predicted values using our instruments similar to our treatment of $ES_{i,t}$. We construct our skewness estimates using 36- and 60-month forward-looking horizons using monthly returns. We also construct excess-skewness measures using daily returns. None of these robustness checks changes the sign of β_1 or its general statistical significance.

In contrast to the robustness of alternative skewness measures, we do find that when we remove *prank* from equation (10) the coefficients on β_1 are often negative and significant, a result that appears to be driven by a strong relationship between price, skewness, and excess value. In particular, we find a strong negative correlation (-0.41) between price and skewness, or excess skewness, driven primarily by the fact that low-priced firms have high positive skewness. Simply put, low-priced stocks have little additional movement downwards with little constraint on prices in the positive direction. In addition, price and excess values have a strong positive correlation (greater than 0.3 for each of our measures of excess value), particularly for firms with low stock prices. To control for this low-priced-stock effect, we include the *prank* variable in all regressions. In unreported regressions, we exclude all firm-year observations in which the stock price is less than five dollars and find that the β_1 coefficient in these regressions is always positive and almost always statistically significant at standard levels, even without the inclusion of the *prank* variable.

Diversified firms trading at a discount tend to offer less upside potential (skewness) than comparable single-segment firms. This section's results also indicate that as firms destroy skewness by segment diversification, their relative values are discounted. One economic mechanism for this discounting would arise if skewness-preferring investors bid

[5] Corporate reporting regulations changed in 1997, which led to a number of firms increasing the number of reported segments simply because of the change in regulations. We include a dummy variable for dates after the change in reporting and find that estimates of β_1 in regressions including this dummy increase, although not significantly.

up the price of single-segment stocks relative to diversified stocks. In this scenario we would also likely see variations in expected returns across diversification as predicted by Barberis and Huang (2005) and Mitton and Vorkink (2006). We investigate the empirical relationship between a diversified firm's excess skewness and average returns in the next section.

IV. Excess Returns and Skewness Exposure

In this section we directly test why firms with diversification discounts have higher expected returns. We test whether skewness helps to explain differential returns on diversification-discount firms relative to diversification-premium firms. We posit that diversified firms offering relatively low skewness (e.g., by embedding and hence diversifying highly skewed segments) will have higher expected returns (lower valuations) than firms offering high levels of skewness. To this end, we first characterize the return properties of portfolio strategies based on diversification and then discuss an empirical investigation into the relationship between diversified-firm portfolios and skewness.

Table V details the return properties of three portfolio strategies based on various exposures to diversification. The four columns under the "Premium Portfolio" heading report return statistics for a portfolio that takes a long position in diversified firms trading at a premium ($EV_Q > 0$ or $EV_M > 0$) and shorts a portfolio of single-segment comparable firms.[6] The four columns under the "Discount Portfolio" heading report return statistics for a portfolio that takes a long position in discount firms and shorts their single-segment comparables. The final two columns under the "Difference Portfolio" heading report return statistics of a portfolio that takes a long position in the discount portfolio strategy and shorts the premium portfolio strategy. The difference portfolio is constructed following the procedure outlined in Lamont and Polk (2001).

[6] We construct our portfolio of single-segment firms in an identical manner to the construction of single-segment benchmarks in the prior section.

The difference portfolio allows us to focus on the cross-sectional difference between diversification-discount and diversification-premium firms. By focusing on diversified firms, the difference portfolio provides greater power to our tests in the presence of firm effects that are common across diversified firms but vary relative to single-segment firms. We report return characteristics of these portfolio strategies using four different approaches to determine a firm's excess value: asset weighted using the mean of single-segment information for imputed values ($EV_{Q(Mean)}$), asset weighted using medians of single-segments ($EV_{Q(Med)}$), sales weighted using means of single-segments ($EV_{M(Mean)}$), and sales weighted using the medians of single segments ($EV_{M(Med)}$). The particular approach is denoted in the first column of Table V.

Consistent with Lamont and Polk (2001), we find that the premium portfolio earns negative returns while the discount portfolio earns positive returns on average and that more diversified firms are characterized as discount firms than premium firms. The difference portfolio earns large positive returns with all approaches, earning at least 46 basis points per month. Both the premium and discount portfolios have negative average excess skewness as expected and consistent with the results of Tables I and II. Our measure of excess skewness is the time-series average of the difference between a firm's estimated skewness and a benchmark skewness estimate constructed from the skewness estimates of single-segment alternatives. The excess-skewness measures on the premium portfolios are slightly larger (less negative) than corresponding measures for discount portfolios. This difference is driven not only by slightly higher skewness estimates for premium diversified firms but also because single-segment comparables for premium firms have slightly lower average skewness estimates than single-segment comparables for discount firms.

If skewness were the only determinant of excess values, the negative excess-skewness values for the premium portfolio in Table V would contradict the skewness hypothesis. Diversification-premium firms do offer more upside (skewness) than diversification-discount firms, but, similar to discount firms, premium firms offer less skewness than their single-segment comparable firms. We do not investigate specific explanations for firms to have negative excess skewness and trade at a premium, other than to note that many theories predict value enhancements from diversification.[7] We note that the R^2 of the regressions in Table IV indicate that only about 10-15 percent of the variation in excess values can be explained by *both* our excess-skewness and cash flow measures. In addition, the nature of the relationship between skewness and diversification-premium firms is also borne out in the subsequent portfolio analysis and is consistent with our hypothesis. Factors based on excess skewness help to explain premium-firm differential returns in similar magnitudes as discount-firm differential returns.

A. Portfolio Results

Despite the striking difference in average returns between discount and premium portfolios reported in Table V, which is similar to the difference reported in Lamont and Polk (2001), expected-return explanations have received very little attention in the diversification-discount literature. We conduct empirical tests to determine how much of the variation in average returns on these portfolios excess skewness can explain. Our empirical work follows Lamont and Polk (2001); we conduct traditional asset-pricing tests and report the results of these tests in Tables VI and VII.

Table VI reports output from regressions of the difference portfolio returns (long discount portfolio and short premium portfolio) on a Fama-French three-factor model as well as regressions where we also include a measure of portfolio excess skewness. Regressions using excess-skewness measures as a pricing factor present problems as the interpretation of the pricing errors would be contaminated by the inclusion of a pricing factor that cannot be interpreted as a portfolio return. However, following Huberman,

[7] Theories of the benefits of diversification include debt coninsurance [Lewellen (1971)], scale economy benefits [Tirole (1995)], and efficient internal capital markets [Gertner, Scharfstein, and Stein (1994), and Stein (1997)].

Kandel, and Stambaugh (1987) we can construct an excess-skewness factor, (r_{ES}), by regressing the portfolio excess skewness, (ES), on a set of portfolios and an intercept as follows:

$$ES_t = \gamma_0 + \boldsymbol{\gamma}\mathbf{r}_{p,t} + \varepsilon_t, \tag{11}$$

where $\mathbf{r}_{p,t}$ is a $k \times 1$ vector denoting the candidate set of mimicking portfolios, and $\boldsymbol{\gamma}$ is a vector of regression coefficients. We let $r_{ES} = \hat{\boldsymbol{\gamma}}\mathbf{r}_{p,t}$, where $\hat{\boldsymbol{\gamma}}$ is estimated using linear regression, implying that the mimicking portfolio will have maximal correlation to the excess-skewness factor.

Our excess-skewness factor is not a common factor in the traditional sense. Typically, asset-pricing factors are intended to explain systematic variations in the cross section of returns. In our case, each test asset (or portfolio) would have an associated excess-skewness factor. Because our tests are univariate, this dilemma is in large part mitigated as we require only one excess-skewness factor in each of our tests. Thus, adopting the methodology of Huberman, Kandel, and Stambaugh (1987) allows us to interpret the resulting pricing errors of an excess-skewness model relative to pricing errors of traditional models such as the Fama-French three-factor model.

We estimate equation (11) for our measures of excess skewness using the set of 25 size and book-to-market sorted portfolios introduced by Fama and French (1993) as our set of mimicking portfolios.[8] For the estimations reported in Table VI, our measure of excess skewness is the difference between the excess skewness of the relevant discount portfolio and the excess skewness of the associated premium portfolio.

We estimate three variations of the following asset-pricing model:

$$r_{dp,t} = \alpha + \beta_1 r_{MKT,t} + \beta_2 r_{SMB,t} + \beta_3 r_{HML,t} + \beta_4 r_{ES,t} + \varepsilon_t, \tag{12}$$

[8] We thank Ken French for making the return data on the 25 size and book-to-market sorted portfolios available on his website. Details of these preliminary regressions are not provided but are available. Robustness on the estimations are performed with other portfolio sets (Fama-French factors and subsets of the 25 size and book-to-market portfolios) with qualitatively similar results.

where $r_{dp,t}$ is the return on the designated diversified portfolio strategy denoted in the first column of Table VI, $r_{MKT,t}$ is the excess return on the market portfolio, $r_{SMB,t}$ is the return on a portfolio that takes a long position in small cap stocks and a short position in large cap stocks, and $r_{HML,t}$ is a portfolio that takes a long position in high book-to-market stocks and a short position in low book-to-market stocks [see Fama and French (1993)]. The first variation we estimate is the Fama-French three-factor model and is obtained by setting $\beta_4 = 0$. We report the three-factor estimation results in the first row of each portfolio sort in Table VI. The second variation we estimate is a one-factor excess-skewness model and is obtained by setting $\beta_1 = \beta_2 = \beta_3 = 0$. We report the one-factor model estimation results in the second row of each portfolio sort. The last variation estimates the full version of equation (12) including all four pricing factors. We report the estimation results of the four-factor model in the last row of each portfolio sort.

Under the null of skewness preference, β_4 should be negative to reconcile the higher expected returns on stocks that have more negative values of excess skewness (stocks that destroy skewness through segment diversification). Enticing skewness-preferring investors to hold stocks with little relative skewness comes at the cost of higher expected returns. Equation (12) implies that months in which the return on the difference portfolio is large and positive should also be accompanied by large disparities in skewness offered by stocks of diversification-discount firms relative to stocks of diversification-premium firms.

We estimate the three variations of equation (12) using our four different approaches to construct excess values described above and noted in the first column of Table VI. The second column in Table VI reports the average return of the specified portfolio sort as well as the standard error of the average return.

The Fama-French three-factor model estimation results reported in Table VI are similar to Lamont and Polk (2001); the coefficients on the market return are small and negative and the coefficients on the size factor (SMB) and the value factor (HML) are positive and significant.[9] Similar to Lamont and Polk (2001), the pricing errors (α estimates) of the three-factor model are large relative to the average returns of the difference-portfolio strategy. For example, the $EV_{Q(Med)}$ approach results in a difference portfolio that earns, on average, 49.5 basis points monthly. The pricing error of the Fama-French three-factor model on this portfolio is 40.2 basis points, which is a 19 percent reduction in pricing error. Qualitatively similar results are found in Table VI for the other three portfolio sorts with the overall average pricing error decrease being 15 percent for the Fama-French three-factor model. The three-factor model loads most heavily on the HML portfolio, suggesting that a value effect helps to explain the relationship between excess values and subsequent returns, consistent with the abundance of value-type effects found in asset prices. Yet, even though the inclusion of the HML factor is statistically important, large residual pricing errors remain.[10]

Table VI shows that the estimated coefficients on the excess-skewness factor, β_4, are always negative and statistically significant, consistent with our hypothesis.[11] The one-factor skewness model performs very well when compared with the Fama-French three-factor model. For example, for the $EV_{Q(Med)}$ sort, the pricing error of the one-factor excess-skewness model is 23.2 basis points, a 53 percent reduction in pricing error. On average, the pricing errors of the one-factor excess-skewness model are 30 percent lower than the three-factor pricing errors and over 40 percent lower than the unconditional portfolio returns. The three-factor model has higher R^2s than the one-factor model; the average three-factor model R^2 is 25 percent and the average one-factor model R^2 is 18 percent.

[9] Differences between Table VI and Lamont and Polk (2001) are primarily driven by the fact that our sample includes eight additional years of data.

[10] Lamont and Polk (2001) also look for liquidity and mispricing explanations for the difference portfolio returns and find little evidence of these alternative explanations.

[11] In unreported regressions we include excess-skewness factors instead of the mimicking portfolio and find that the β_4 in these regressions is negative and signficant, similar to the results in Table VI.

The four-factor model's results also favor the inclusion of the excess-skewness pricing factor. Even with the addition of the three traditional pricing factors, β_4 remains negative and significant, although in all cases β_4 is less negative in the four-factor model than in the one-factor model. The estimated values on the other three factors remain similar to estimated values for the three-factor model. The pricing errors of the four-factor model also tend to be close to the pricing errors of the one-factor skewness model. These values are lower than their three-factor model counterparts and indicate that any pricing error improvements of the three-factor model are primarily independent of the pricing improvements generated by the excess-skewness factor. The increases in R^2s of the four-factor model relative to the Fama-French three-factor model are large, nearly 38 percent on average. The increases in R^2 also highlight the independent explanatory power offered by the excess-skewness factor.

The β_4 coefficients for the sales-based (M) approaches are somewhat larger in magnitude than for the asset-based (Q) counterparts, and we find little distinction in the results for the mean-based results versus the median-based results. Overall the results of Table VI signify that higher spreads between discount- and premium-portfolio returns correlate strongly and negatively with excess portfolio skewness.

B. Premium Versus Discount Portfolios

The results of Table VI appear to support the notion that investors penalize diversified firms that embed segments, which, if available as securities themselves, would offer positive skewness in returns. These results pit the returns of diversification-discount firms against the returns of diversification-premium firms. In this section we compare the returns of diversified firms against their single-segment alternatives to see how excess skewness relates to excess returns. In particular, we investigate the relationship between skewness and returns for both the premium and discount portfolios.

If skewness were the sole determinant of value, then we would not expect to see any diversified firms trading at a premium. Given that many diversified firms do trade at a premium and that even premium firms diversify away skewness relative to single-segment comparable firms, we break down the regressions of Table VI into their components to determine if the results hold for the diversified and premium portfolios individually. These results are reported in Table VII. As noted earlier, our difference portfolio returns are robust to effects common across diversified firms, and consequently, the estimations reported in Table VII may have less power to detect skewness factors given that we do not isolate these potentially confounding effects.

For brevity, in Table VII we only report the estimates of the Fama-French three-factor model and the four-factor model adding the appropriately constructed skewness factor portfolio. Excess-skewness factor portfolios are constructed using average excess-skewness measures on the respective portfolio denoted in the first column of Table VII. We include the base regressions of Table VI on the difference portfolio for comparison purposes and we report the results for two portfolio sorts: $EV_{Q(Mean)}$ and $EV_{M(Mean)}$.

We make three main observations regarding the estimations of Table VII. First, the excess-skewness factor plays a role in explaining the differential returns of both the discount portfolio and the premium portfolio. Estimated β_4 values are negative and statistically significant in all cases. In fact, the estimated β_4 values are more negative and significant for the premium portfolio than for the discount portfolio. While the larger β_4 coefficients would likely result from the lower excess-skewness values on premium portfolios as shown in Table V, the fact that β_4 remains negative and significant for the premium portfolio suggests that the returns on these stocks are penalized for destroying skewness relative to their comparable single-segment stocks.

Our second observation is that the pricing errors of the four-factor model are much lower than the three-factor model pricing errors. On average, the four-factor model reduces pricing errors by 38 percent relative to the three-factor model and by nearly 47 percent relative to the average portfolio returns. In fact, both discount and premium portfolio pricing errors using the asset-weighted portfolio sort become statistically insignificant for the four-factor model. The pricing errors are larger for the sales-weighted results, although the proportional reductions in pricing errors are still quite large.

Our third observation is that the fit of the asset-pricing model is much stronger for the four-factor model as compared to the three-factor model. On average, the improvements in R^2 for the four-factor model relative to the three-factor model are nearly 41 percent. The fit improvements are much greater for the premium portfolio than for the discount portfolio. The average increase in R^2 for the four-factor model relative to the three-factor model are 63 percent for the premium portfolio as compared to a 20 percent increase for the discount portfolio.

We find that both the returns on the diversification-discount stock portfolio and the returns on the diversification-premium stock portfolio correlate strongly with associated excess-skewness factors and that once these factors are included in an asset-pricing context, both the pricing errors are reduced and the amount of variation explained increases. We find that our excess-skewness/excess-return relationship works on multiple levels, both at the diversified firm relative to single-segment level as well as the diversification-discount firm relative to diversification-premium firm level. In sum, we find that the results of Tables VI and VII strongly support the notion that investors' preference for stocks with positive skewness is strong enough to have pricing effects, and that variations in firms' excess skewness explain much of the variation in average returns of diversified firms.

V. Conclusion

Investors have long realized that portfolio diversification will both reduce risk and reduce the chance of an extremely high return. However, little effort has been expended to understand how corporate diversification affects firm returns. We find that the reductions in portfolio risk and skewness arising from portfolio diversification occur in a similar fashion with corporate diversification. Stock returns for firms with multiple business segments have less variance and skewness than stock returns for firms that operate in a single business segment. This difference in return distributions persists when we compare diversified firms with an industry-matched portfolio of single-segment firms. If investors seek stocks with strong upside potential, they are less likely to find them among the stocks of diversified firms.

A natural question that arises from these results is how corporate diversification influences stock prices and expected returns, particularly in the presence of skewness-preferring investors. We find evidence of pricing effects connected to a firm's level of diversification. Specifically, we find that the valuation of a diversified firm relative to single-segment comparables is significantly related to the amount of skewness destroyed through the firm's operation of multiple businesses. Investors tend to discount the value of conglomerates when the conglomerate embeds business segments that would have strong upside potential as a separate company. The finding suggests one rationale for how spin-offs might "unlock value" in a conglomerate with unrelated business units – the spin-off creates a pure play with skewness exposure for which investors may be willing to pay a premium.

The premium that investors pay for the chance of owning an extreme winner appears to be a large part of the explanation for why firms with diversification discounts have higher expected returns. Investors may require higher average returns on diversification-discount firms to compensate for the fact that such firms are unlikely to produce extreme winners. Our asset-pricing tests confirm this relationship. We find that a substantial proportion (up to 53%) of the excess returns received on diversification-discount firms relative to diversification-premium firms can be explained by differences in exposure to skewness. While existing explanations for how diversified firms dissipate cash flows may also have merit (and our findings do not exclude such explanations), our results suggest that skewness preference is of first-order importance in explaining why some firms exhibit a diversification discount.

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Table I

Corporate Diversification and Return Skewness

The table presents stock return statistics of firms sorted by degree of corporate diversification. Firms are ranked by number of unique operating segments, based on 4-digit SIC codes reported in Compustat, in each year from 1977 through 2003. Return statistics are averages across all firm-year observations based on monthly returns for the twelve months beginning in January of the subsequent year.

Number of unique operating segments	Firm-year observations	Mean monthly return	Variance of monthly returns	Skewness of monthly returns (S)
1	51,288	0.0136	0.0285	0.3071
2	9,720	0.0141	0.0209	0.2618
3	5,840	0.0143	0.0160	0.2243
4	2,460	0.0158	0.0119	0.1501
5	1,013	0.0151	0.0118	0.1410
6	318	0.0160	0.0089	0.1262
7+	172	0.0134	0.0100	0.1012

Table II

Skewness Values for Diversified Firms

The table presents skewness measures for diversified firms between 1977 and 2003. Skewness (*S)* is the return skewness measured over the 12 months subsequent to the reporting of segment data. Imputed skewness ($S_{imputed}$) is the weighted average of the mean (or median) skewness attained over the same period by single-segment firms matched to each of the industries in which the diversified firm operates. Asset weighted (sales weighted) indicates that a firm's imputed skewness is calculated based on the proportion of assets (sales) attributable to each segment of the firm. Excess skewness (*ES*) is constructed as the difference between a diversified firm's return skewness and the corresponding imputed return skewness. The sample consists of 20,316 firm-year observations.

Variable	Mean	Median	Standard Deviation	Minimum	Maximum
Skewness (*S*)	0.229	0.207	0.742	-2.476	2.983
Imputed Skewness ($S_{imputed}$)					
Asset weighted, mean	0.297	0.321	0.280	-1.493	1.609
Asset weighted, median	0.270	0.291	0.292	-1.612	1.557
Sales weighted, mean	0.299	0.322	0.280	-1.394	1.386
Sales weighted, median	0.272	0.291	0.292	-1.533	1.730
Excess Skewness (*ES*)					
Asset weighted, mean	-0.068	-0.095	0.731	-2.878	3.424
Asset weighted, median	-0.041	-0.070	0.737	-3.177	3.672
Sales weighted, mean	-0.069	-0.099	0.733	-3.121	3.525
Sales weighted, median	-0.043	-0.075	0.739	-3.534	3.816

Table III

Value Ratios for Diversified Firms

The table presents value ratios for diversified firms between 1977 and 2003. *Q* is the market-to-book ratio, and *M* is the market-to-sales ratio. Imputed values are calculated as the weighted average of the mean (or median) value of single-segment firms matched to each of the industries in which the diversified firm operates. Excess values (*EV*) indicate the valuation metric of the diversified firm relative to the comparable portfolio of single-segment firms, calculated as $\log(Q/Q_{imputed})$ or $\log(M/M_{imputed})$. The sample consists of 20,316 firm-year observations.

Variable	Mean	Median	Standard Deviation	Minimum	Maximum	Fraction Positive
Q	1.30	1.10	0.76	0.11	22.81	1.00
M	1.14	0.74	1.72	0.02	103.15	1.00
Imputed Values						
$Q_{imputed(Mean)}$	1.52	1.38	0.65	0.63	21.54	1.00
$Q_{imputed(Med)}$	1.31	1.21	0.41	0.61	5.65	1.00
$M_{imputed(Mean)}$	1.48	1.06	1.73	0.11	41.80	1.00
$M_{imputed(Med)}$	1.12	0.86	0.91	0.08	25.89	1.00
Excess Values						
$EV_{Q(Mean)}$	-0.19	-0.19	0.40	-3.44	3.16	0.26
Premium firms only	0.26	0.18	0.27	0.00	3.16	1.00
Discount firms only	-0.37	-0.30	0.30	-3.44	0.00	0.00
$EV_{Q(Med)}$	-0.06	-0.07	0.39	-2.57	3.25	0.39
Premium firms only	0.28	0.19	0.29	0.00	3.25	1.00
Discount firms only	-0.28	-0.22	0.25	-2.57	0.00	0.00
$EV_{M(Mean)}$	-0.37	-0.32	0.69	-5.31	4.46	0.28
Premium firms only	0.39	0.28	0.37	0.00	4.46	1.00
Discount firms only	-0.66	-0.54	0.55	-5.31	0.00	0.00
$EV_{M(Med)}$	-0.14	-0.13	0.65	-4.52	4.59	0.41
Premium firms only	0.44	0.33	0.41	0.00	4.59	1.00
Discount firms only	-0.54	-0.43	0.47	-4.52	0.00	0.00

Table IV

Determinants of Excess Value

The table presents coefficient estimates from a regression of diversified-firm excess value (*EV*) on excess skewness (ES). Other determinants of excess value included in the regression are *prank*, the quintile ranking of the firm's lagged stock price; *numsic*, the number of 2-digit SIC codes in which the firm operates; *size*, the log of sales for the asset-weighted regressions and the log of assets for the sales-weighted regressions; *profit*, measured as EBIT/sales; *r&d*, measured as R&D expenditures/assets; *capex*, measured as capital expenditures/sales; and *div*, measured as the standard deviation of the firm's segment *Q* values. We run a preliminary regression of excess skewness, *ES*, on a number of predetermined instruments including SIC code dummy variables, previous realizations of firm return, variance, and skewness, a firm's number of SIC codes, time dummy variables, and other instruments. We then use the fitted values from the preliminary regression, denoted as *ES**, as the independent variable in the excess-value regressions. We use two-stage least squares as the estimation procedure. Standard errors, in parentheses, are below the point estimates.

	Excess Value Measure							
	EV_Q				EV_M			
	Mean		Median		Mean		Median	
Intercept	-0.446	-0.341	-0.288	-0.208	-0.685	-0.674	-0.551	-0.514
	(0.010)	(0.022)	(0.010)	(0.022)	(0.018)	(0.035)	(0.017)	(0.033)
*ES**	0.040	0.046	0.014	0.035	0.182	0.193	0.096	0.130
	(0.014)	(0.018)	(0.014)	(0.018)	(0.025)	(0.030)	(0.023)	(0.029)
prank	0.107	0.126	0.099	0.119	0.191	0.203	0.165	0.174
	(0.004)	(0.006)	(0.004)	(0.006)	(0.006)	(0.010)	(0.006)	(0.009)
numsic	-	-0.007	-	-0.007	-	-0.020	-	-0.021
		(0.004)		(0.004)		(0.007)		(0.006)
size	-	-0.022	-	-0.017	-	-0.019	-	-0.004
		(0.004)		(0.003)		(0.006)		(0.005)
profit	-	0.269	-	0.296	-	0.261	-	0.205
		(0.039)		(0.038)		(0.066)		(0.061)
r&d	-	-0.146	-	0.405	-	-1.247	-	-0.329
		(0.121)		(0.117)		(0.203)		(0.189)
capex	-	0.073	-	-0.019	-	1.455	-	1.227
		(0.065)		(0.063)		(0.110)		(0.102)
div	-	-0.362	-	-0.334	-	-0.569	-	-0.460
		(0.021)		(0.021)		(0.036)		(0.033)
Adj. R^2	0.104	0.140	0.106	0.138	0.087	0.143	0.088	0.130
N	14,320	7,550	14,320	7,550	14,320	7,550	14,320	7,550

Table V

Excess Value Portfolio Return Properties

The table presents return characteristics on portfolios created by sorting diversified firms into either premium or discount excess portfolios (excess because the portfolio returns are in excess of the return on a portfolio of comparable single-segment firms). *Q* is the market-to-book ratio, and *M* is the market-to-sales ratio. Average N reports the time series average of the number of firms in the diversified portfolio. Excess skewness reports the time-series average of the differences between diversified firm return skewness and its benchmark skewness constructed using comparable single-segment firm skewness. Mean and Std. Dev columns report the time-series estimates of the corresponding portfolio.

	Premium Portfolio				Discount Portfolio				Difference Portfolio	
Sorting Variable	Average N	Excess Skewness	Mean (%)	Std Dev (%)	Average N	Excess Skewness	Mean (%)	Std Dev (%)	Mean (%)	Std Dev (%)
$EV_{Q(Mean)}$	220	-0.055	-0.306	1.727	590	-0.073	0.147	1.300	0.453	1.641
$EV_{Q(Med)}$	318	-0.064	-0.272	1.633	491	-0.079	0.223	1.312	0.495	1.580
$EV_{M(Mean)}$	227	-0.051	-0.424	1.536	586	-0.094	0.217	1.126	0.640	1.736
$EV_{M(Med)}$	327	-0.051	-0.339	1.329	485	-0.081	0.303	1.214	0.642	1.604

Table VI

Asset Pricing Tests of Equity Returns

The table presents coefficient estimates of a Fama-French three-factor model and a model that also includes an excess skewness factor.

$$r_{Diff} = \alpha + \beta_1 r_{MKT} + \beta_2 r_{SMB} + \beta_3 r_{HML} + \beta_4 r_{ES} + \varepsilon$$

The dependent variable, r_{Diff}, is the return on a portfolio that is long a zero-investment portfolio of discount firms (short comparable single segment) and short a zero-investment portfolio of premium firms (short comparable single segment). The first column indicates the particular value measure used for portfolio sorting. Independent variables are the value-weighted market return in excess of the risk-free rate (*MKT*), the size factor return (*SMB*), the book-to-market factor return (*HML*), and an excess-skewness factor return (*ES*). The first three factors are introduced in Fama and French (1993), while the last variable is constructed by regressing the monthly differences between discount and premium portfolio excess return skewness on the 25 size and book-to-market sorted portfolio returns. We use the fitted values to construct a factor mimicking portfolio. Our data set includes monthly returns from July 1978 through December 2003. Standard errors, in parentheses, are below the point estimates.

Sort	Mean (%)	α	β_1	β_2	β_3	β_4	R^2
$EV_{Q(Mean)}$	0.453	0.351	-0.026	0.204	0.229	--	0.245
	(0.095)	(0.085)	(0.020)	(0.027)	(0.031)		
		0.247	--	--	--	-0.241	0.131
		(0.092)				(0.035)	
		0.195	-0.028	0.183	0.217	-0.212	0.345
		(0.083)	(0.019)	(0.025)	(0.029)	(0.031)	
$EV_{Q(Med)}$	0.495	0.402	-0.021	0.185	0.210	--	0.214
	(0.091)	(0.084)	(0.020)	(0.026)	(0.031)		
		0.232	--	--	--	-0.314	0.182
		(0.088)				(0.037)	
		0.230	-0.032	0.156	0.153	-0.249	0.326
		(0.082)	(0.019)	(0.025)	(0.030)	(0.035)	
$EV_{M(Mean)}$	0.640	0.571	-0.082	0.183	0.219	--	0.277
	(0.100)	(0.088)	(0.021)	(0.028)	(0.032)		
		0.433	--	--	--	-0.356	0.215
		(0.091)				(0.039)	
		0.437	-0.095	0.081	0.135	-0.272	0.366
		(0.084)	(0.020)	(0.030)	(0.033)	(0.042)	
$EV_{M(Med)}$	0.642	0.586	-0.079	0.177	0.179	--	0.261
	(0.091)	(0.082)	(0.019)	(0.026)	(0.030)		
		0.465	--	--	--	-0.325	0.173
		(0.085)				(0.041)	
		0.481	-0.083	0.114	0.126	-0.219	0.321
		(0.079)	(0.019)	(0.027)	(0.030)	(0.042)	

Table VII

Asset Pricing Tests for Discount and Premium Portfolios

The table presents coefficient estimates of a Fama-French three-factor model and a model that also includes an excess skewness factor.

$$r_{dp,Sort} = \alpha + \beta_1 r_{MKT} + \beta_2 r_{SMB} + \beta_3 r_{HML} + \beta_4 r_{ES} + \varepsilon$$

The dependent variable, $r_{dp,Sort}$, is the differential diversified portfolio return as designated in the first column. Independent variables are the value-weighted market return in excess of the risk-free rate (*MKT*), the size factor return (*SMB*), the book-to-market factor return (*HML*), and an excess skewness factor return (*ES*). The first three were introduced in Fama and French (1993) while the last variable is constructed by regressing the monthly excess return skewness of the respective portfolio on the 25 size- and book-to-market sorted portfolio returns. We use the fitted values to construct a factor mimicking portfolio. Our data set includes monthly returns from July 1978 through December 2003. Standard errors, in parentheses, are below the point estimates.

Panel A: Q-weighted Firms

Sort	Mean (%)	α	β_1	β_2	β_3	β_4	R^2
(Discount - Premium)	0.453	0.351	-0.026	0.204	0.229	--	0.245
	(0.095)	(0.085)	(0.020)	(0.027)	(0.031)		
		0.195	-0.028	0.183	0.217	-0.212	0.345
		(0.083)	(0.019)	(0.025)	(0.029)	(0.031)	
Discount	0.147	0.116	-0.056	-0.027	0.125	--	0.214
	(0.075)	(0.069)	(0.016)	(0.022)	(0.025)		
		0.066	-0.054	-0.050	0.118	-0.141	0.261
		(0.068)	(0.016)	(0.022)	(0.025)	(0.034)	
Premium	-0.306	-0.247	-0.031	-0.230	-0.107	--	0.161
	(0.099)	(0.094)	(0.022)	(0.030)	(0.034)		
		-0.126	-0.014	-0.242	-0.088	-0.386	0.247
		(0.092)	(0.021)	(0.028)	(0.033)	(0.066)	

Panel B: M-weighted Firms

Sort	Mean (%)	α	β_1	β_2	β_3	β_4	R^2
(Discount - Premium)	0.640	0.571	-0.082	0.183	0.219	--	0.277
	(0.100)	(0.088)	(0.021)	(0.028)	(0.032)		
		0.437	-0.095	0.081	0.135	-0.272	0.366
		(0.084)	(0.020)	(0.030)	(0.033)	(0.042)	
Discount	0.217	0.202	-0.050	-0.038	0.085	--	0.185
	(0.064)	(0.061)	(0.014)	(0.019)	(0.022)		
		0.137	-0.054	-0.058	0.066	-0.112	0.218
		(0.061)	(0.014)	(0.020)	(0.023)	(0.038)	
Premium	-0.424	-0.383	0.027	-0.221	-0.141	--	0.213
	(0.088)	(0.081)	(0.019)	(0.025)	(0.030)		
		-0.270	0.105	-0.105	0.038	-0.504	0.371
		(0.070)	(0.018)	(0.024)	(0.031)	(0.118)	