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ACCOUNTING IMPLICATIONS OF CORPORATE DIVERSIFICATION*

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This study investigates the direct effects of corporate diversification on accounting reports, and the implications of these effects for accounting research. The study shows that firms which diversify into unrelated areas of business devote a larger proportion of their capital investments to acquisitions and are, therefore, characterized by smaller differences between replacement-cost and historical-cost values of assets than undiversified firms. The implications of these findings, as well as other operating characteristics of diversified firms, for the following areas of accounting research are subsequently examined.

(1) **Inflation-adjusted data.** Inflation-adjusted data of diversified firms have less incremental information content (beyond historical-cost) than those of undiversified firms.

(2) **Earnings Response Coefficients.** Diversified firms have stronger market associations with earnings changes, and their earnings are more persistent.

(3) **Selection of accounting methods.** Diversified firms select, ceteris paribus, more liberal accounting methods than their undiversified counterparts.

(CORPORATE DIVERSIFICATION; INFLATION-ADJUSTED INFORMATION; PERSISTENCE OF EARNINGS; EARNINGS RESPONSE COEFFICIENTS; SELECTION OF ACCOUNTING METHODS)

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Corporate diversification is a prevalent phenomenon in the U.S. The Bureau of the Census reports that multi-industry firms have total annual sales of about $2.81 trillion, while single-industry firms have total annual sales of $2.55 trillion (U.S. Department of Commerce 1983). *The Accounting Trends and Techniques* (AICPA 1986) reports that about 450 firms, out of 600 included in their sample, disclose information about their segments. Thus, diversified firms constitute a significant portion of the U.S. economy and an important sector for accountants.[1]

This study examines the *direct* effects of corporate diversification on accounting reports, and the *indirect* effects of corporate diversification on accounting research. The study demonstrates that diversified and undiversified firms differ systematically in their expansion strategies.[2] Diversified firms tend to devote a larger proportion of their capital investments to acquisitions of other businesses than do undiversified firms. If acquired firms are levered, more assets are carried at replacement cost values than if the acquiring

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[1] This study takes corporate diversification as given, and investigates its effects on accounting data. Several theoretical motives for corporate diversification have been provided in the literature. Coase (1937), Williamson (1975) and recently Teece (1982) assumed that failures in real markets prevent firms from selling or leasing out underutilized resources. Three imperfections in financial markets were offered in the literature on corporate diversification; (1) Bankruptcy costs and taxes (Galai and Masulis 1976, Higgins and Schall 1975, and Lewellen 1971), (2) Manager-owner conflict (Amihud and Lev 1981), and (3) Asymmetry of information (Aron 1988).

[2] Throughout the study diversified firms are those firms that diversify into *unrelated* areas of business.

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firm had made identical dollar investment in capital projects directly.[3] Thus, the balance sheets of diversified firms have smaller differences between replacement cost and historical cost values than undiversified firms.

We examine whether this systematic difference in accounting measurement, as well as other differences in operating characteristics between diversified and undiversified firms, affects empirical results in three areas of research: the disclosure of inflation-adjusted data, cross-sectional variation in market associations with earnings, and the selection of accounting methods. While these have been major areas of research in recent years, previous research in these fields has ignored the effects of corporate diversification. This study replicates recent studies and shows the importance of corporate diversification in the analysis. The study does *not* attempt to develop new methodological approaches to examine these issues. Instead, it extends prior research by explicitly considering cross-sectional variation that is associated with corporate diversification.

The results of this study indicate that diversified firms are characterized by balance sheet assets that are closer to their replacement cost values than those of undiversified firms. Consequently, the associations between inflation-adjusted data and security prices are shown to be smaller for diversified firms. The study shows that diversified firms are characterized by larger earnings response coefficients than those of undiversified firms, and that earnings of diversified firms are more persistent. Corporate diversification is also shown to be an important factor in the selection of accounting methods; diversified firms tend to select more liberal accounting methods than their undiversified counterparts. While each of these three studies is an extension of prior research, the contribution of this study is in its *combined* evidence, which illustrates how the economic phenomenon of corporate diversification causes significant cross-sectional differences in accounting data, which, in turn, affect the results of accounting research.

The study is organized as follows: The next section documents differences between capital investments of diversified and undiversified firms and the effects of these differences on replacement cost of assets. §3 discusses the implications of corporate diversification for studies of inflation-adjusted data. §4 examines the differences in earnings response coefficients and earnings persistence between diversified and undiversified firms. §5 discusses the effects of diversification on the selection of accounting methods. The last section summarizes and concludes the study.

2. Differences between Diversified and Undiversified Firms' Investment Policies and Measurement of Assets

This section establishes empirically that diversified firms devote a larger proportion of their funds to acquisitions than undiversified firms. It also documents that replacement cost and historical cost values of assets of diversified firms are closer to each other than are those of undiversified firms. These relationships will be used later to examine the effects of corporate diversification on the disclosure of inflation-adjusted data.

Data

The data in this study were obtained from four sources. The Compustat Annual Industrial File was used to retrieve most of the financial information. The Compustat Business Segment File was used to retrieve business segment data about firms, including

[3] For example, assume that a firm invests $100 in purchasing new Property, Plant, and Equipment (PPE). These will be recorded on the balance sheet at their acquisition cost, which is close to their replacement cost, of $100. If the firm invests the same $100 in purchasing all the equity of another firm which has debt valued at $50, the assets of the acquired firm will be recorded at $150. The latter will be split between the fair market values of the acquired assets and "goodwill". Thus, it is possible that assets at replacement cost value of the acquired firm will exceed $100. We are thankful to an anonymous referee for pointing this out.

sales, operating income, and assets. The FASB No. 33 Data File provided various inflation-adjusted data about firms. The CRSP Returns File was used to estimate abnormal returns.

Sample Selection

All firms in the 1984 Compustat Annual Industrial File were ranked in descending order by sales. We eliminated firms in the financial and regulated utilities industries because they were subject to special accounting regulations. We also eliminated firms that did not have at least six years of segment data for the period 1977 to 1984.[4] The largest 400 firms that fulfilled these conditions provided data for the study.[5] We selected the largest firms to maximize the availability of segment data. However, the sample firms are characterized by a wide distribution of size. For example, the mean 1980 annual sales was 4.35 billion dollars, with a range of 78 million dollars to 103 billion dollars.[6]

Variables

The variables needed for this section are measures of corporate diversification, measures of capital investments (to assess differential investment policies by diversified firms), and measures of replacement cost values (to assess the differences between historical cost and replacement cost values of assets). These variables are described in turn.

Traditional diversification measures have relied on SIC codes to assess the extent of the firm's operations in different industries (see Pitts and Hopkins 1982 for a review). This study uses a measure of diversification that is based on each segment's fundamental economic attributes rather than on its SIC code. It uses the economic sector to which the segment's products are sold, and whether the segment leads, lags or coincides with the business cycle. Specifically, we follow these steps:

1. Identify the economic sector that purchases most of the output produced by the segment. There are five broad and commonly referred to GNP sectors which are considered in this study: (a) consumer nondurable, (b) consumer durable, (c) services, (d) business-fixed investment, and (e) government.
2. Identify the segment as leading, lagging, or coincidental with the economic cycles. This is done by correlating each segment's sales with: (a) the index of lagging economic indicators, (b) the index of coincidental economic indicators, and (c) the index of leading economic indicators. The segment is identified as lagging, coincidental, or leading the business cycles, depending on which correlation was the highest among the three.
3. Assign each segment to one of the 15 combinations which results from the product of the five economic sectors (in step 1 above) and the three economic indicators (in step 2 above).
4. Sum up the data of all segments with the same combination (a number between 1 and 15) and treat it as one segment or one "industry."
5. Compute the diversification measure as:

$$\text{Economic Diversification} = 1 - [(\sum P_j^2)/(\sum P_j)^2], \qquad j = 1, \ldots, 15,$$

where P_j represents the proportion of total sales made by businesses with the same combination of economic sector and business cycle indicators, and 15 combinations are used to assign these businesses. This measure of diversification is bounded by zero and one,[7]

[4] We require at least six years of segment data to estimate the extent of economic diversification as described below.

[5] The sample is limited to 400 firms due to the acquisition cost of segment data from Compustat.

[6] The sample is by no means a random sample. Results of this study may not generalize to the entire population of public firms. Nevertheless, many research studies are limited to large firms.

[7] When all of the firm's segments have the same economic profits, that is, they are in the same economic sector and they respond in an identical manner to changes in the business cycle, the measure of economic diversification equals 0. Further, it may easily be established that when the shares of total sales in any business

and has been shown to capture the extent of a firm's diversification into unrelated areas of business (Amit and Livnat 1988a, b, and c).

Capital expenditures are estimated by net new investments of firms in PPE as disclosed in the Statement of Changes in Financial Position (SCFP) according to Accounting Principles Board (APB) Opinion No. 19 (AICPA 1971). Acquisitions are also taken from the SCFP after subtracting proceeds from sales of investments. Both variables are scaled by total uses of funds from the SCFP, and averaged over the most recent five years. We scale these variables to reduce heteroskedasticity in our cross-sectional comparisons, and we average the data over five years to reduce the effects of large one-year investments.

Replacement-cost values of the firms' assets are estimated by the current replacement cost of inventories and PPE (from the FASB 33 data file), plus the historical-cost values of all other assets. This provides a reasonable approximation of replacement cost value for total assets, since inventories and PPE are the items most sensitive to the effects of inflation.

We test for differences in capital investments and valuation of assets between diversified and undiversified firms by comparing the means of the two extreme quartiles, after sorting firms by their diversification measures. The results of these tests are provided in Table 1.

As can be seen in Table 1, the more diversified firms have a larger proportion of total uses devoted to acquisitions than the less diversified firms. The table also reveals that the differences between replacement cost and historical cost values of assets are smaller for diversified firms than for undiversified firms.[8] The table also reports the results of tests based on sorting firms by sales, to verify that the above differences between diversified

TABLE 1

Tests of Differences in Certain Variables Between Least and Most-Diversified Firms, 1979

	CAPUSE	ACQUSE	DAS
Economic Diversification			
Low diversification mean	0.549	0.032	0.552
High diversification mean	0.514	0.063	0.409
Significance level *t*-test	0.290	0.022	0.025
Sales			
Small firms mean	0.512	0.049	0.423
Large firms mean	0.594	0.044	0.524
Significance level *t*-test	0.013	0.720	0.023

Notes

1. Sample firms are first sorted in ascending order of diversification or sales. The two extreme quartiles are tested for differences in the proportion of capital expenditures to total uses of funds, CAPUSE, the proportion of acquisitions to uses, ACQUSE, and the differences between replacement cost of assets and total assets at historical cost scaled by total assets, DAS.

2. The differences in the variables are tested by the parametric two-sample *t*-test. Significance levels are reported in the table.

segment, n, are chosen to maximize the extent of diversification, then all segments are of equal size $(1/n)$ and the diversification index increases monotonically as the number of segments in which the firm is active increases, and, at the limit, the diversification measure approaches 1.

[8] We have also examined the differences between market and replacement cost values of assets, and found no discernible differences between diversified and undiversified firms. Thus, there are no major differences in the way goodwill or other intangible assets are recorded by the two groups.

and undiversified firms are not merely due to differences in size. As can be seen in the table, the differences are likely not driven by size; larger firms invest a smaller proportion in acquisitions, and have greater differences between replacement cost and historical cost values of assets than smaller firms. Similar results were obtained for other years.

Thus, the results of this section indicate that diversified firms have smaller differences between replacement cost and historical cost values of assets than undiversified firms.

3. Implications for Studies of Inflation-Adjusted Data

The previous section demonstrates that diversified firms carry their assets on the balance sheet at values that are closer to replacement-cost values than undiversified firms. Therefore, there may be less incremental information content (relative to historical-cost data) in inflation-adjusted data of diversified firms. Consequently, we hypothesize that the association of inflation-adjusted data with market returns is weaker for diversified firms than for undiversified firms. This section tests this hypothesis.

Research Design

Several recent studies (reviewed by DeBerg and Shriver 1987) test the incremental information content of inflation-adjusted data, and show that inflation-adjusted data do not have information content beyond historical-cost data. However, Bublitz, Frecka and McKeown (BFM) (1985) show that inflation-adjusted data do have information content, when components of current cost income, rather than aggregated current cost income, are used in the test. Like many other accounting studies, the term "information content" is used here to describe significant associations with security returns.

This study replicates the results of BFM (1985), and extends their procedure to test for the effects of diversification on the incremental information content of inflation-adjusted data. It considers three sets of regressors: (1) historical-cost data, (2) historical-cost and inflation-adjusted data, and (3) historical-cost and inflation adjusted data that allow for different regression coefficients on the inflation-adjusted variable between more-diversified and less-diversified firms.[9] For simplicity, suppose that Ret, HC, CC, and Div represent the stock return, historical cost income, current cost income, and a dummy variable for above-median diversification. Then, we have the following equations:[10]

$$\text{Ret} = a_0 + a_1\text{HC} + e, \tag{1}$$

$$\text{Ret} = b_0 + b_1\text{HC} + b_2\text{CC} + u, \tag{2}$$

$$\text{Ret} = c_0 + c_1\text{HC} + c_2\text{CC} + c_3\text{Div CC} + z. \tag{3}$$

BFM (1985) test whether R^2 of regression (2) is statistically greater than R^2 obtained from regression (1). This study further tests whether the improvement in R^2 from regression (2) to regression (3) is statistically significant. The latter test is used to examine whether diversified firms have different incremental information content of inflation-adjusted data than nondiversified firms. If the incremental information content of diversified and undiversified firms is the same, there should be no significant increase in

[9] Another approach to test for the effects of diversification can proceed as follows: the independent variables may include not only historical-cost and inflation-adjusted variables, but also interaction variables between diversification and inflation-adjusted data. However, this procedure implicitly assumes that there is a linear relationship between diversification and the effects of inflation-adjusted data on returns. To the extent that the relationship is nonlinear, this procedure is inferior to the one used in the study. Since there is no theoretical reason to expect a linear relationship between diversification and inflation-adjusted data, we simply split the sample into high and low levels of diversification.

[10] The actual variables used in the regressions differ from those shown above, as we describe in detail below. However, these equations capture the spirit of the analysis.

R^2 of regression (3) as compared to R^2 of regression (2). However, a significant improvement in R^2 implies that the incremental information content of inflation-adjusted data is different for diversified and undiversified firms.[11]

Bernard and Ruland (1987) show that in industries where historical-cost and replacement-cost data are not highly correlated, more information content is provided by replacement-cost data. This study goes one step further; it identifies firms which have small differences between replacement-cost and historical-cost data. Highly diversified firms are characterized by such small differences, and are, therefore, expected to possess less information content of replacement-cost data than undiversified firms. Thus, the results of this study provide a possible economic explanation for the empirical evidence in Bernard and Ruland (1987).[12]

Variables

The independent variables are identical to those used by BFM (1985), and include DRHC and DRCF, which measure unexpected historical-cost earnings and unexpected cash flows, respectively. The inflation-adjusted variables are DRREHG (a measure of unexpected realized holding gains at current cost), DRCDADJ (a measure of the unexpected historical-cost/constant-dollar adjustment to income), RHG (a measure of total holding gains), RHGP (a measure of total holding gains net of general inflation), and DRPPGL (a measure of unexpected purchasing power gains or losses). These variables are scaled by market value of equity at the beginning of the year, and are defined precisely in Table 1 of BFM (1985, p. 9). The dependent variable is TRET12, the contemporaneous annual return, computed from the Compustat Annual Industrial File. BFM show that their results are insensitive to the exact definition of the return measure.

Results

Table 2 reports the R^2's of the three regressions for the years 1980 to 1983, as well as F-statistics for the improvements in R^2 and their associated significance levels[13]. The first F-statistic tests for the incremental information content of inflation-adjusted data, as in BFM (1985). This model constrains the coefficients of the independent variables to be the same for all sample firms. In contrast, the second F-statistic tests the incremental information content of a model that allows the coefficients of inflation adjusted data to be estimated separately for more- and less-diversified firms. If diversification affects the incremental information content of inflation-adjusted data, the second F-statistic should be statistically significant.

Table 2 indicates that inflation-adjusted data had incremental information content in every year during the period 1980 to 1983, as is evidenced by the significance levels PROB (RC = 0). These results are consistent with BFM. Table 2 also indicates that in three of the four years, 1981 to 1983, allowing separate coefficients for different levels of diversification contributed significantly to R^2. This is seen from the significance levels of the second F-statistic, PROB (RC + DIV = 0). Table 2 reports the results of aggregating the significance levels of the four years, assuming independence of the individual F-tests,

[11] Note that an improvement in R^2 from equation (2) to equation (3) can occur if CC income of highly diversified firms is systematically different than that of undiversified firms. A priori, we are unaware of any reason for such systematic differences. We are thankful to an anonymous referee for pointing out this issue.

[12] Bernard and Ruland (1987) use time-series estimates of replacement-cost data. In this study, we use actual data reported by firms in 1979-1983. Due to the small number of observations for each firm, we cannot use the Seemingly Unrelated Regression Model to control for cross-sectional dependencies in the data, as performed by Bernard and Ruland. Instead, we include dummy variables for the two-digit SIC industries in our study. According to Bernard (1987), this is likely to reduce the understatement of standard errors due to cross-sectional correlations in the data.

[13] These years were selected because of the availability of inflation-adjusted data.

TABLE 2

Tests of Improvements in R^2 Due to Inflation-Adjusted Data and Separate Coefficients for Different Levels of Diversification[1]

	No. of Firms	HC* R^2	HC + RC R^2	*F*-STAT**	PROB (RC = 0)	HC + RC + DIV R^2	*F*-STAT***	PROB (RC + DIV = 0)
1980	251	0.403	0.441	2.57	0.013	0.459	1.32	0.249
1981	257	0.324	0.393	4.72	0.001	0.424	2.19	0.045
1982	174	0.427	0.481	2.88	0.011	0.547	3.91	0.011
1983	123	0.274	0.420	4.82	0.001	0.508	4.36	0.001
X^2-Statistics[2]				45.34	0.001		31.82	0.001

Notes

[1] Sample firms were sorted into two groups: those with above-median diversification and those with below-median diversification. The regression coefficients for the inflation-adjusted variables are estimated separately for the two groups.

[2] The X^2-statistic aggregates the significance levels of the *F*-statistics for the four years.

* HC represents the regression equation with historical-cost independent variables. HC + RC represents the regression equation with historical-cost *and* inflation-adjusted independent variables. HC + RC + DIV represents the regression equation with historical-cost and inflation-adjusted independent variables, allowing for different regression coefficients for the two groups.

** The *F*-statistic and its significance level, PROB (RC = 0), test whether the improvement in R^2, due to the inflation-adjusted variables, is statistically significant.

*** The *F*-statistic and its significance level, PROB (RC + DIV = 0), test whether the increase in R^2, due to a separate estimation of inflation adjusted coefficients for different diversification levels, is statistically significant.

as suggested by Christie (1990).[14] As can be seen, the inflation-adjusted data have information content beyond historical cost data. Furthermore, inflation-adjusted data have differential information content for diversified and undiversified firms.[15]

The above results suggest that the associations between inflation-adjusted data and market returns are different for diversified and undiversified firms. However, these results may be caused by greater associations of market returns with inflation-adjusted data supplied by diversified firms instead of undiversified firms; i.e., the previous results indicated that there are differences between the two groups, but not the direction of these differences. Table 3 reports results for the incremental information content of inflation-adjusted data separately for diversified and undiversified firms. The results reported in Table 3 indicate more incremental information content of inflation-adjusted data disclosed by undiversified firms; the X^2-statistic that aggregates the significance levels of the four years indicates strong information content for the group of firms with below-median economic diversification, whereas the X^2-statistic of the diversified firms indicates a significance level of about 13%. Thus, while inflation-adjusted data may have some information content for diversified firms as well, it seems to possess more information content for undiversified firms.

Finally, the above results may be driven not by differing degrees of corporate diversification, but by the extent of recent replacement of assets. For example, if diversified firms are also those that replace a higher proportion of assets, then their replacement cost and historical cost values may be closer because of their recent replacement of assets and not because of diversification. To test for this possibility, we ranked firms not only

[14] There is much evidence that returns are approximately serially independent. The significance levels (p_j) of the annual *F*-tests are aggregated and tested by the X^2-statistic:

$$X^2 = \sum_{j=1}^{N} -2 \ln p_j.$$

[15] We have replicated the regressions in Table 2 with dummy variables for two-digit SIC industries, as a test for the severity of understatement in standard errors of coefficients, which is caused by cross-sectional correlations in the data. The results of the various *F*-tests are similar to those reported in Table 2, indicating that cross-sectional dependencies in the data do not introduce a material bias into the tests.

TABLE 3

The Incremental Information Content of Inflation-Adjusted Data for Diversified Versus Undiversified Firms[1]

	Number of Firms	HC* R^2	HC + RC R^2	*F*-STAT**	PROB*** (RC = 0)
1980					
Below-median diversification	123	0.370	0.421	1.37	0.233
Above-median diversification	128	0.506	0.539	1.43	0.208
1981					
Below-median diversification	132	0.375	0.480	4.17	0.001
Above-median diversification	125	0.292	0.342	1.48	0.190
1982					
Below-median diversification	87	0.510	0.665	6.09	0.001
Above-median diversification	87	0.346	0.363	0.35	0.907
1983					
Below-median diversification	60	0.042	0.247	2.36	0.043
Above-median diversification	63	0.629	0.702	2.25	0.052
X^2-Statistic[2]					
Below-median diversification			36.84	0.001	
Above-median diversification			12.57	0.128	

Notes

[1] The sample firms were sorted in ascending order of economic diversification. The table reports results for below- and above-median firms.

[2] The X^2-statistic aggregates the significance levels of the *F*-statistics for the four years.

* The first two columns report the R^2 of the regressions that include historical-cost variables and historical-cost + inflation-adjusted variables, respectively.

** The *F*-statistic tests whether all the coefficients of the inflation-adjusted variables are equal to zero.

*** The last column reports the significance level of the test that all the inflation-adjusted variables have coefficients that are equal to zero.

by diversification, but also by the average proportion of total assets that were replaced in the most recent five years. We then divided the sample into four groups of above- and below-median of diversification, as well as above- or below-median recent replacement of assets. Equation (3) was estimated with separate slope coefficients for each of the four groups. If the driving force behind the observed differences in the association of inflation-adjusted data with returns is the extent of corporate diversification and not the proportion of replaced assets, then the two slope coefficients for the above- and below-median groups of assets that were recently replaced should be equal. Similarly, if the proportion of replaced assets is the driving force and not corporate diversification, then the two slope coefficients for above- and below-median diversification should be equal. We test the constraints that both diversification groups had identical coefficients, and that both groups of recent replacement of assets had identical coefficients. The significance levels of these tests were combined for the four years using the X^2-statistic. The results indicate a significant effect for each classification, while holding the other classification constant.[16] Thus, the observed differences between diversified and undiversified firms cannot be attributed solely to differences in the proportion of assets that were recently replaced.[17]

[16] A X^2-statistic of 33.05 with probability of 0.001 is observed for the constraint that the two groups of above- and below-median economic diversification have identical coefficients. A X^2-statistic of 23.89 with probability of 0.002 is observed for the constraint that the two groups of above- and below-median recent replacement of assets have identical coefficients. Thus, *both* variables seem to be associated with differential information content of inflation-adjusted data.

[17] It should be noted that our sample size prevents us from using a more accurate test; i.e., whether the association of returns with inflation-adjusted measures of income is greater for undiversified firms than for diversified firms, *conditional* on the level of recent replacement of assets. The current test may provide misleading

Summary of Findings

Diversification is an important variable in studies of the incremental information content of inflation-adjusted data. The association of inflation-adjusted data with market returns is related to the extent of corporate diversification. There are stronger associations between inflation-adjusted data and security returns for undiversified firms than for diversified firms.

4. Earnings Response Coefficients

A careful examination of the R^2's in Table 3 shows that diversified and undiversified firms differ not only in their associations between inflation-adjusted data and security returns, but also, perhaps, in their associations between historical cost data and returns.[18] The accounting literature has recently documented the existence of cross-sectional differences in earnings response coefficients (ERC's) of firms. These coefficients measure the association between market returns and unexpected earnings. Collins and Kothari (1989) show that cross-sectional differences in earnings response coefficients are related to growth and systematic risk of firms, whereas Lipe (1989) shows an association between earnings response coefficients and persistence and stability of earnings. In contrast to these studies, Biddle and Seow (1989) attempt to explain observed differences in earnings response coefficients by differential economic characteristics of industries. We extend this line of research by examining the differential effects of corporate diversification on earnings response coefficients. Since diversified firms have more stable earnings than undiversified firms (Bettis and Mahajan 1985, and Amit and Livnat 1988a, c), cross-sectional differences in earnings response coefficients may also be related to the level of corporate diversification. In particular, it is expected that larger earnings response coefficients will be found for diversified firms than for undiversified firms, because earnings of diversified firms are more stable.

To test for differences in earnings response coefficients between diversified and undiversified firms, we follow Collins and Kothari (1989) and estimate the following equation using pooled cross-sectional and time series data over the 1980–1983 period:

$$CAR_t = a_0 + a_1 D + a_2 \frac{\Delta E_t}{MV_{t-1}} + a_3 D \frac{\Delta E_t}{MV_{t-1}} + \epsilon \qquad (4)$$

where CAR_t is the cumulative abnormal return over year t, E_t is earnings for year t, MV_{t-1} is market value of equity at the beginning of year t, and D is a dummy variable for firms with above-median diversification.

Thus, a_2 equals the ERC for the undiversified firms, and $a_2 + a_3$ equals the ERC for the diversified firms. The results of equation (4), reported in Panel A of Table 4, show that the earnings response coefficients of diversified firms are greater than those of undiversified firms as a_3 is significantly greater than zero.[19]

As noted above, one reason for the greater earnings response coefficients of diversified firms is that their earnings are more stable. By contrast, differences in systematic risk cannot be a source of the different ERC's since diversified and undiversified firms have similar systematic risks (Amit and Livnat 1988b). To our knowledge, no one has examined whether persistence and growth of earnings differ between diversified and undiversified firms.

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results if there exists a positive correlation between the level of diversification and the extent of recent replacement of assets. Our sample size does not allow us a breakdown of more than four groups. Thus, the results of our tests should be viewed only as suggestive. We are thankful to a referee for pointing out this problem.

[18] We are thankful to an anonymous referee for suggesting this line of inquiry.

[19] We also estimated equation (4) with year dummies, obtaining virtually identical results.

TABLE 4

Comparisons of Earnings Response Coefficients, Persistence and Price/Earnings Ratios

Panel A Earnings Response Coefficients

$$CAR_t = a_0 + a_1 D + a_2 \frac{\Delta E_t}{MV_{t-1}} + a_3 D \frac{\Delta E_t}{MV_{t-1}} + \epsilon$$

	−0.037	0.037	0.111	0.653
	(−2.6)	(1.9)	(3.1)	(5.0)

$N = 948$ $R^2 = 0.052$

F-statistic that $a_1 = a_3 = 0$	13.99
Significance	0.0001

Panel B Persistence

$$\frac{\Delta E_t}{MV_{t-1}} = b_0 + b_1 D + b_2 \frac{\Delta E_{t-1}}{MV_{t-2}} + b_3 D \frac{\Delta E_{t-1}}{MV_{t-2}} + \gamma$$

	−0.042	0.042	−0.731	0.648
	(−3.5)	(2.5)	(−17.7)	(6.0)

$N = 1115$ $R^2 = 0.221$

F-test that $b_1 = b_3 = 0$

F-statistic = 19.92
Significance = 0.0001

Panel C—Price-Earnings Ratios

	Mean P/E ratio	
Below-median diversification	9.77	t-statistic that P/E ratios are equal for the two groups = 0.33
Above-median	9.19	Significance = 0.742
		$N = 1486$

Notes

[1] CAR_t = Cumulative abnormal return for year t

D = 1 above-median diverisification

= 0 below-median diversification

ΔE_t = First difference in earnings during year t, i.e., $E_t - E_{t-1}$, MV_{t-1} = market value of equity at the beginning of year t.

[2] The regression equation uses all firm-years with available data during 1980–1983. N represents the total number of observations.

[3] t-statistics are reported in parentheses.

[4] P/E ratios are computed as market value at the beginning of the year divided by earnings for the year.

To compare the earnings persistence of diversified and undiversified firms we follow Penman (1989) and estimate the following regression

$$\frac{\Delta E_t}{MV_{t-1}} = b_0 + b_1 D + b_2 \frac{\Delta E_{t-1}}{MV_{t-2}} + b_3 D \frac{\Delta E_{t-1}}{MV_{t-2}} + \gamma, \tag{5}$$

where the variables are as defined above. Easton and Zmijewski (1989) refer to the slope coefficient in equation (5) as the "coefficient relating current earnings to future earnings". The closer is the slope coefficient to zero, the closer are earnings to a random walk, because the slope coefficient of zero implies that successive earnings changes are independent. The more mean reverting (i.e., less persistent) are earnings, the closer is the slope coefficient to −1. Thus, if the earnings of diversified firms are more persistent than those of undiversified firms, we expect b_3 to be greater than zero. The results of equation

(5), reported in Panel B of Table 4, show that the earnings of diversified firms are more persistent than the earnings of undiversified firms, as b_3 is significantly greater than zero.[20]

To test for differences in earnings growth between diversified and undiversified firms, we follow Collins and Kothari (1989) and compare the price/earnings ratios of the two groups. While forecasts of earnings growth are usually not directly observable, there is much evidence that P/E ratios are signals of earnings growth (Zarowin 1990 and Kothari 1989). We compare the price/earnings ratios of diversified and undiversified firms using a two-sample t-test. The results of this test are reported in Panel C of Table 4, and they show that the price/earnings ratios of diversified and undiversified firms cannot be distinguished from each other. These results suggest that diversified and undiversified firms do not differ in terms of their earnings growth.[21]

Summary of Findings

Our results show that earnings response coefficients of diversified firms are greater than those of undiversified firms. Diversified firms have more persistent earnings than undiversified firms, but the two groups have similar earnings growth. Since previous research showed that diversified firms have more stable earnings than undiversified firms, but similar systematic risk to undiversified firms, we conclude that the differences in persistence and stability of earnings are responsible for the differences in earnings response coefficients.

5. Diversification and the Selection of Accounting Methods

Hypothesis

The selection of accounting methods is affected by many variables, some of which have been analyzed by Watts and Zimmerman (1978); Hagerman and Zmijewski (1979); and Zmijewski and Hagerman (1981). These variables include bond covenants, relative capital intensity, compensation arrangements, systematic risk, concentration ratio, and size. The last two variables have been used as surrogates for political costs, where larger firms or firms operating in concentrated industries select more conservative accounting methods in order to report lower earnings. Presumably, lower earnings invite less scrutiny by regulators and fewer legal suits. Size has been shown to be a significant variable in determining the selection of accounting treatments, perhaps because of the greater visibility of large firms.

Theoretically, political costs are related to monopoly or excess profits: firms that have monopoly power and are also very profitable draw more attention by such regulatory bodies as the Federal Trade Commission (FTC). Such firms may select more conservative accounting treatments to appear less profitable. This argument is somewhat weaker for large firms that operate in multiple industries; although size may indicate the potential for monopoly power, the diversity of operations reduces that potential. Large firms that are well diversified may have less market power in each of their industries than firms with equivalent size operating in a single industry. Thus, it is expected that the selection of conservative accounting methods is positively related to size and negatively related to the magnitude of diversification.

[20] We also tested for differences in earnings response coefficients and persistence between diversified and undiversified firms using the methodology of Kormendi and Lipe (1987). The test assumes that earnings follow an integrated autoregressive process and jointly estimates the ERC and the autoregressive parameters in a two-equation system. Results with Kormendi and Lipe's methodology were virtually identical to those reported in the paper.

[21] As noted above, previous research has shown that diversified and undiversified firms do not differ with respect to systematic risk. Since risk and growth are the theoretical determinants of price earnings ratios (Kothari 1989), this is further evidence that the two groups of firms have similar earnings growth.

Tests

The treatment of depreciation is selected to test this hypothesis. Each of our sample firms is classified as *conservative* if it uses accelerated depreciation for some assets, and as *liberal* if it uses only straight-line depreciation. Forty-seven percent of the sample firms selected conservative depreciation methods in 1979, compared to 22 percent of the sample firms in *Accounting Trends and Techniques*. Since our sample includes primarily large firms, this difference lends support to the political-cost hypothesis which suggests that large firms tend to choose income reducing (that is, conservative) accounting methods.

Consistent with prior studies, we use Logit analysis, where the dependent variable is dichotomous, taking a value of one if the firm selected a liberal depreciation policy and zero otherwise. Also consistent with prior studies, size is computed as log of sales, and leverage is estimated by the debt-to-assets ratio. It is expected that leverage will be positively related to the selection of accounting methods because the more levered the firm, the more likely it is to default on its loan covenants, and the more likely it is to select liberal accounting treatments. Thus, we expect to observe a negative coefficient for size, but positive coefficients for leverage and diversification.

Summary of Results

The results of the Logit analysis are reported in Table 5, which shows that size has a negative coefficient that is statistically different from zero in every year and in every configuration of independent variables. Leverage also has the predicted sign in every year, but in some years its statistical significance is not high. The diversification measure also has the predicted positive sign, and is statistically significant in four of the five years under analysis. These results suggest the importance of diversification in studies of accounting method choice.

6. Summary and Conclusions

This study has investigated accounting implications of corporate diversification. It has shown empirically that diversified firms tend to invest a larger proportion of their funds

TABLE 5

Determinants of Depreciation Policy[1]

	Expected Sign	1979	1980	1981	1982	1983
Sales	(−)	−0.312	−0.399	−0.435	−0.401	−0.455
		(0.006)[2]	(0.001)	(0.001)	(0.001)	(0.001)
Leverage	(+)	1.553	1.929	1.500	0.775	1.085
		(0.065)	(0.023)	(0.072)	(0.309)	(0.159)
Overall[3]		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Sales	(−)	−0.311	−0.394	−0.432	−0.394	−0.445
		(0.007)	(0.001)	(0.001)	(0.001)	(0.001)
Leverage	(+)	1.368	1.789	1.015	0.743	1.126
		(0.106)	(0.035)	(0.104)	(0.331)	(0.146)
EDiv[4]	(+)	0.921	0.941	1.366	0.749	1.127
		(0.041)	(0.042)	(0.030)	(0.110)	(0.020)
Overall		(0.001)	(0.001)	(0.001)	(0.001)	(0.001)

Notes

[1] Straight-line depreciation was coded 1. All other methods were coded 0.

[2] Significance levels in parentheses.

[3] Overall refers to the statistical significance of the entire logit equation.

[4] EDiv = Economic Diversification.

in acquisitions of other businesses than undiversified firms. Because of the implicit leveraging in acquisitions, the balance sheets of diversified firms were postulated to carry assets at values that are closer to their replacement cost than the balance sheets of undiversified firms. These expectations were confirmed by the data, and led to the hypotheses that diversification may be important in studies of replacement-cost data, earnings response coefficients, and selection of accounting methods. These hypotheses were tested by the replication of studies in these areas of research. The results showed that the incremental information content of inflation-adjusted data over historical-cost data is smaller for diversified than undiversified firms; that earnings response coefficients are greater for diversified firms than for undiversified firms; and that diversification also affects the selection of depreciation methods.

Although diversification was determined to be a relevant factor in each of the three areas, it should be emphasized that, taken together, the evidence of these studies suggests the importance of diversification in other areas of research. The evidence presented here indicates that the economic phenomenon of diversification is associated with cross-sectional differences in accounting data, and that some studies may benefit from the incorporation of diversification into their analyses.[22]

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