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Observations on the Predictive Quality of McGraw–Hill Surveys of Business' Plans for New Plants and Equipment

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Over their ten-year history, the McGraw–Hill surveys of business' plans for investment in new plants and equipment have been remarkably successful in predicting actual performance in this field. The mere making of these surveys seems to have stimulated longer-range investment planning and improved the accuracy of estimates of future capital expenditures.

Of course, their reliability has yet to be thoroughly tested since the past ten years have been characterized by unusual circumstances, including a sustained investment boom. However, their value has been sufficiently well established to make it foolhardy for anyone engaged in forecasting to neglect this source of information.

Such success as the McGraw–Hill surveys of plans have achieved as forecasting devices is incidental to the purposes they are designed to serve: (1) to measure the long-range *potential* for business investment and (2) to shed light on the *underlying forces* shaping the character and volume of such investment.

Origin of McGraw–Hill Surveys

In 1947, two rather inconsistent notions about business investment had impressively wide sponsorship. One was that the post-World War II boom in such investment had pretty well run its course. The other, reflected in proposed legislation, was that the federal government should be generally authorized to purchase and install manufacturing facilities where shortages existed.[1]

The staff of the McGraw–Hill Department of Economics disagreed with both these notions. It was our contention that the postwar boom in new producing facilities still had a long way to go. Also we felt that the right

[1] For example, the Spence Bill (Economic Stability Act of 1949), introduced in the House of Representatives in the first session of the 81st Congress, contained a proposal to provide the President with the power to provide industrial facilities in industries where he found that a shortage was hampering or likely to hamper the economy. However, the government was not to construct new plants if private companies would do it through government loans, or on terms prescribed by the President.

of way in providing adequate industrial equipment properly belonged to private establishments, assuming they had the requisite capacity and inclination.

Factual information to document these positions was notably lacking. The Department of Commerce and the Securities and Exchange Commission had initiated surveys of business plans for new plants and equipment, but these early surveys did not provide detailed information on the plans and there was no breakdown by manufacturing industries. Also they were not available as early as persons concerned with economic policy and business forecasting might have wished.

Therefore, in 1947, our Department undertook the development of surveys that would (1) bring out the full potential for private investment, with enough explanatory detail to make this a tangible goal, and (2) indicate, in some detail, the plans for investment by particular industries. We also undertook to publish the data on a faster schedule than was possible for the government agencies.

We were influenced by the fact that McGraw-Hill periodical publications are, as a group, particularly concerned with the capital goods industries and hence would benefit from more knowledge about capital investment on an industry basis. The information developed by the surveys has been especially helpful in this regard. However the need for greater knowledge for public purposes was also a motivating factor.

Framing the Questions

An important decision concerned the type of questions we could reasonably expect companies to answer. The questions were drawn up to permit simple and definite answers. The McGraw-Hill surveys have always concentrated on *plans* for business investment rather than anticipations or expectations. A plan gives an expectation a dimension of action and reduces its ephemeral character.

In our experience, *plans* reported to us represent varying degrees of finality. Some represent actual construction schedules based on outstanding orders; others, expenditures formally approved by a board of directors. We have not sought to standardize the concept of a plan, but rather to encourage individual companies to be consistent in the concept they use. The first question on the McGraw-Hill surveys has always been simply: "How much do you now plan to spend on new plants and equipment in 19—?"

Originally we limited ourselves pretty much to this one question. We used it in a survey made early in the year of plans for new plants and equipment (1) in the current year, and (2) in the following year. In 1949 the survey was extended to include plans for the next five years and, since 1952, plans for the next four years have been a regular feature of the

survey. This extension in time has improved our picture of the potential for capital expenditures.

Surveys since 1952 have also included detailed questions on the purpose of investment (modernization, expansion, new products or processes) and on the potential for investment under varying conditions of capital availability, technical progress, and general business activity. Thus we are gauging the long-range potential (over a four-year period) and the underlying forces that affect investment. These detailed surveys of business' plans are made in the spring of the year for which current plans are reported.

Since 1954 we have also made a preliminary check in the fall on plans for the year just ahead. This was suggested by reporting firms who told us that advance information would be available to them in the budget-making period toward the close of the old year. Thus in the spring of 1957 one would obtain information from the McGraw–Hill survey on advance plans for 1958, 1959, and 1960 to compare with plans for the current year. The October 1957 McGraw–Hill survey provided a closer, though still preliminary, estimate for 1958. However, the Department of Commerce survey for 1958 was not available until early in that year.

We believe that our surveys with their reiterated questions about long-range investment plans have stimulated the development of such plans and imparted an element of stability to them. Initially, only a handful of companies had any definite idea of expenditures more than one year ahead. But in our most recent survey, which included a much larger number of firms, almost 90 per cent could give estimates of capital spending for three years in advance. We feel that business interest in investment planning, as stimulated by the McGraw–Hill and Department of Commerce–SEC surveys, has made it easier for other groups to conduct surveys on special aspects of the problem. Notable among the latter are various regional surveys of plans for capital expenditures,[2] the *Fortune* survey of machinery producers on expected deliveries of new capital equipment and the National Industrial Conference Board survey of capital appropriations by manufacturing companies. Special studies are needed since the McGraw–Hill national surveys do not provide data that are readily applicable to the situation in a particular region or product line.

Predictive Value

In reporting the results of our questionnaires we have always stated that "the McGraw–Hill survey is *not a forecast*. It is a report of what companies

[2] Regional surveys are conducted regularly by the Federal Reserve Bank of Philadelphia for the Philadelphia metropolitan area; the Federal Reserve Bank of Boston for Massachusetts; and the University of Pittsburgh for the Pittsburgh area. In addition, regional surveys have also been carried out by the Federal Reserve Bank of St. Louis for St. Louis, and by the Cleveland Electric Illuminating Company for the Cleveland area.

now plan to spend on new plants and equipment." It was probably inevitable, however, that analysts would use the results of the McGraw-Hill surveys to forecast events in the crucial sector of business investment.

Experience has shown that the dollar expenditures planned for the year immediately ahead are pretty good indicators of the actual level of investment and of the degree and direction of change. Except in 1948, 1950, and 1956, actual capital expenditures, as measured by the Commerce-SEC final figures, were within 8 per cent of planned spending, as measured by the McGraw-Hill surveys (Table 1). We have had the right direction in every year except two: in our first survey carried out early in 1948, and in the one carried out early in 1950, when plans were drastically changed as a result of the Korean war. Our last five surveys indicated changes in the volume of investment which, on the average, differed less than 4 per cent from actual changes as measured by the final Commerce-SEC figures (Table 2).

A comparison of the planned expenditures of reporting companies (Table 3 gives the sample coverage) with what they actually spent shows the performance of the McGraw-Hill surveys to have been remarkably good. Except in 1950, capital expenditures made by industrial firms

TABLE 1

Actual and Planned Plant and Equipment Expenditures, 1948-1956

	Amount (millions of dollars)		*Percentage Ratio of Actual to Planned*
	Actual	*Planned*	
1948	$16,904	$14,856	114
1949	14,625	14,130	104
1950	14,934	12,400	120
1951	19,728	21,544	92
1952	20,936	21,175	99
1953	22,012	23,335	94
1954	20,314	21,499	94
1955	28,707	29,486	97
1956	35,080	38,965	90

Source: Actual expenditures as reported by the Dept. of Commerce and the Securities and Exchange Commission in the June 1956 and March 1957 *Survey of Current Business*. Figures include major revisions in the manufacturing and nonmanufacturing series published in the December 1951 and August 1952 *Survey of Current Business*. Planned expenditures as reported in annual reports, *Business' Plans for New Plants and Equipment*, McGraw-Hill. The series were made directly comparable for the years 1948 through 1954. Agricultural business, and commercial capital expenditures, and outlays charged to current account are excluded. For 1955 and 1956 both series include commercial capital expenditures. The McGraw-Hill data for 1955 and 1956 also include outlays of the petroleum industry charged to current account (estimated at $1.0 billion in 1955 and $1.5 billion in 1956).

TABLE 2

Year-to-Year Actual and Planned Changes in Plant and Equipment Expenditures, 1948-1956
(*previous year* = 100)

	Actual	*Planned*	*Percentage Ratio of Actual to Planned*
1948	116.4	92.1	126.4
1949	86.5	95.2	90.9
1950	102.1	86.7	117.8
1951	132.1	145.2	91.0
1952	106.1	112.8	94.1
1953	105.1	106.2	99.0
1954	92.3	96.4	95.7
1955	107.0	105.5	101.4
1956	122.2	129.8	94.1

Source: Actual changes based on actual expenditures listed in Table 1. Planned changes based on data reported by McGraw-Hill in annual reports, *Business' Plans for New Plants and Equipment.*

TABLE 3

Employment Accounted for by Companies Reporting to McGraw-Hill, by Industry, 1956
(*per cent*)

Iron and steel	70
Nonferrous metals	63
Machinery	44
Electrical machinery	66
Autos, trucks, and parts	95
Transportation equipment	59
Other metalworking	31
Chemicals	73
Paper and pulp	31
Rubber	63
Stone, clay, and glass	30
Petroleum refining	82
Food and beverages	33
Textiles	20
All manufacturing	38
Petroleum industry	83
Mining	35
Railroads	53
Other transportation and communications	43
Electric and gas utilities	59
All business excluding commercial	42
Commercial	11
All business	30

reporting to McGraw-Hill came within 4 per cent of their planned expenditures. In 1955, their actual and planned expenditures were exactly equal (Table 4).

TABLE 4

Differences between Actual and Planned Plant and Equipment Expenditures of Companies Reporting to McGraw-Hill, by Industry, 1949-1956
(*per cent*)

	1949	*1950*	*1951*	*1952*	*1953*	*1954*	*1955*[a]	*1956*[a]
Chemicals	−14	+19	+11	−1	−4	−9	−16	−4
Food	+4	−12	+3	+11	−1	−7	−10	+2
Steel	−15	+15	−12	−7	−11	−26	+2	−9
Petroleum refining	−15	−9	−3	−15	−15	−1	−4	−14
Machinery	−7	+43	+16	+37	+1	−2	+12	0
Autos	−35	+7	+13	−6	+8	+12	+9	−13
Textiles	+2	+19	+9	+24	+26	+4	+46	+9
Electrical machinery	−10	+4	−13	−37	−16	−22	+2	+1
Transportation equipment	−11	−12	+34	−29	−28	−10	+7	−10
Miscellaneous manufacturing	−11	+41	+21	+27	+4	−2	−4	−8
All manufacturing	−12	+11	+6	0	−5	−5	−2	−5
Mining	+17	+7	−4	0	−30	−18	−3	+12
Railroads	−5	+33	+2	−10	+1	−3	+11	−12
Utilities	+10	+5	+7	−2	−4	−3	−3	+1
Other transportation and communications	+2	+4	+42	+18	−17	+2	+11	+4
All business	−4	+10	+4	+1	−2	−4	0	−1

[a] Not directly comparable with previous years because of differences in classifications.

Table 4 shows that this close correspondence between plans and performance is not characteristic of particular industries. The record in individual manufacturing industries shows variation as large as 46 per cent in one year. The economic temperament of the managers of industry may have a bearing here. Some appear to be chronically optimistic about the amount of new producing facilities they expect to buy; others, chronically pessimistic. The textile industry, for example, has always purchased more than it anticipated. In contrast, the petroleum industry has never, over a decade, managed to make all of its planned purchases.

Also, individual companies generally do not do as well in keeping to plans as the averages for industries would suggest. In every year with the exception of 1956, one-fifth of the companies reporting were off the mark by 40 per cent or more and at least 45 per cent were off by 20 per cent or more (Table 5). To date, the individual errors have offset each other in the totals, but there is no guarantee that it will always work out that way.

Since the surveys were begun there has been an almost continuous boom in business investment in new plants and equipment. This condition may well have had a decisive influence in giving our reports their high predictive value although we can only be sure about this after we experience a recession. At any rate, an assessment of the nature of the economic times is essential to the wise use of the data on plans.

TABLE 5

Difference between Actual and Planned Plant and Equipment Expenditures of Individual Companies Reporting to McGraw-Hill, 1949-1956

	RANGE OF DIFFERENCE			
	0	*1% to 19%*	*20% to 39%*	*40% and over*
	(per cent of companies)			
1949	5	38	24	33
1950	2	36	21	41
1951	4	46	25	25
1952	4	41	26	29
1953	3	52	25	20
1954	6	49	23	22
1955	2	47	24	27
1956	4	55	29	12

The Purpose of Investment

To throw light on the *underlying forces* that shape investment in new plants and equipment, we have—over the years—asked a series of questions on capacity, sales expectations, and expansion versus modernization, and many qualitative questions as well. The answers to some of these questions also have an important predictive value.

NEW CAPACITY

Questions on recent and planned additions to capacity have been included in the McGraw–Hill surveys since 1949. The answers, weighted by industrial importance in the same way as the Federal Reserve index of manufacturing production is weighted, are combined in the McGraw–Hill index of manufacturing capacity. This is the only index now available that shows the yearly increase in total manufacturing capacity. (The Federal Reserve Board has developed a capacity index for production of basic materials, but this is only a small part of all manufacturing.) Separate capacity indexes are available for each of the major manufacturing industries.

The McGraw–Hill index of manufacturing capacity has proved to be a valuable forecasting device. The index increased sharply in 1951-53, presaging the downturn in expenditures in 1954. Since 1954 the index has again risen. As reported in the spring 1957 survey, the 1957 year-end index was expected to stand 50 per cent above the figure for 1950. Manufacturing output rose only 30 per cent in the same period. This build-up of extra capacity clearly foreshadowed a decline in manufacturing investment in 1958.

The McGraw–Hill surveys show that companies fulfill their capacity expectations much more accurately than they do their plans for dollar

investment in new facilities. Since we began checking the capacity figures, the planned figure for manufacturing has not been off by more than 2 per cent in any year except 1950, when it was off by 4 per cent—presumably because of the unexpected defense build-up (Table 6). Individual com-

TABLE 6

Actual and Planned Changes in Plant Capacity by Companies Reporting to McGraw-Hill, 1950-1956
(*per cent*)

	Actual	*Planned*
1950	+7	+3
1951	+7	+9
1952	+9	+9
1953	+7	+7
1954	+5	+4
1955	+7	+5
1956	+6	+8

panies and industries also adhere more closely to their capacity plans than to their dollar investment plans. The reasons for this may include the effects of price increases on dollar outlays, and the fact that dollar payments tend to lag behind physical construction.

Since 1955 we have asked companies at what rate they are operating their capacity and at what rate they would *like* to operate. Apparently, manufacturing companies generally prefer to operate at around 90 per cent of capacity. When operations are at a higher rate, expenditures for new plant capacity probably increase. When operations are much below 90 per cent, it is time to look for a downturn. Anyone who followed these operating figures closely could easily have predicted the rise in manufacturing investment during 1955-56, or the tapering off in 1957. Whereas most companies reported operating above 90 per cent capacity at the end of 1955, the average rate was down to 86 per cent by the end of 1956—and some important industries were well below this. These data—coupled with the very large rise in the index of manufacturing capacity—clearly indicated that manufacturing investment was about to slow down.

DEPRECIATION, REPLACEMENT, AND MODERNIZATION

We have also established certain facts about expenditures for purposes other than expansion. For example, most companies report that they regularly spend their entire depreciation allowance for new plants and equipment (presumably for modernization in most cases) and that depreciation allowances are increasing. This puts a limit on the drop in investment that might occur in any year. We have also learned that over the years about half of the capital expenditure dollar has gone for modernization and replacement but that the ratio generally increases after a capacity

build-up has begun to taper off, as after the 1948 build-up and again after the Korean expansion. Thus we can predict with some assurance that modernization and replacement's share in the investment total will increase in 1958, and perhaps in 1959.

The survey findings dispose of the old notion that once capacity reaches a temporary peak, capital investment will decline drastically until a situation of demonstrable undercapacity develops. The modern businessman seems to regard the end of an expansion phase as an opportunity to step up modernization outlays (provided his cash flow including depreciation is adequate). These data permitted the careful analyst to predict the mild nature of the 1949 and 1954 declines in capital investment.

Other questions in the McGraw–Hill surveys have provided data to support the prediction that any drop in expansion outlays will be cushioned by greater expenditures for modernization. In 1948 we asked companies how much it would cost to put all their plant and equipment in "first-class shape." The replies indicated a relatively large backlog of technical improvements ($136 billion at 1948 prices) to be made whenever cash became available.

In several early surveys we also asked, "How soon do you expect an investment in new equipment to pay off?" The typical answer for manufacturing companies was: in three to five years. In other words a return of 20 to 33 per cent was expected. Follow-up interviews revealed that modernization expenditures offered such rich rewards, in terms of cost-saving, that companies could spend all their available funds on projects with short payout periods. With a huge backlog of modernization to be accomplished, and a high rate of return on such expenditures, it is evident that any prediction of total capital investment must allow for a high level of modernization outlays.

RESEARCH AND DEVELOPMENT

When industrial technology is changing rapidly, it is vital to know how quickly technical developments are proceeding and how quickly they can be translated into a practical basis for capital investment. Before 1953 there were no comprehensive data available. In that year the National Science Foundation found that $3.7 billion was spent on research performed by private industry. And since 1956 the McGraw–Hill surveys have included regular questions on expenditures for research and development. The spring 1957 survey indicated that expenditures for research by private industry would reach $7.3 billion in 1957. Even allowing for cost increases since 1953, this is a striking increase.

Exactly when and how these outlays will lead to investment in new plants and equipment is not yet clear. A recheck conducted among a small sample of the participants in the 1957 survey indicated that about seven years—on the average—is required from the start of research on a

new product to the time when it is ready for full-scale production. This suggests that the upswing in research spending that got underway in the mid-fifties will begin to show up as a major force in capital investment during the early sixties. Our check also revealed that improvements in *existing* products—which take less time to accomplish—are a major purpose of research outlays, especially where machinery and other capital goods companies are concerned. We can, therefore, expect a substantial impetus to modernization by 1958 or 1959 from the increasing development of improved machinery.

As to the dollar volume of capital expenditure that may be influenced by research, the 1957 McGraw-Hill survey indicated that 32 per cent of all manufacturing companies expected a "substantial" portion of their 1957 capital investment to be for the production of new products. The increase over the 1956 proportion (28 per cent) suggests that as research expenditures rise, more manufacturing investment will be related to new product development—a prediction confirmed by the replies to our question "What per cent of your 1960 sales do you expect to be in new products?" The answers averaged 10 per cent for all manufacturing but more than 15 per cent in the industries making the largest expenditures on research. The present average for manufacturing is only about 8 per cent.

Thus we can expect that an increasing share of total capital investment will be tied not to the business cycle or to a desire to expand capacity but to the independent and steadily rising trend of new product development. Such a shift would add to the stability of capital expenditures. The data on research and new products—like those on modernization—are a warning against projecting into the late fifties the sort of cyclical decline that occurred in the thirties.

A Practical Test

A significant way of gauging the predictive value of the McGraw-Hill surveys is to compare the course of events as indicated by a survey with events as they actually occurred. For this purpose, we refer to the 1954 survey which covered plans through 1957.

The 1954 survey showed that industry was still expansion minded, despite falling sales in that year. (Because of the decline, the 1954 questionnaire included questions on expected *future* sales and comparisons with capacity plans.) Most companies correctly anticipated sales and capacity increases between 1954 and 1957. The survey also indicated that expansion might be overdone, for most companies were counting on sales increases considerably larger than they forecast for the average in their own industries. Because so many companies were planning to outsell their industries, the survey report observed "that more intense competition is in the offing." It also noted an increased emphasis on plant modernization, because "modernization means cost cutting—an essential for many

companies that want to prosper in the competitive period they see ahead." This describes what actually took place in 1957.

The respondents were also asked the minimum they would spend on plant and equipment if sales declined substantially and the maximum they would spend if they could take advantage of all the new technical developments. For most industries, the answers indicated the 1954-57 range with remarkable accuracy, even though business fluctuated considerably and the cost of capital goods rose sharply. The chemical industry, despite rapid growth, has not spent more than the $1.8 billion maximum estimated in the 1954 survey. The textile industry, despite severe recession, has not spent less than the $245 million minimum they estimated. For all manufacturing, the estimate of maximum capital spending in 1954-57 was $14.4 billion. Three years later, at the peak of the investment boom, plans for 1957 investment totaled $14.5 billion (actual expenditures turned out to be slightly lower). This and other tests clearly indicate that the survey data, sensibly handled, can be remarkably helpful to those engaged in plotting the economic future.

Appendix: Questions on Investment Plans in McGraw–Hill Surveys, 1948-1957

QUESTIONS ASKED IN ALL YEARS

1. How much did you invest in new plants and equipment in the continental United States in [previous year, $]? (This includes all purchases charged to capital accounts, whether for replacement, expansion, or other purposes.)
2. How much do you now plan to invest in new plants and equipment in [current year, $]?
3. How much do you now plan to invest in new plants and equipment in [each of 3 years ahead, $]?
4. At the end of [previous year] how did your capacity, measured in terms of physical volume, compare with what it was at the end of [a year ago, greater or smaller, %]?
5. If you carry out this program [investment plans for current year], what will be the net change in your company's physical capacity [greater or smaller, %]?
6. If you carry out this program [investment plans for 3 years ahead], what will be the net increase in your company's capacity from the end of [current year] to the end of [3 years ahead, %]?

QUESTIONS ASKED IN CERTAIN YEARS ONLY

Capacity

1. [1949, 1955-57] At the end of [previous year], how much of your capacity were you operating? [%]

2. [1949, 1955, 1957] What do you consider a desirable operating rate at the end of the year in your industry? [%]

3. [1948] Can you break down your capital investment budget to show how important each of the following objectives is in your 1948 budget and in your 1949-53 plans? Your best judgment here, even though precise allocations are impossible, will be of tremendous value. Reasons: To expand capacity? To replace or modernize facilities? Other (please specify)? [% of investment allocated to each for 1948 and 1949-53]

A. Of the money you are spending to expand capacity: How much is going to add capacity for production of present products? How much is going to add capacity for new products? [%, 1948 and 1949-53]

B. Of the money you are spending to replace and modernize facilities: How much is being spent to install entirely new processes for making your present products? How much is going to replace particular buildings or equipment by more efficient types of the same general design? [%, 1948 and 1949-53]

4. [1948] When your postwar expansion is complete, how much greater will your capacity be than it was in 1939? [%]

Sales

1. [1953-57] How much were your company's sales in [previous year, $]?

2. [1954-57] How much do you think the physical volume of sales of your company will increase or decrease between [previous year] and [current year, increase or decrease, %]?

3. [1953-57] How much do you think the physical volume of sales of your *company* will increase or decrease between [current year] and [3 years ahead, increase or decrease, %]?

4. [1953, 1954] How much do you think the physical volume of sales of your *industry* will increase or decrease by the end of [3 years ahead, increase or decrease, %]?

5. [1948] Do you expect sales of your company in 1948 to be higher or lower than in 1947 or the same? If you expect higher sales, how big an increase do you look for? [%]

Research and Development—New Products and Processes

1. [1956, 1957] What was the cost of all research and development performed by your company in [previous year, $]? (Research and development includes basic and applied research and engineering, and also design and development of prototypes and processes. It does *not* include quality control, routine product testing, market research, sales

promotion, sales service, geological or geophysical exploration. This definition is the same as used by the Bureau of Labor Statistics in its survey of research and development expenditures for 1953.)

2. [1956, 1957] How much do you estimate your expenditures for research and development will increase (decrease) between [previous year] and [current year] and between [current year] and [3 years ahead, %]?

3. [1954] How much did your company spend on all types of research in 1953, excluding research paid for by the government? [$] How much do you estimate your company will spend for research in [each of 4 years ahead, $]?

4. [1956, 1957] Roughly, what per cent of your [3 years ahead] sales do you think will be in new products (either products not produced in [previous year] or products sufficiently changed to be reasonably considered as new products)? [%]

5. [1956, 1957] Will a significant part (more than 5%) of your [current year] expenditures for new plants and equipment be for facilities to make new products? [yes or no] If yes, how much? [about what % of total expenditures]

6. [1953] Are there any new machines or processes in your *industry* which will require particularly large capital expenditures during the next few years? [yes or no] If yes, please describe briefly.

Expansion versus Modernization

1. [1951-55] Roughly, how was your [previous year] investment in new plants and equipment divided between (a) expansion and (b) replacement and modernization? [%]

2. [1950-55, 1957] Of the total amount you plan to invest in new plants and equipment in [current year] please indicate how much is for (a) expansion and (b) modernization? [%]

3. [1953, 1954, 1957] Roughly, how would your total investment [3 years ahead] be divided between (a) expansion and (b) replacement and modernization? [%]

Employment

1. [1957] How much will this program [research expenditures 3 years ahead] change your employment of scientists and engineers in research and development? [increase or decrease, 1 and 3 years ahead, %]

2. [1951] How many employees do you have? [number] If it is convenient, would you indicate the number of *production workers*: On the first shift? On the second shift? On the third shift?

3. [1954] How much do you expect your company's employment to increase or decrease between 1953 and the end of 1957? [%]

Construction versus Equipment

1. [1951, 1955] Of the total amount you invested in new plants and equipment in [previous year] please indicate how much was for: (a) new construction (buildings) and (b) equipment? [%]

2. [1951, 1955, 1956] Of the total amount you plan to invest in new plants and equipment in [current year], please indicate how much is for (a) new construction (buildings) and (b) equipment? [%]

Depreciation and Accelerated Amortization

1. [1953] How much was your depreciation allowance, including rapid amortization of defense facilities, in [previous year, $]? How much do you estimate your depreciation allowance, including rapid amortization, will be in [each of 4 years ahead, $]? Has it been your policy to spend all or nearly all of your depreciation allowance for new plant and equipment? [yes or no] Do you expect any change in this policy? [yes or no] If so, please list the other uses for these funds.

2. [1954] Has it been your policy to spend all or nearly all of your depreciation allowance for new plants and equipment? [yes or no] If depreciation allowances were substantially increased, what would be the main effect on your company's financial policy? [check] Spend more on new plants and equipment? Rely less on outside funds? Reduce outstanding debt? Other (please specify)?

3. [1951] On what part of your planned 1951 expenditures for plants and equipment will you apply for certificates of necessity authorizing accelerated amortization? [%]

Pay-off Periods

1. [1952, 1955] How soon do you figure an investment in new equipment should pay off? Please give estimate *before taxes.* [years]

2. [1952] How does this compare with the pay-off period you expected two or three years ago? [longer, shorter, or same] If the pay-off period has changed, what is the main reason?

3. [1949] In general, how soon do you think a new investment should pay off to make it worthwhile? In equipment? In buildings? [years]

Source of Funds

1. [1949] Would you tell us (a) where you expect you will raise the money, and (b) where you would like to get the funds to finance the program outlined in your answer to question [investment plans in next 5 years]? What part do you expect you will get from each source? Internal sources including retained earnings, reserves, and depreciation? Bonds or notes? Stock? Others (please specify)? [%] What part would you like to get from each source? Internal sources including retained

earnings, reserves, and depreciation? Stock? Bonds or notes? Others (please specify)? [%]

2. [1948, 1950-52] Where will the money to finance your [1 year ahead] program come from? Retained earnings, depreciation, and reserves? Bonds or notes? New stock? Other (please explain below)? Total [100]. [%]

3. [1952] Where will the money to finance your [3 years ahead] program come from? Retained earnings, depreciation, and reserves? Bonds or notes? New stock? Other (please explain below)? Total [100]. [%]

Advance Planning

1. [1953-55] How far in advance does your company usually plan its capital expenditures? [years]

2. [1955] In what month and year could you first have given a reasonably accurate estimate of your capital spending plans for [current year; month and year]?

3. [1950] Are your 1950 investment plans subject to review and revision? [yes or no] If yes: Monthly? Quarterly? Semiannually? By whom: Officers? Directors? Others? [check]

4. [1952] Is it the usual practice in your company to plan capital expenditures several years in advance? [yes or no] If yes, please indicate how many years.

Value and Cost of Replacing Present Facilities with Most Modern Facilities

1. [1955] What would be the total cost—approximately—of equipping your company fully with the most up-to-date plants and equipment? [$]

2. [1949] At present prices what do you estimate was the value (reproduction cost in its present condition) of your plant and equipment at the beginning of 1948? [$] What would it cost—approximately—to replace your present facilities with the most up-to-date plant and equipment so far developed? [$]

3. [1949] Assuming that you could get what's needed at present prices, and finance it, how much would you need to invest now to put your plant and equipment in first-class shape? Total? Equipment? Buildings? [$]

If Economic Conditions Were to Change

1. [1953, 1954] What is the *maximum* annual expenditure on new plant and equipment you feel your company could make in the years [3 years ahead] if you were able to take full advantage of all technological developments? [$, per year]

2. [1953, 1954] What is the *minimum* annual expenditure on new plant

and equipment you feel your company would make in the years [3 years ahead] even if sales declined substantially? [$, per year]

3. [1950] Would you increase your planned capital expenditures for 1950 if you could sell new common stock at a price 50% above its present market price? [yes or no] If yes, by approximately how much would you increase it? [%]

4. [1950] Would you cut your 1950 capital budget if general business activity declined 20% during the year? [yes or no] If yes, by about how much? [%] Apart from an increase in volume of sales, what single development would cause you to increase your 1950 capital expenditure budget?

5. [1949] Would you increase your 1949-53 investment in new plant and equipment if: Your net profit increased 10%? The corporate income tax rate were reduced to 20% (from 38% today)? You were allowed to depreciate fully new plant and equipment in 5 years for federal income tax purposes? You were able to issue new common stock at a price equal to ten times gross earnings? [yes or no]

6. [1950] If you changed your 1949 capital budget during the year by 10% or more, please indicate: Whether you spent more or less than planned. [more or less] How much more, or less? [%] The principal reason or reasons for the change?

7. [1950] If your 1950 investment will be substantially more or less than your 1949 investment, please indicate the principal reason for the change.

8. [1949] Have you been holding back on plant construction? [yes or no] (a) If so, would you list the major reasons? (b) If construction costs should drop 20% (which is as much as they could be cut, short of a major depression) would you increase your construction budget for the next 5 years? [yes or no]

9. [1949] If you think your expenditure will decline after 1948, what are the major reasons?

10. [1948] If wage rates go up 15-20%, will you increase or decrease your capital budget substantially? [yes or no]

Other Questions

1. [1952] What will be the primary reason for this investment [planned investment for 3 years ahead]? More capacity to make present products? Capacity to make new products? Plant dispersal for security reasons? Plants to serve new market areas? Replacement and modernization of plant and equipment? Other (please specify)? [check]

2. [1951] Do you expect that additional defense orders will raise your needs for new plants and equipment as the year goes on? [yes or no]

3. [1952] Are your plans for new plants and equipment in 1952 limited by prospective shortages of materials or equipment? [yes or no]

If yes, how much would your program be increased if you could get all the materials and equipment you want? [%]

4. [1952] Approximately how much of your 1952 investment do you plan to make in the first half-year and how much in the second half-year? [%]

5. [1948] What proportion of your postwar expansion program is now complete? [%] How much of it will be complete by the end of 1948?

6. [1948] How much of your planned capital expenditures have been placed under contract? [%] How much will be under contract by June 30? [%]

7. [1948] Do you expect to spend more or less for new plant and equipment in 1949 than in 1948? [more, less, same, no plans]

COMMENT

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In the spring of 1955, with the encouragement of Dexter Keezer, we discussed with Pittsburgh companies the possibility of their cooperation with the University in a semiannual survey of estimated plant and equipment expenditures. The results of the first survey were published in November 1955. Later we included in the survey questions on employment and inventory policies and developed adequate sampling methods. The fall 1957 survey went to 452 companies.

A regional survey has certain aspects which may make it of more than local significance. Close personal contacts with respondents may permit evaluation of the motives behind changes in investment decisions (plant, equipment, inventories) and of the role played by changes in profit margins, sales, equipment prices, liquidity, interest rates, and equity prices. Personal contacts may also reveal the nature of planned outlays, that is, whether they represent primarily initial steps (foundations) or completions (machinery). Initial steps are more vulnerable to cancellation than are completions, but they provide a better basis for projecting expenditures into the future. The problem is how to quantify such information obtained from personal contacts.

Knowledge of the activities and anticipations of the Pittsburgh district as a center of capital goods industries may possibly prove valuable for forecasting. To determine whether and to what extent the Pittsburgh district leads or lags in these respects we are comparing the local and national surveys and also the Pittsburgh business index with the Federal Reserve Board index. Our local index, which is published weekly, monthly, and annually, has just been revised backward to 1929 to conform with the FRB index.

I am working with local companies to compare the results in lead time

and accuracy that "expectations to spend" data (McGraw-Hill, Commerce Department–Securities and Exchange Commission, and University of Pittsburgh) and "appropriations by boards" data (National Industrial Conference Board) would have yielded during the last decade. We are planning a conference between local company officials who fill out the various questionnaires and those who use the final results with a view to improving our surveys in the light of the questions raised above.