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Some Empirical Survey Evidence

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During the last decade, inflation affected business in many areas ranging from external financial reporting to internal decision making. For example, in the area of financial reporting, the Financial Accounting Standards Board (FASB) in September 1979 issued Statement of Financial Accounting Standard (SFAS) No. 33, *Financial Reporting and Changing Prices.*[1] This statement requires certain large publicly-held companies to present constant dollar and current cost information as supplementary disclosures in their annual reports. During this same time, many writers addressed the concern of inflation's impact on the decision-making processes.[2] This paper presents some empirical data indicating whether and in what manner managers actually use inflation data in their decision-making processes.

Specifically, this paper reports the results of a survey determining whether managers use SFAS No. 33 data in internal decision making, and whether they have adjusted their capital budgeting techniques for inflation. A determination that managers use SFAS No. 33 data for internal decision making adds justification to the reporting requirements of that statement. Failure of management to use the data, however, might indicate a usefulness limited to external reporting purposes; thus requiring the FASB to reassess the cost-benefit ratio of SFAS No. 33 when determining whether to continue the requirements. Since the FASB is currently studying the continued requirement of SFAS No. 33, this survey's results should aid the evaluation of the data's overall utilization.[3]

The impact of inflation on capital budgeting techniques was chosen for this study because it was assumed that capital budgeting techniques are used in most companies and, therefore, related company personnel should be familiar with the analyses used by management when making these important decisions. In addition, many writers have urged that inflation be incorporated into capital budgeting models.[4] For these reasons, capital budgeting techniques were selected as a representative management analysis indicating whether managers are in general adjusting for inflation in their decision-making processes.

The Sample

To determine the impact of inflation on capital budgeting, questionnaires were sent in November 1982 to the chief financial officers of 500 companies stratified by size and type of business.[5] The size strata consisted of large firms in the Fortune 1000 industrials, Fortune 50 banks, Fortune 50 retailers, Fortune 50 utilities, and Fortune 50 transportation companies; and smaller firms selected from companies listed on COMPUSTAT tapes. Equal size samples of large and small companies were selected in each industry class, i.e. 150 companies were sampled from each industrials group and 25 companies from each of the other business classes.

The chief financial officer of each company was asked to delegate completion of the questionnaire to someone within the company knowledgeable of the firm's capital budgeting process. Although individuals were assured that their responses would remain anonymous, questionnaires were coded to facilitate grouped analysis and follow-up procedures. One-hundred sixty-eight questionnaires were completed and returned, resulting in an overall response rate of 34 percent. As expected, the response rate varied among strata. Although some respondents failed to answer all questions, the following analyses are based on 168 substantially completed questionnaires with the number of no responses being noted where applicable.

Impact of SFAS No. 33

To determine the perceived impact of SFAS No. 33 requirements on management decisions, respondents were first asked whether their companies are required to report the data specified by the statement. Responses indicate that 126 companies (75 percent) are required to report under SFAS No. 33, 39 companies (23 percent) are not required to report, and three companies (2 percent) did not respond. Since three of every four companies responding to this survey must present SFAS No. 33 inflation adjusted data in their annual reports, the potential for utilization of the data by management is significant among the firms sampled.

To determine the impact of SFAS No. 33 reporting requirements on management decisions, respondents were asked whether the data had heightened their awareness of the impact of inflation on reported earnings,

had heightened the awareness of operating managers of the impact of inflation, and whether the data are incorporated into any significant management decision analyses. Responses are shown in Table 1.

Respondents to the questions in Table 1 indicate that SFAS No. 33 data have heightened their awareness of the impact of inflation more than they believe it has heightened the awareness of operating managers. Although over half responded that the data had not increased their awareness, almost half reported that it had. This might be viewed as supporting the requirements of SFAS No. 33, since almost half reported that it had an impact. On the other hand, the large number failing to perceive an impact could indicate a need for exploring more comprehensive requirements, variations in the data content, or even techniques for expanding users' comprehension of the data's significance.

Other responses shown in Table 1 indicate that SFAS No. 33 data have not heightened most operating managers' awareness of the impact of inflation nor is the data used very much in management decision analyses. Over 85 percent of the respondents answered no to both questions, indicating that the data are not used significantly by most companies in the decision-making processes.

Although SFAS No. 33 data are apparently not being used for internal decision making, other inflation data may be developed and used in specific decision areas such as capital budgeting.

Inflation and Capital Budgeting

Capital investment analysis is one area where managers need to consider the impact of inflation in decision making. To determine whether adjustments for inflation are being considered in this area, respondents were asked whether their companies adjust for inflation in payback period (PBP), net present value (NPV), and internal rate of return (IRR) capital budgeting techniques.

Payback Period Analysis

Payback period is one of the most popular methods for analyzing capital investments. This method measures the length of time in years it takes to recover the initial investment. Although the traditional PBP calculation does not consider the investment's profitability or the time value of money, it is often used as a supplementary technique in conjunction with NPV and IRR methods. In this survey, only 2 percent of the respondents used PBP as their sole capital budgeting method. However, 65 percent used PBP in conjunction with other methods.

The PBP method can be adapted to include the impact of inflation by shortening the minimum acceptable payback period. To determine whether companies are making this adjustment, respondents were asked if they offset the effect of inflation by shortening the required payback period. The possible responses were: not used, not used now but anticipate using soon, used as a recently adopted practice, or used for some time as an established practice. Responses from companies using the PBP method are shown in Column 1 of Table 2.

Column 1 data in Table 2 show that a total of 41 companies or 34 percent of those using PBP analysis shorten the required payback period to accommodate the effect of inflation. Thus, a majority of the companies (60 percent) do not use this method to accommodate inflation in their analyses. Eight (7 percent) of the companies using PBP failed to answer this question.

Net Present Value Analysis

The second capital investment technique included in this survey was NPV analysis. This method reflects the time value of money and, therefore, is generally considered superior to PBP analysis. The NPV method discounts a project's expected future cash flows using a minimum discount rate to determine whether the investment is acceptable. Of the 168 companies responding to this survey, 117 (70 percent) reported using the NPV method.

To accommodate inflation in NPV analysis, the discount rate can be increased by an inflation factor. To determine whether companies make this adjustment, respondents were asked whether they increase the discount rate used to offset the effect of inflation. Possible responses were the same as those for the question regarding shortening the payback period. Responses for the 117 companies using the NPV technique are shown in Column 2 of Table 2.

These data show that 66 (56 percent) of the companies using NPV analysis do increase the discount rate either as a recently adopted, or an established practice. However, 49 or 42 percent of the companies using NPV analyses do not use this method to adjust for the effects of inflation.

Internal Rate of Return Analysis

Use of IRR analysis for capital investment decisions determines the rate of return that equates the present value of expected future net cash inflows to the cost of the investment. Like NPV analysis, IRR analysis

TABLE 1

Perceived Impact of SFAS No. 33 Data

Survey questions	Yes Number	Yes %	No Number	No %
Have the requirements of SFAS No. 33 heightened your awareness of the impact of inflation on reported earnings?	63	48	67	52
Have the requirements of SFAS No. 33 heightened the awareness of operating managers of the impact of inflation?	20	14	122	86
Are the data generated for SFAS No. 33 reporting requirements used for any significant management decision analyses?	11	8	125	92

NOTE: These numbers do not add to the 126 companies required to report SFAS No. 33 data. Some companies, however, may voluntarily report or develop the data and, therefore, all responses are included in this table.

reflects the time value of money. Acceptable projects are determined by comparing the calculated rate with a minimum acceptable rate. Inflation can be included in IRR analysis by increasing the minimum acceptable rate of return. Column 3, Table 2 shows responses of the 130 companies that use the IRR technique regarding their use of an increased minimum acceptable rate of return to accommodate the effect of inflation.

Data in Column 3, Table 2 show that 76 (59 percent) of the 130 companies using IRR techniques increase the discount rate to include the effect of inflation. However, more than a third of the companies surveyed still do not use this adjustment for accommodating inflation in IRR analysis.

Restatement of Cash Flows

In addition to the above methods for offsetting inflation in the use of PBP, NPV, and IRR techniques, the impact of inflation can also be included in capital investment analyses by restating cash flows from nominal (historical) dollars to constant dollars (i.e., dollars of constant purchasing power). To determine whether companies are making this adjustment, respondents were asked whether cash flows originating from revenues, expenses, and residual values (or disposal costs) are restated from nominal to constant dollars. Possible responses were: not used, not used but expect to use soon, used as a recently adopted practice, or used as an established practice. Table 3 shows responses to this question.

Data in Table 3 show that most of the companies do not restate cash flows from nominal to constant dollars in capital investment analyses. Over 60 percent of the companies adjust neither revenues, expenses, nor residual values to offset inflation's impact.

Analyses of Combined Responses

Analyses of combined responses related to inflation adjustments in all capital budgeting techniques indicate that many companies include inflation in their capital investment analyses especially when NPV and IRR methods are used. Table 2 shows that over 55 percent of companies adjust for inflation by increasing the discount rate in NPV analysis and increasing the

TABLE 2

Number and Percent of Companies Using and Adjusting Specific Capital Budgeting Techniques For Inflation

	(1) Shortening Payback Period		(2) Increasing Discount Rate in NPV Analysis		(3) Increasing Minimum Rate in IRR Anaysis	
Responses	Number	%	Number	%	Number	%
Not Used	69	57	46	39	44	34
Not used now but anticipate using soon	3	2	3	3	7	5
Total not using adjustment	72	60*	49	42	51	39
Used as a recently adopted practice	8	7	18	15	18	14
Used as an established practice	33	27	48	41	58	45
Total using adjustment	41	34	66	56	76	59
No Response	8	7	2	2	3	2
Total using capital budgeting technique	121	101*	117	100	130	100

*Due to rounding

TABLE 3

Number and Percent of Companies Restating Cash Flows For Inflation in Capital Budgeting Techniques

	Revenues (Cash Inflows)		Expenses (Cash Outflows)		Residual Values or Disposal Costs	
Response	Number	%	Number	%	Number	%
Not Used	104	62	101	60	111	66
Not used now but anticipate using soon	4	2	4	2	4	2
Total not using adjustment	108	64	105	62	115	68
Used as recently adopted practice	11	7	11	7	7	4
Used as an established practice	45	27	48	29	40	24
Total using adjustment	56	33*	59	35*	47	28
No response	4	2	4	2	6	4
Total respondents	168	99*	168	99*	168	100

*Due to rounding

TABLE 4

Number and Percent of Companies Not Adjusting For Inflation in the Capital Budgeting Techniques Used

No. Using Related Analyses	Related Adjusting Techniques	Companies Making Neither Adjustment Number	%
121	Shortening payback period and adjusting revenues to constant dollars	45	37
117	Increasing NPV discount rate and adjusting revenues to constant dollars	34	29
130	Increasing IRR minimum rate and adjusting revenues to constant dollars	32	25

TABLE 5

Number and Percent of Companies Employing Sensitivity Analysis in Capital Budgeting Techniques

Response	Number	%
Not used	83	49
Not used now but anticipate using soon	9	5
Used as a recently adopted practice	22	13
Used as an established practice	47	28
No response	7	4
Total	168	99*

*Due to rounding

minimum acceptable rate of return in IRR analysis. In addition, Table 3 shows that over 30 percent of the companies restate nominal dollar revenues and expenses to constant dollar revenues and expenses either as a recently adopted or a long-time practice. Since either method may be used to accommodate inflation, the number of companies not adjusting for inflation would be indicated by those that responded "not used" or "not used now but anticipate using soon" to both questions. Table 4 presents the results of this tabulation for adjusting the minimum acceptable criteria in PBP, NPV, and IRR methods, and restating revenues from nominal to constant dollars. The results for restating cash flows from expenses and residual values were very similar to revenues and thus are not shown in Table 4.

Data in Table 4 show that 45 or 37 percent of the companies using paycheck period analysis do not adjust the PBP for inflation. However, less than 30 percent of the companies using NPV and IRR methods employ neither adjustment. Thus, overall a majority of the companies recognize the impact of inflation on capital budgeting and include it in their analyses.

It should be emphasized that the data in Table 4 are not simply a summation of the figures in Tables 2 and 3. Table 4 is based only on the companies that report using a specific capital budgeting technique, while the data in Table 3 include all 168 respondents. Thus, the 37 percent of the companies who neither shorten the payback period nor restate revenues from nominal dollars to constant dollars is based on the 121 companies using the PBP method. Similarly, the other data in Table 4 is based on 117 and 130 companies that, respectively, used the NPV and IRR methods.

Since future inflation rates are not known, the appropriate inflation estimate to be included in capital investment analyses is subject to uncertainty. Consideration of this uncertainty can be incorporated in the analyses through the use of sensitivity analysis. Simply stated, sensitivity analysis determines the amount of change in key variables necessary to reverse the implication (i.e. acceptable to unacceptable) in quantitatively based decision analyses.[6] To determine whether companies are using this technique, respondents were asked if they employ sensitivity analysis to determine the potential effects of various assumed inflation rates on project analyses. Responses are shown in Table 5.

Table 5 data show that over 40 percent of the companies use sensitivity analysis either as a long-time or recently adopted practice. However, almost 55 percent of the companies do not currently use sensitivity analysis although 5 percent anticipate using it in the near future. The lack of use of sensitivity analysis may mean that managers do not know the extent key variables must change to reverse the implication.

Inflation Rate Estimates

Since the appropriate inflation rate to be incorporated into capital budgeting analyses is based on estimates of future inflation rates, it might be enlightening to learn who originates these estimates. Respondents were asked to indicate who usually determines the estimates for future inflation rates. Responses are given in Table 6. Since many companies indicated that more than one person is involved in making the estimates, the number of companies shown in Table 6 total more than the 168 companies responding. The percentages, however, are based on the 168 respondents.

Table 6 shows that the treasurer or controller, planning staff, top management, and/or firm's economists estimate future inflation rates in most of the companies. Outside consultants are used by only 11 (7 percent) of the companies and operating management makes the estimates in only 11 (7 percent) companies. Thus, most

TABLE 6

Persons Responsible For Estimates of Inflation Rates

	Number	%
Treasurer or controller	55	33
Planning Staff	47	28
Top management	38	23
Firm's economists	30	18
Outside consultant	11	7
Operating management	11	7
Responsibility unassigned	12	7
No response	8	5

NOTE: Percentages add to more than 100% because some companies indicated the estimates are the responsibility of more than one person.

TABLE 7

United States Inflation Rates Projected By Survey Respondents

Year	Range	Median
1983	0 - 11%	7.0%
1984	4 - 12	7.0
Average 1985-1990	5 - 20	7.5

estimates of future inflation rates are determined by relatively high level management. To the extent external sources are used, they apparently play an indirect role in this key variable.

Since the estimates of inflation rates used in capital budgeting often must be made many years in advance, the survey also attempted to determine the overall rate of inflation assumed to be relevant to the firms during the remainder of this decade. Responses are shown in Table 7 and indicate that the median inflation rate is expected to be around 7 percent through 1990. Thus, respondents do not generally expect a return to double-digit inflation. However, the anticipated inflation rate is large enough to justify specific consideration in future decision analyses.

Discussion of Results

Data derived from this survey indicate that many companies are using inflation-adjusted data in making capital investment decisions. The adjustment for inflation is made primarily by increasing the discount rate when using the NPV technique and by increasing the minimum acceptable rate of return when using the IRR method. Fewer companies adjust for inflation when using the PBP method by shortening the required payback time.

One explanation for fewer companies adjusting for inflation in payback period analysis may be that since the technique is often used in conjunction with some other method, the adjustment is deferred to the more sophisticated analysis used. If the other analysis includes an inflation adjustment, the decision to invest may be based primarily on the signal given by that model and the payback period used only as supplementary information. Thus, adjustments in the payback technique for inflation may be less important than the adjustment used in the other techniques.

The method of adjusting for inflation by restating nominal dollars to constant dollars appears to be used less than the adjustments to the minimum acceptable criteria. One reason for this may be that the adjustment to constant dollars is considered more difficult. For example, revenues and expenses may need to be deflated by different factors if inflation affects inflows and outflows differently. In other words, a firm may experience different inflationary pressures in its supply markets than it does in its selling markets. Therefore, companies may find it easier to simply adjust their minimum criteria when inflation rates change.

The estimate of future inflation rates used by companies responding to this survey is primarily the responsibility of the treasurer or controller, planning staff, top management, and/or the firm's economists. Data used for decision making are not the data reported under SFAS No. 33. One explanation for this may be that decisions need to be based on information about the future while the data reported under SFAS No. 33 are based on what has happened in the past. Thus, SFAS No. 33 data may help increase the awareness of managers about the potential impact of inflation on earnings but it is not used significantly for decision making purposes. To justify its inclusion in annual reports advocates of SFAS No. 33 need to determine whether the incremental benefits from the data exceed the incremental costs of developing and reporting the data.

Summary

This paper reports the results of a survey to determine whether companies specifically consider inflation when making decisions, particularly those involving capital budgeting. Results indicate that many companies include inflation adjustments in capital investment evaluations. Although respondents do not expect inflation to reach double-digit levels again in the near future, collectively they projected a rate of approximately 7 percent through 1990 indicating that inflation will continue to be a factor in their decision-making processes. With projected annual United States Federal budget deficits approximating $200 billion for the next several fiscal years management's awareness and routine use of inflation adjustments in capital budgeting analyses may well become essential. Ω

NOTES

[1]Financial Accounting Standards Board, *Financial Reporting and Changing Prices*, Statement of Financial Accounting Standards, No. 33 (Stamford, CT: Financial Accounting Standards Board, 1979).

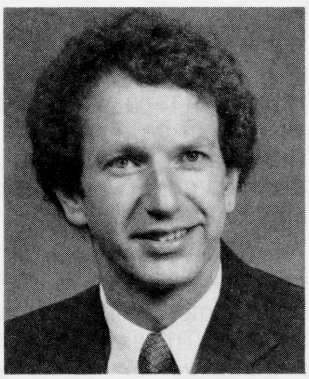
[2]For examples, see Moon Kim, "Inflationary Effects in the Capital Investment Process: An Empirical Examination," *The Journal of Finance* (September 1979): pp. 945-950; Gerald A. Fleischer and Arnold Reisman, "Investment Decisions Under Conditions of Inflation," *The International Journal of Production Research*, 6 (1967): pp. 87-95; Cornelius J. Casey and Michael J. Sandretto, "Internal Uses of Accounting for Inflation," *Harvard Business Review* (November-December 1981): pp. 149-156; Neil C. Churchill, "Don't Let Inflation Get the Best of You," *Harvard Business Review* (March-April 1982): pp. 6-8, 12-14, 20-23, 26; John Dearden, "Facing Facts with Inflation Accounting," *Harvard Business Review* (July-August 1981): pp. 8-12, 16; and Kenneth S. Axelson, "Facing the Hard Truths About Inflation," *Management Accounting* (June 1980): pp. 11-14

[3]For example, the FASB held a conference on research into financial reporting and changing prices on January 6-7, 1983, in White Plains, NY. At that conference, various researchers presented the results of their studies using SFAS No. 33 data. A summary of the conference is given by the Bureau of National Affairs, Inc. in *Taxation and Accounting* (January 17, 1983): pp. G2-G7; and by Andrew Mann, "Special Report — FASB Conference on Use of Inflation-Adjusted Data," *Journal of Accountancy* (March 1983): pp. 10-13.

[4]See Debra D. Raiborn and Thomas A. Ratcliffe, "Are You Accounting for Inflation in Your Capital Budgeting Process?" *Management Accounting* (September 1979): pp. 19-22; and Jon W. Bartley, "A NPV Model Modified for Inflation," *Management Accounting* (December 1980): pp. 49-52.

[5]This is part of a larger study encompassing many aspects of capital budgeting. A complete analysis of the study is available from the authors.

[6]For elaboration of this concept, see W.J. Morse, *Cost Accounting: Processing, Evaluating and Using Cost Data*, 2nd. ed. (Reading, Mass.: Addison Wesley, 1981), pp. 243 and 291; or C.T. Horngren, *Cost Accounting: A Managerial Emphasis*, 5th ed., (Englewood Cliffs, N.J.: Prentice Hall, 1982), pp. 413-415.



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