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The National Industrial Conference Board Survey of Capital Appropriations

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My paper is a progress report on the quarterly survey of capital appropriations by large manufacturing companies conducted by the National Industrial Conference Board, under the financial sponsorship of *Newsweek* magazine. The project, less than two years old, may furnish significant insights into the capital spending decision. However, here I shall dwell only on the forecasting potentialities of the data.

First, I shall set the role of the appropriations survey in the complex of expenditure intentions surveys which have come into being with the postwar development of business statistics and the parallel trends in growth of business planning. Second, I shall discuss our coverage, and the problems peculiar to an appropriations approach. Third, there is an outline of the battery of statistical indicators made available by the survey. In conclusion, I shall present the findings of the quarterly data for 1953-58 and some new dimensions of the 1955-56 capital spending boom.

Foreshadowing Series and Business Planning

The quarterly survey of capital appropriations is a newcomer among collections of expectations information. Over the past decade, the short-term forecasting emphasis has shifted to indicators of this type.

The movement to foreshadowing data has its basis in a parallel trend toward business planning. Since the war, the progressive company has turned to the budgeting process as an important tool of scientific management.[1] The founding and growth of the National Society for Business Budgeting, with some eight hundred members, chapters in twenty-two cities, and annual and regional meetings attended by hundreds of staff technicians, attest to the growing importance of business planning.[2] This

NOTE: The author hereby expresses his appreciation to Jane Were-Bey for her assistance in the preparation of this paper.

[1] A survey of the historical development of business budgeting by date when the budget, especially the capital budget, was first instituted would be interesting and might reveal how recently the forecasting aspect of scientific management has really taken hold in medium and larger-scale business. For example, I was surprised to learn that in a very large public utility the capital budget was less than twenty years old.

[2] See Morris Cohen, "An Economist Looks at Budgeting," *Business Budgeting*, September 1957, pp. 20-25. (This is the bimonthly publication of the National Society for Business Budgeting.)

development has made available to statisticians a growing body of information concerning the future.

The Department of Commerce and the Securities and Exchange Commission surveys of expected capital expenditures and those of the McGraw–Hill organization have become widely accepted as a basic tool of short-term forecasting. What, then, has the new appropriations survey to offer?

Comparison with Expenditure Intentions

The appropriations survey is linked to the expenditure intentions surveys via the capital budgeting process. The government and McGraw–Hill surveys report expected annual capital expenditures based upon the annual capital budget. The SEC–Commerce survey also reports historical and prospective quarterly figures. The latter are reported early in the third month of the quarter for the following quarter. The basic rationale of our survey is the need to gauge changes in trends before they show up in these statistics. For this we require a frequent measure of decisions and changes in decisions to spend for plant and equipment.

Such a measure is the capital appropriation. Each time a board of directors approves a capital appropriation it makes a decision which can corroborate the capital budget or change it. The capital budget is thus tested project by project through the appropriations procedure.[3] In a sense, our survey represents a second stage of development in tapping the formalized business planning process.

The approval of the capital appropriation formalizes the top management planning decision for each block of capital spending and unlocks the company's vaults so that the money can be committed and spent. Of course, the actual expenditure may not show up on the books for months.

Like other expenditure expectations surveys, our emphasis is on the company making the decision. Here the company is the active agent. We started out with the hope of constructing a new order expectations series but discovered that this was not feasible. Other surveys focus on the company receiving the order. For example, both McGraw–Hill and *Fortune* magazine have conducted surveys on the order expectations of machinery producers. In these cases, the company is more or less passive. Both points of view, that of the producer and that of the company placing the order, should complement each other.

Pilot Studies

A review of some of the pilot studies carried out at the Conference Board suggests why the appropriations approach was followed and some

[3] For a comprehensive discussion of company practices in this field, see *Controlling Capital Expenditures*, National Industrial Conference Board, *Studies in Business Policy 62*, 1953.

of the future lines our research may take. Early in 1956, a questionnaire was addressed to a hundred members of the Conference Board's Council of Financial Executives, Council of Marketing Research Directors, and West Coast Marketing Research Council.[4] Forty-two formal replies were received, as classified in Table 1.

TABLE 1

Replies to NICB Questionnaire on the Availability of Data on Capital Appropriations and New Capital Orders, Early 1958

	NUMBER OF COMPANIES REPORTING			
	Total	*Data Available*	*Data Could Be Available*[a]	*Data Not Available*
Total capital appropriations:[b]				
Reply not detailed	12	4		8[c]
Reply detailed	30	29	1	
Appropriations breakdown:				
Plant versus equipment	30	18	8	4
New plant versus modernization	30	20	6	4
Equipment by type	30	12	8	10
New capital goods orders expected to be placed	30	9		21

[a] With added effort, e.g., capital appropriations could be consolidated.

[b] Three informal replies were also received: one company had the information readily available; two had it on a divisional basis so it would require added effort to comply.

[c] Includes one sales division and one service organization where the data were inapplicable.

It was clear that the information on capital appropriations was available, but relatively few companies prepared schedules of new capital goods orders expected to be placed. Plant could be separated from equipment in the appropriations approach by the majority of companies, new plant could be distinguished from plant modernization by fewer companies, and equipment could be classified by type, though with added effort. In view of the newness of the approach we decided to confine the opening survey to total capital appropriations on a quarterly basis, although breakdowns along the lines indicated are on the agenda for the future.

In undertaking a regular appropriations survey, we brought into reality the recommendation of the Terborgh Committee, one of the five consultant committees organized in 1954 by the Federal Reserve Board at the request of the Subcommittee on Economic Statistics of the Joint

[4] For a list of these councils, see *Annual Report 1956*, NICB.

Committee on the Economic Report (now the Joint Economic Committee).[5] We have learned that, by and large, the results are consistent and comparable. There are exceptional companies, now numbering six, that cannot be included in our survey while others cannot participate because they do not follow the appropriations procedure. However, we feel that we have sufficient coverage to warrant serious attention.

The Universe: The 1,000 Top Companies

Unlike other capital spending surveys, the appropriation survey is limited to large companies. This limitation is inherent in our purpose. We are necessarily confined to organizations large enough to have a formal appropriations procedure. We chose to concentrate on the 1,000 largest manufacturing companies in terms of total assets; the cut-off point was roughly $15 million.[6] Experience has shown that this group comes close to exhausting the present universe.

Although we are debarred from investigating all manufacturing, the area we cover is significant. Our 1,000 top companies account for about 55 per cent of manufacturing employment and about two-thirds of manufacturing assets. They account for about three-quarters of manufacturing investment and contribute substantially to all business investment. Since satellite and other lesser companies often gear their investment programs to those of major companies, the activities of the latter should provide important clues to trends in these totals.

Because we focus on companies where spending is subject to the discipline of capital budgeting and appropriation, the information we obtain is objective and a matter of record. Also our approach is the more

[5] *Statistics on Business Plant and Equipment Expenditure Expectations*, Report of the Consultant Committee on Business Plant and Equipment Expenditure Expectations, July 1955, pp. 5-6. "The present question is the feasibility of compiling a current series of authorizations. . . .

"This question can be answered definitely only by a more extended investigation than we have been able to make. This is true also of the possibility of defining authorizations in such a way as to get consistent and comparable results from different companies. It is probably desirable to explore these questions further, but on the basis of our present knowledge we favor an alternative approach, a compilation of equipment orders placed.

"*There should be further exploration of the possible advantages and the feasibility of a series on authorization for the purchase of equipment.*"

[6] The universe of the individual top 1,000 manufacturing companies was developed primarily from Moody's *Industrials, 1955.* This was supplemented by Standard and Poor's *Register of Directors and Executives, 1956*, annual company reports, and other private trade sources. An effort was made to compile as accurate a listing as possible. Comparison with the Federal Trade Commission's *A List of 1,000 Large Manufacturing Companies, Their Subsidiaries and Affiliates, 1948* (June 1951) discloses that the great majority of companies are found to be on both registers. Comparison has not yet been made with the latest, *Report of the Federal Trade Commission on Industrial Concentration and Product Diversification in the 1,000 Largest Manufacturing Companies, 1950*, published in 1957.

practical for being back-stopped by the government survey which covers thousands of companies regardless of their size or planning practices.

Survey Coverage

Our basic published tables are based upon a continuous sample of 500 companies for all quarters of 1955 to date. These surveys provide the basis for the comparisons over time. In addition, 86 companies reported only for 1956, 1957, and 1958. The resulting 586 company data for 1956-58 are "blown up" to yield estimated results for the 1,000 company universe.[7]

TABLE 2

Ratio of Assets of NICB Respondent Companies to Assets of the 1,000 Largest Manufacturing Companies, by Industry, 1954
(*per cent*)

	586 Company Sample	*500 Company Sample*
All manufacturing	75	70
Durable goods industries	75	67
Primary iron and steel	96	94
Primary nonferrous metals	96	95
Electrical machinery and equipment	85	79
Machinery, except electrical	72	64
Transportation equipment[a]	52	39
Stone, clay, and glass products	93	86
Fabricated metal products	71	52
Other durable goods industries[b]	51	43
Nondurable goods industries	75	72
Food and beverages	59	52
Textile mill products	74	66
Paper and allied products	82	80
Chemicals and allied products	92	88
Petroleum and coal products	74	74
Rubber products	97	97
Other nondurable goods industries[c]	53	45

NOTE: The assets are from balance sheets for year-end 1954 or the closest fiscal year to it. The 586 companies furnished information for 1956, 1957, and the first quarter of 1958 (nine quarters); the 500 companies also furnished information for 1955 (thirteen quarters).

[a] Includes motor vehicles.

[b] Includes lumber products, furniture and fixtures, instruments, ordnance, and miscellaneous manufactures.

[c] Includes apparel and related products, tobacco, leather and leather products, and printing and publishing.

In Table 2, the coverage of our latest report is expressed as the ratio of the assets of our respondents to those of the top 1,000 manufacturing

[7] The data reported by the 586 companies were blown up by the ratio of total industry assets (of the 1,000 top companies) to the industry assets of the reporting companies, for each of three size classes: under $50 million; $50 to under $100 million; and $100 million and over.

companies. The assets of the basic 500 sample group represent 70 per cent of the assets of the top 1,000 manufacturing companies. Coverage rises to 75 per cent for the 586 company sample, with the highest ratios in the iron and steel; nonferrous metals; stone, clay, and glass; chemicals; and rubber industries. Aside from transportation equipment, coverage is weakest in groups characterized by a relatively small scale of operations, even at the apex of the manufacturing pyramid. For example, in both the "other" durables and "other" nondurables, coverage is only about 50 per cent; lumber and furniture in the hard-goods group, and apparel, leather, and printing in the soft-goods group are the least represented. These figures indicate that the survey is sufficiently broad in scope to reflect the activities of the manufacturing sector.

The capital expenditures reported by the NICB–cooperating companies represent over half of the capital spending estimated by Commerce–SEC

TABLE 3

Distribution of Capital Expenditures Reported in NICB and Commerce–SEC Surveys, by Industry, 1957

	CAPITAL EXPENDITURES			
	As percentage of All Manufacturing		*As percentage of Durables and and Nondurables*	
	NICB[a]	*Commerce–SEC*	*NICB*[a]	*Commerce–SEC*
All manufacturing	100.0	100.0		
Durable goods industries	49.6	50.3	100.0	100.0
Primary iron and steel	17.6	10.8	35.4	21.5
Primary nonferrous metals	7.6	5.1	15.3	10.1
Electrical machinery and equipment	5.3	3.8	10.6	7.5
Machinery, except electrical	4.9	8.0	10.0	15.9
Transportation equipment[b]	6.5	10.0	13.1	20.0
Stone, clay, and glass products	4.6	3.6	9.2	7.1
Other durable goods industries[c]	3.2	9.0	6.4	17.9
Nondurable goods industries	50.4	49.7	100.0	100.0
Food and beverages	3.1	5.3	6.2	10.7
Textile mill products	1.7	2.6	3.4	5.1
Paper and allied products	4.7	5.1	9.3	10.2
Chemicals and allied products	14.4	10.8	28.5	21.7
Petroleum and coal products	23.7	21.6	47.2	43.5
Rubber products	2.1	1.2	4.2	2.5
Other nondurable goods industries[d]	0.6	3.1	1.2	6.2

[a] Based upon capital expenditures reported by the basic sample of 500 companies.

[b] Including motor vehicles.

[c] Includes fabricated metal products, lumber products, furniture and fixtures, instruments, ordnance, and miscellaneous manufactures.

[d] Includes apparel and related products, tobacco, leather and leather products, and printing and publishing.

for all manufacturing companies. A comparison of the composition of the appropriations survey sample with that of the total Commerce–SEC survey is shown in Table 3 in terms of the distribution of 1957 capital expenditures by industries. The proportion accounted for by durables and nondurables is roughly similar, but the weighting of the constituent series varies.

The NICB emphasis on large companies naturally underweights the miscellaneous groups which consist predominantly of smaller companies. The same emphasis, as well as excellent coverage, accounts for the importance of iron and steel in our survey. The lower proportion accounted for by transportation equipment reflects the lower coverage of the NICB sample. The higher proportion accounted for by the petroleum industry is a result of the NICB definition which includes more of the industry in manufacturing than does Commerce–SEC.

Limitations

First, the appropriations survey differs from other expenditure intentions surveys in that no specific time dimension is attached to an approved capital appropriation. At mid-1957 the backlog of approved appropriations represented between three and four quarters of spending at the II 1957 spending rate, so that the time dimension does not stretch out indefinitely. What cannot be foretold is the specific quarter or quarters in which appropriated money will be spent. For the present the link between an appropriation and ensuing expenditures will have to be constructed through correlation and other statistical methods.

Second, capital appropriations may contain an allowance for overstatement and understatement, such as plus or minus 10 per cent. Relatively small changes in total capital appropriations are thus not to be sifted too finely. Since movements in the series over the past five years have been generally large in either direction, this does not detract from its usefulness.

Third, the capital appropriations survey is limited by the problems inherent in an attempt to develop a foreshadowing series. No matter how carefully a company plans and appropriates for capital spending, factors such as supply limitations, price changes, unexpected engineering and construction problems, and financial difficulties may affect the amount and timing of expenditures.

Fourth, there are problems involved in attempting to fit capital appropriation procedures into one consistent pattern. There is a question of what constitutes an appropriation. In some companies, only major expenditures are appropriated. In others, fortunately few, expense items associated with capital expenditures (capital items otherwise charged to current expense) are included in capital appropriations.

Another complication arises because some companies (among industries, most important in size is petroleum) make a lump sum appropriation for the year as a whole. If all companies did this, the appropriations survey would be identical with the survey of annual capital budgets. However, of the 500 companies in the basic sample, only thirty-four generally follow this practice and half of these find it necessary to make supplemental appropriations during the year. Since twenty-five make their major appropriations in the first quarter (almost all the rest make them in the fourth quarter), these practices contribute to a first-quarter seasonal peak in new appropriations as opposed to a first-quarter seasonal trough in expenditures. In our judgment, at least for the manufacturing sector, such complications present less of a problem than originally thought. While considerable correspondence marked the opening stages of the survey, the present reports contain comparable and consistent information.

More troublesome is the question of postponements which was raised by technicians and by some public pronouncements in early 1957. These can represent a problem in the context of the annual capital budget, as well as in the appropriations approach. The decision to postpone may take place when the capital appropriation is up for review in which case they could show up as a decline in approved capital appropriations.

Postponements may also occur after the formal approval by the board of directors. Then, as the survey is presently constituted, we would not be formally aware of it. However, if such a development were to become widespread, as in a recession, for example, it would show up as a relative rise in the backlog of appropriations with declining expenditures and commitments.

Lastly, questions arise in the definition of manufacturing. These are particularly troublesome for the nonferrous metals and the petroleum industries, where extraction, transportation, and distribution are sometimes included in the industry total. The NICB and government surveys are not comparable in this respect.

Appropriation Indicators

A battery of statistical indicators is made available by the quarterly survey of capital appropriations. We start out with the capital appropriations outstanding at the beginning of the quarter. These are the appropriations, previously approved, that have not yet been used. To this we add the capital appropriations approved during the quarter. The sum of the backlogs and the appropriations newly approved gives us the total appropriations available for use during the quarter.

We next take into account the capital appropriations either committed or spent during the quarter. By commitment, we mean the actual placing of the order for new plant and equipment. From one point of view this is

when the company's capital spending decision has its initial impact on other firms. If all companies were able to report their commitments, the survey would be even more forward looking. Unfortunately, only about 35 per cent of the companies are able to report on this basis.[8]

We use the information on capital expenditures to expire the appropriations of companies unable to report commitments.[9] We also take into account the cancellation of appropriations. This may serve as an indicator of the level of business optimism in the field of capital spending decisions. If you subtract from the total appropriations available for use during the quarter those appropriations that were either committed or spent, and those appropriations that were canceled, you arrive at the total outstanding and available for use in future quarters.[10]

To illustrate, we estimated that at the beginning of 1957 the top 1,000 manufacturing companies had an appropriations backlog of $9.5 billion. To this is added the $4.5 billion in new appropriations approved during the first quarter making a total of $14 billion in appropriations available for use. During the first quarter, these companies either spent or committed $2.9 billion and canceled a little over $100 million. This left a backlog of $10.9 billion in outstanding appropriations at the end of the first quarter.

Thus far, we have published in fifteen, two-digit industry detail, this battery of quarterly appropriation information for 1955, 1956, 1957, and the first quarter of 1958. We have presented estimated figures for the 1,000 top manufacturing companies, in total, and for durables and non-

[8] The count refers to II 1957 for the basic sample of 500 companies. Actual dollar commitments reported by these companies amounted to 36 per cent of the total commitments and expenditures published for the quarter. Thus the survey is mostly on an expended basis.

[9] Albert Hart, in correspondence with the author, called attention to the series of appropriations committed but not yet spent obtained by subtracting capital expenditures from the total of appropriations committed or spent.

[10] In practice, the relationships do not add exactly. For example, in some companies all capital expenditures are not covered by appropriations. Subtracting total capital expenditures from the sum of outstanding appropriations plus net new appropriations would, therefore, not yield exactly the total outstanding at the end of the quarter. However, in the aggregate, such differences are small.

To illustrate, consider the II 1957 information for all manufacturing companies (*Conference Board Business Record*, September 1957, p. 411). The arithmetic sum of the total outstanding capital appropriations at the beginning of the quarter, plus new appropriations during the quarter, less commitments or expenditures during the quarter, less cancellations, is $7,870 million. The actual reported backlog at mid-1957 was $7,891 million, a difference of only $21 million, or a fraction of one per cent.

There are other small differences between the backlog at the end of a quarter and the backlog at the beginning of the following quarter. Some companies find it necessary to make some technical adjustments such as the change of a particular appropriation from capital to expense, or vice versa. Again, these technical accounting adjustments so far as the total survey is concerned represent a small discrepancy. Thus, at the end of I 1957, the backlog was $8,498 million. At the beginning of II 1957, the backlog was reported as $8,494 million.

The reported figures are always shown with these minor discrepancies.

durables.[11] More recently, we collected quarterly information for 1953 and 1954 from the basic sample of 493 companies. Of these, we have thus far tabulated 353 companies, which account for 89 per cent of new appropriations in 1955 as reported by the larger sample of 500.[12]

My analysis will be based upon the basic sample of 500 companies reporting for the quarters of 1955 to date, linked to the subsample of 353 companies also reporting for 1953-54. The subsample returns were blown up to the level of the 500 companies by applying the ratio prevailing in 1955 for each appropriation measure (e.g. for appropriations, backlogs, etc.).

Seasonal Fluctuations

New appropriations reported by the petroleum industry have a pronounced seasonal fluctuation, dominated by annual appropriations in the first quarter. Data for iron and steel, electrical and nonelectrical machinery, and the fabricated metal products industries also show evidence of seasonality. Recognizing the obvious dangers of constructing seasonal indexes for less than twenty quarters, we nevertheless made separate adjustments for these industries. The data for the other industries have not been adjusted.

The problem of seasonal adjustment for expenditures is less troublesome, since the basic factors at work are the accounting convention which siphons proportionately more expenditures into the fourth quarter, and cold weather which limits first-quarter construction activity. Our seasonal indexes for capital expenditures were calculated for the durables and nondurables groups as a whole. Cancellations also have a seasonal peak in the fourth quarter, probably associated with the year-end closing of company books, and adjustment has been made for this.

Appropriation Cycles

The seasonally adjusted data on new appropriations for all manufacturing for 1953-57 are given in Table 4. According to Commerce–SEC, capital expenditures by all manufacturers and by nondurable goods manufacturers were fractionally higher in 1953 than in 1952. Outlays by durable manufacturers declined in 1953. A peak in capital appropriations occurred in III 1953. From this peak to the trough in I 1954, new appropriations dropped 15 per cent. If correction is made for cancellations, appropriations declined 19 per cent from a III 1953 peak to a I 1954 trough.

[11] The results of the surveys so far conducted were published in *Conference Board Business Record*, October 1956, December 1956, March 1957, June 1957, September 1957, December 1957, March 1958, and June 1958.

[12] Additional returns for 1953-54 are still being received. The data presented for 1953-54, therefore, are preliminary and subject to revision.

TABLE 4

Appropriations, Cancellations, and Capital Expenditures of Manufacturing Companies, by Quarters, 1953-1958
(*millions of dollars*)

	New Appropriations (1)	*Cancellations* (2)	*Net New Appropriations* (3)	*Capital Expenditures* (4)	*Changes in Backlogs* (3)−(4) (5)
1953					
I	1,162	66	1,096	1,504	−408
II	1,412	111	1,301	1,492	−191
III	1,459	68	1,391	1,491	−100
IV	1,260	106	1,154	1,463	−309
1954					
I	1,243	116	1,127	1,428	−301
II	1,255	89	1,166	1,369	−203
III	1,284	83	1,201	1,327	−126
IV	1,595	71	1,524	1,335	189
1955					
I	1,878	89	1,789	1,302	487
II	2,121	80	2,041	1,389	652
III	2,426	82	2,344	1,469	875
IV	2,648	76	2,572	1,565	1,007
1956					
I	2,910	78	2,832	1,755	1,077
II	2,888	96	2,792	1,967	825
III	2,297	130	2,167	2,116	51
IV	2,288	127	2,161	2,239	−78
1957					
I	2,728	93	2,635	2,380	255
II	2,126	185	1,941	2,371	−430
III	1,665	119	1,546	2,477	−931
IV	1,668	232	1,436	2,216	−780
1958					
I	1,448	332	1,116	2,009	−893

NOTE: All data are seasonally adjusted and based upon reports from 500 companies for 1955-58, linked to a subsample of 353 companies for 1953-54. In 1953-54 each measure has been raised by the appropriate ratio between the 353 company sample and the 500 company sample prevailing in 1955.

From a peak in I 1953 to a trough in I 1955, spending fell 13 per cent. As shown in Table 5, the peak in new appropriations for durables was reached in II 1953. From peak to I 1954 trough, new appropriations fell 28 per cent. On a net basis, the decline was 34 per cent. In contrast, capital spending fell 20 per cent from the I 1953 peak to the III 1954 trough.

TABLE 5

Appropriations, Cancellations, and Capital Expenditures of Durables Manufacturing Companies, by Quarters, 1953-1958
(*millions of dollars*)

	New Appropriations (1)	*Cancellations* (2)	*Net New Appropriations* (3)	*Capital Expenditures* (4)	*Changes in Backlogs* (3)−(4) (5)
1953					
I	485	12	473	689	−216
II	602	36	566	679	−113
III	590	32	558	643	−85
IV	566	43	523	596	−73
1954					
I	435	63	372	570	−198
II	477	42	435	583	−148
III	533	33	500	550	−50
IV	530	26	504	552	−48
1955					
I	933	31	902	551	351
II	1,095	28	1,067	550	517
III	1,364	29	1,335	634	701
IV	1,365	41	1,324	701	623
1956					
I	1,512	30	1,482	819	663
II	1,540	43	1,497	968	524
III	934	55	879	1,039	−160
IV	1,180	47	1,133	1,140	−7
1957					
I	1,155	34	1,121	1,200	−79
II	1,002	85	917	1,201	−284
III	689	55	634	1,219	−585
IV	653	67	586	1,063	−477
1958					
I	463	122	341	933	−592

NOTE: Seasonally adjusted; see footnote to Table 4.

Table 6 shows that the peak in new appropriations by nondurables manufacturers occurred in III 1953 with the trough in III 1954. The peak to trough decline was 14 per cent. From the IV 1953 peak in capital spending to the I 1955 trough, the drop was 13 per cent.

The evidence for 1953-54 must be considered separately for durables and nondurables. New appropriations net of cancellations is the series most likely to foreshadow future expenditures. For the durables the peak in net appropriations followed the peak in spending by one quarter. In

TABLE 6

Appropriations, Cancellations, and Capital Expenditures of Nondurables Manufacturing Companies, by Quarters, 1953-1958
(*millions of dollars*)

	New Appropriations (1)	*Cancellations* (2)	*Net New Appropriations* (3)	*Capital Expenditures* (4)	*Changes in Backlogs* (3)−(4) (5)
1953					
I	677	54	623	815	−192
II	810	75	735	813	−78
III	869	36	833	848	−15
IV	694	63	631	867	−236
1954					
I	808	53	755	858	−103
II	778	47	731	786	−55
III	751	50	701	777	−76
IV	1,065	45	1,020	783	237
1955					
I	945	58	887	751	136
II	1,026	52	974	839	135
III	1,062	53	1,009	835	174
IV	1,283	35	1,248	864	384
1956					
I	1,398	48	1,350	936	414
II	1,348	53	1,295	999	296
III	1,363	75	1,288	1,077	211
IV	1,108	80	1,028	1,099	−71
1957					
I	1,573	59	1,514	1,180	334
II	1,124	100	1,024	1,170	−146
III	976	64	912	1,258	−346
IV	1,015	165	850	1,153	−303
1958					
I	985	210	775	1,076	−301

NOTE: Seasonally adjusted; see footnote to Table 4.

nondurables, the peak in net appropriations preceded by one quarter the peak in spending. For durables the appropriations decline was significantly greater than the spending decline. For nondurables the two declines were roughly comparable.

However, in the absence of information prior to 1953, it is not possible to appraise fully the relationships between the magnitude and timing of appropriations versus expenditures for this period.

The evidence from the trough to the peak of the next cycle should convince even the skeptics. Capital spending by manufacturing companies

(see Table 4) reached a trough in I 1955, as in the Commerce–SEC series. Meanwhile new appropriations were rising from the I 1954 trough. By I 1955, new appropriations had increased 51 per cent; net appropriations, 59 per cent.

How does this compare with the findings of the capital spending intentions approach? In November 1954, the first McGraw–Hill survey of annual capital budgets foreshadowed a 7 per cent decline in manufacturers' capital outlays in 1955 compared with 1954. In mid-March 1955, Commerce–SEC reported that annual 1955 manufacturers' capital spending was expected to be down 3 per cent from 1954. Actual 1955 spending was almost 4 per cent higher than a year earlier.

It is noteworthy that the second McGraw–Hill survey of annual capital budgets published in the spring disclosed that 1955 annual capital outlays by manufacturers were now expected to be 4 per cent higher. Thus the shift in expectations from -7 per cent to -3 to $+4$ per cent occurred over the period when substantial I 1955 capital appropriations were being approved. The appropriations survey would have noted the fact of this increase and probably the implication of higher outlays in 1955.

The full half cycle in appropriations from the I 1954 trough to a peak in I 1956 reveals the magnitude of the investment boom of 1955-56. New appropriations rose 134 per cent and net appropriations rose 151 per cent. The increase in spending from the I 1955 trough to the I 1957 peak was only 83 per cent, implying an increase in backlogs.

Since mid-1956, the trend in net new appropriation approvals has been generally downward. The rate of net appropriations during the four quarters beginning with III 1956 was almost a fifth lower than the three peak quarters of late 1955 and the first half of 1956, and about a sixth less than the average rate of the four quarters beginning with III 1955. Net appropriations in the three quarters beginning with III 1957 were almost 40 per cent below the average rate of the four quarters.

Changes in Appropriation Backlogs

The pattern of change in unspent appropriation backlogs (see Table 4) parallels the course of newly approved appropriations. During 1953 and 1954, backlogs were whittled down while expenditures declined.

In I 1955 the trend was sharply reversed. Backlogs increased while actual spending was rising gradually. By the end of the third quarter, the average 1955 rate of net appropriations was 64 per cent higher than during 1954. The initial shock which greeted the first McGraw–Hill announcement of preliminary plans for 1956 capital spending might have been tempered had these figures been available. During the second half of 1956, the change in backlogs was negligible. There was an increase in I 1957 (entirely in nondurables, discussed below) but this was followed, in

the remaining quarters of 1957 and I 1958 by a decline amounting to almost 60 per cent of the cumulative change in backlogs which had taken place between I 1955 and I 1957.

Backlogs of durables companies surged ahead during 1955 and the first half of 1956 (Table 5). By the end of III 1955, the average 1955 rate of net appropriations was 143 per cent higher than the 1954 average. Here is evidence of the upsweep of capital spending plans as they were unfolding during a period when capital spending was rising moderately. Since mid-1956 appropriation backlogs have declined in the durables group. Beginning with III 1956 and continuing through I 1958, backlogs were whittled down to about one-third of the total accumulated over 1955 and the first half of 1956.

The cutback in backlogs during 1953-54 and the increase in backlogs in 1955-56 were more moderate for nondurables than for durables (Tables 5 and 6). Furthermore, nondurables appropriation backlogs were still increasing in III 1956 and I 1957. It was only in II 1957 that these backlogs fell appreciably. The fall from II 1957 through I 1958 was just under 50 per cent of the cumulative change in backlogs from IV 1954 through I 1957.

The patterns outlined for the durables and nondurables groups are reasonable on a priori grounds. One would expect the former to react more quickly and violently to outside stimuli affecting the strategic capital goods sector.

Year-to-Year Patterns

Further perspective on the patterns of new appropriations, backlogs, and spending is available by comparing year-to-year changes in each series, as shown in Table 7. For all manufacturing, in the 1953-54 comparison, changes in backlogs were greater than in new appropriations. In the 1954-1955 comparison the relationship was reversed. During 1955-56, gains in new appropriations became a loss, while gains in backlogs narrowed. In the 1956-57 and 1957-58 comparisons, new appropriations declined more than backlogs.

The fluctuations in appropriations and backlogs parallel the cycle of spending, but lead by two quarters in the 1954-55 upswing. Thus, the gains in new appropriations and backlogs in the I and II of 1955 compared with 1954 were reflected in the gain in spending beginning in III 1955. A similar two-quarter lead is evident for durables and nondurables.

The evidence for the full downswing of the cycle is still incomplete. Yet, the first year-to-year decline in new appropriations occurred in the III 1956 to III 1955 comparison, while spending first slowed up in I 1957 as compared with I 1956. This relation held for all manufacturing and for durables. For nondurables, the I 1956 to I 1957 gain in new appropriations

TABLE 7

Changes in New Appropriations, Backlogs, and Capital Expenditures, Manufacturing Groups, by Quarters, 1954-1953 to 1958-1957
(*per cent*)

	ALL MANUFACTURING			DURABLES			NONDURABLES		
	New Appropriations	*Backlogs*	*Capital Expenditures*	*New Appropriations*	*Backlogs*	*Capital Expenditures*	*New Appropriations*	*Backlogs*	*Capital Expenditures*
1954-53									
I	10	−18	−5	−10	−18	−18	21	−17	6
II	−12	−18	−8	−21	−17	−15	−6	−19	−3
III	−11	−16	−11	−10	−13	−15	−12	−20	−8
IV	19	−7	−9	−7	−11	−8	46	−4	−9
1955-54									
I	41	13	−10	109	14	−4	14	11	−13
II	74	28	1	138	36	−7	32	20	6
III	93	47	10	164	62	14	43	31	7
IV	80	67	16	156	90	26	30	42	9
1956-55									
I	46	64	35	60	82	49	35	46	24
II	33	63	41	35	73	76	31	52	19
III	−4	47	44	−35	41	64	37	54	28
IV	−14	23	44	−12	21	63	−15	26	28
1957-56									
I	−3	12	37	−21	6	49	12	19	27
II	−28	−1	22	−34	−7	26	−19	7	18
III	−33	−11	19	−29	−15	19	−35	−6	18
IV	−33	−20	−1	−47	−25	−6	−13	−14	5
1958-57									
I	−43	−31	−16	−59	−35	−23	−33	−26	−9

NOTE: Based upon unadjusted figures. Data for 1955-58 relate to reports by 500 companies. Data for 1953-54 relate to 353 companies raised to the level of the 500 company sample by the ratio for the particular measure prevailing between the two samples in 1955.

represents a complication in this two-quarter relationship; nevertheless, the drop in appropriations in the fourth-quarter comparison was followed by a narrowing of the gain in expenditures in II 1957 compared with the same period a year previous.

Appropriation Diffusion

Perspective is added to the year-to-year percentage changes by considering the diffusion of appropriation changes. Accordingly, the 500 companies reporting quarterly information for 1955-58, and the 353 companies reporting information for the quarters of 1953-55, have been placed in three categories: those with increases from year to year in new appropriation approvals, those with decreases, and those reporting no changes. The percentage distribution of the number of companies in each category is given in Table 8.

TABLE 8

Distribution of Companies by Direction of Change in Appropriations, Manufacturing Groups, by Quarters, 1954-1953 to 1958-1957
(*per cent*)

	ALL MANUFACTURING			DURABLES			NONDURABLES		
	Higher	*Lower*	*No Change*	*Higher*	*Lower*	*No Change*	*Higher*	*Lower*	*No Change*
1954-53									
I	48	47	5	46	48	6	50	47	3
II	44	49	7	39	53	8	51	44	5
III	41	51	8	37	53	10	47	47	6
IV	49	44	7	53	39	8	44	50	6
1955-54									
I	59	38	3	63	34	3	53	44	3
II	61	33	6	63	29	8	57	39	4
III	64	30	6	68	26	6	60	35	5
IV	68	28	4	68	27	5	66	30	4
1956-55									
I	64	34	2	65	33	2	63	36	1
II	55	41	4	52	43	5	58	39	3
III	50	44	6	47	46	7	55	41	4
IV	47	50	3	49	47	4	44	53	3
1957-56									
I	48	50	2	45	53	2	51	47	2
II	42	54	4	42	54	4	43	54	3
III	39	54	7	35	57	8	45	51	4
IV	39	57	4	37	60	3	41	54	5
1958-57									
I	31	65	4	28	69	3	37	59	4

NOTE: The 1956-55, 1957-56, and 1958-57 comparisons are based upon 500 reporting companies, the 1954-53 and 1955-54 comparisons upon 353. Examination of the percentages for the overlap period, 1956-55 for the smaller sample shows no substantial difference from the above data.

Changes in the diffusion of company behavior generally parallel changes in new dollar appropriations (Table 7), but there is some evidence of a lead in the former. (All changes specified in this section are on a year-to-year basis. For example, changes in 1954 refer to 1954-53 data, although this will not be spelled out.) The increase in new appropriations in I 1954 was followed by two quarters of losses. This corresponds to a decline in the number of companies reporting higher appropriations (from 48 per cent to 41 per cent) from I to III 1954.

In IV 1954, there was an increase in dollar appropriations, while the number of companies reporting higher appropriations rose sharply, foreshadowing a further rise in appropriations. In I 1955, dollar appropriations actually were substantially higher and the number of companies reporting higher appropriations increased from 49 to 59 per cent, the largest absolute gain in the series.

In II and III 1955, dollar appropriations increased substantially while the number of companies reporting higher appropriation levels rose modestly. Both series peaked in IV 1955. In the first half of 1956, the rate of increase in dollar appropriations slowed down. There was a small

decline in the number of companies registering increases in I 1956, and a much sharper decline in the second quarter. While dollar appropriations reached a peak in the first half of 1956, the number of companies lowering their rate of appropriations increased, a lead corresponding to a cyclical pattern discovered in the business cycle research of the National Bureau.

The first absolute declines in dollar appropriations occurring in III and IV 1956 were matched by a further fall in the number of companies reporting increases. The absence of dollar change in I 1957 was paralleled by stability in the number of companies reporting lower appropriations. However, the sharp dollar drop in II 1957 was accompanied by a decrease in the number of companies reporting higher appropriations. The appropriation declines in the balance of 1957 and early 1958 were matched by further deterioration in the percentage of companies with higher approvals.

The comparisons between year-to-year changes in dollar appropriations and the number of companies reporting higher or lower approvals also generally hold true for durables and nondurables. Of interest is the rise in the number of durables companies reporting higher appropriations in IV 1954 along with a reduction in the appropriation decline during that quarter. The spectacular increase in the dollar approvals in I 1955 was accompanied by a larger percentage of durables companies with higher levels, but the absolute increase in these percentages from III 1954 (37 per cent) to IV 1954 (53 per cent) was greater than the increase from then to I 1955 (63 per cent). The slowing down of the rate of the dollar increase during II 1956 was matched by a sharp reduction in the number of durables companies reporting higher levels.

Nondurables again complicate the analysis. In IV 1954 they reported a higher dollar rate of appropriations while the number of companies with higher appropriations declined. On the other hand, a modest increase in the I 1955 appropriations was accompanied by a sharp increase in the number of companies reporting higher approvals.

In the first half of 1956, nondurables followed the pattern of the durables group. In particular, the second-quarter drop in the number of companies with higher appropriations supported the thesis of the lead underlying the diffusion approach. The rebound in nondurables appropriations in I 1957 was matched by an increase in the number of companies with higher levels. Again, the sharp dollar drop in II 1957 paralleled the decline in the number of nondurables companies reporting higher approvals.

While the relationship between changes in the diffusion of company behavior and changes in total dollar appropriations needs more analysis, the evidence thus far tends to bear out the Mitchellian-based hypothesis of a lead in the former.[13]

[13] Thor Hultgren has demonstrated a similar hypothesis with profits data. See *Cyclical Diversities in the Fortunes of Industrial Corporations*, National Bureau of Economic Research, Occasional Paper 32, 1950, p. 12.

Cancellations

A feature of the appropriations survey is the separate information available on the cancellation of appropriations. In Table 9 cancellations are shown as a ratio of new appropriations. Although erratic, the course of the ratio is related to trends in new appropriations. For example, the trough in appropriations occurred in the first half of 1954, as did the peak in the cancellation ratio. The peak in new appropriations was reached in the first half of 1956, along with the trough in the cancellation ratio. Finally, the sharp cutback in appropriations in II 1957 was associated with a higher cancellation ratio. The further reductions in appropriations

TABLE 9

Ratio of Cancellations to New Appropriations, Manufacturing Groups, by Quarters, 1953-1958
(*per cent*)

	All Manufacturing	*Durables*	*Nondurables*
1953			
I	5.7	2.5	8.0
II	7.9	6.0	9.3
III	4.7	5.4	4.1
IV	8.4	7.6	9.1
1954			
I	9.3	14.5	6.6
II	7.1	8.8	6.0
III	6.5	6.2	6.7
IV	4.5	4.9	4.2
1955			
I	4.7	3.3	6.1
II	3.8	2.6	5.1
III	3.4	2.1	5.0
IV	2.9	3.0	2.7
1956			
I	2.7	2.0	3.4
II	3.3	2.8	3.9
III	5.7	5.9	5.5
IV	5.6	4.0	7.2
1957			
I	3.4	2.9	3.8
II	8.7	8.5	8.9
III	7.1	8.0	6.6
IV	13.9	10.3	16.3
1958			
I	22.9	26.3	21.3

Source: Based upon data shown in Tables 4, 5, and 6.

in late 1957 and early 1958 brought with them a peak in the cancellation ratio.

This matching of peaks and troughs in appropriations and cancellations also held for durables. Furthermore, the sharp drop in the III 1956 rate of appropriation approvals was paralleled by a rise in the cancellation ratio.

For nondurables, however, the low point in appropriations came in the middle quarters of 1954 while the peak in cancellations occurred in 1953. More recently, the rise in the cancellation ratio paralleled the IV 1956 drop in new appropriations. The further drop in appropriations in II 1957 was associated with a greater rise in the ratio.

Backlog Rates

A backlog rate shows how many quarters the appropriations backlog will last at the present rate of spending or commitment. Backlog rates for all manufacturing, durables, and nondurables, are shown in Table 10. Since a seasonally adjusted total backlog cannot be readily calculated, comparison is restricted to year-to-year changes.

Corresponding to the trough in appropriations and deep backlog losses, backlog rates showed large year-to-year declines in the first half of 1954. In the second half of 1954 these year-to-year losses disappeared. The backlog rate rose in succeeding quarters, reaching a peak, in terms of absolute advance over the year-ago quarter, in II 1956. By IV 1956, the backlog rate was below the same quarter of the previous year, and still further below II 1957.

The time shape of these developments for durables and nondurables differed slightly. The durables backlog rate rose during 1954 when compared to 1953, starting with the second quarter. The subsequent trend was generally the same as for all manufacturing.

For nondurables, the rise in appropriations began with IV 1954, but while backlogs were still lower than a year previously, the backlog rate was a shade over the 1953 level. However, with I 1955, the backlog rate evidenced a sharp gain over the 1954 figure. The trend since that time parallels that for durables and for the total. Thus we have an additional measure which can corroborate developments in capital goods expectations.

Forecasting and Analysis

The quarterly survey of capital appropriations is a multi-dimensional approach. The battery of statistical indicators provided by the survey strengthens the analysis of capital goods anticipations. When they all point in the same direction, the analyst can have increased confidence in his forecast.

TABLE 10

Appropriation Backlog Rates, Manufacturing Groups, By Quarters, 1953-1958

	All Manufacturing	*Durables*	*Nondurables*
1953			
I	3.9	4.2	3.6
II	3.1	3.3	2.8
III	3.0	3.4	2.6
IV	2.4	2.9	2.0
1954			
I	3.1	4.2	2.5
II	2.8	3.6	2.3
III	2.9	4.0	2.3
IV	2.6	3.2	2.2
1955			
I	3.6	4.2	3.1
II	3.1	3.7	2.5
III	3.4	4.3	2.7
IV	3.2	3.6	2.7
1956			
I	4.3	4.8	3.8
II	3.8	4.3	3.2
III	3.8	4.6	3.1
IV	2.9	3.2	2.5
1957			
I	4.1	4.4	3.7
II	3.4	3.8	3.0
III	3.2	3.6	2.8
IV	2.5	2.9	2.2
1958			
I	3.7	4.3	3.3

NOTE: Backlog rate is defined as the number of quarters of commitments or expenditures represented by outstanding appropriations at the end of the quarter. The underlying data are unadjusted and based upon reports from 500 companies for 1955-58, and reports by 353 companies for 1953-54 which were raised to the level of 1955-58 by the ratio between the two samples in 1955 for appropriations, committed or spent, and backlogs, respectively.

In our continuing commentary in the *Conference Board Business Record*, we can compare simultaneously changes in new appropriations with changes in profits, profit margins, and liquidity. Such interrelationships can be traced on a quarterly basis. One major step forward in our analysis of this new body of data is to make such simultaneous comparisons on a formal statistical basis, through correlation and other techniques. We also plan to do this on a company basis. With over 7,500 quarterly observations

at hand, many hypotheses can be tested relating the decision to spend with other variables.

The quarterly survey of capital appropriations is a short-run forecasting tool. The backlog rates suggest that, *on the average*, the formal planning period is about one year. For some industries, such as iron and steel, electrical machinery, and chemicals, it may be a year and a half. There are instances in which companies have long-range budgets running as far ahead as twenty years. But the appropriations survey suggests that these long-range budgets are merely guides to thinking.

As an indicator of prospective short-run trends in plant and equipment spending, the appropriations survey foreshadowed the 1955-56 capital spending boom. It provided the first quantitative indication of a leveling off in 1957 outlays, and the capital spending decline in 1958.

The series on appropriation approvals, and the ancillary measures contribute to a richer understanding of the flow of capital spending dollars. It may help us to discover whether, in a downturn, a decline in business investment takes the form of cancellations of existing projects, stretching out of existing appropriations, a sharp drop in newly approved capital appropriations, or a combination of all three. The evidence for 1953-54, however, does not reveal any mass cancellation. The drop in new appropriations was mostly moderate, and backlogs declined even more than appropriations. In view of the relatively mild decline in capital spending during this period, these developments are not surprising. With a more severe cycle, the role of these factors may become clearer.

The survey is not intended to supersede the surveys of capital spending budgets; they are companion measures with differing perspectives. For the short-term forecast which goes beyond the end of the calendar year, the appropriations data provide the first clue to prospective changes in manufacturers' spending for plant and equipment. In addition, this new series may disclose changes in direction in spending decisions during the year which are not clear from expected expenditure figures.

COMMENT

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Undoubtedly the National Industrial Conference Board's capital appropriation series represents a substantial addition to the available information on anticipations. It increases our knowledge of the time pattern of the capital budgeting process and should enable us to improve predictions of future capital spending patterns. Furthermore, the information on cancellations of capital appropriations and the extent of the appropriations backlog should provide information about how the capital budgeting process may change at different stages of the business cycle and under various external business conditions. Certainly, the first results

are most hopeful and suggestive. It is possible, however, to be overly optimistic about how much additional information on investment decisions the appropriations series will provide. Information on appropriations will add mainly to our knowledge of short-run reversals or changes in investment policies. It will provide little new knowledge of exogenous or longer-run investment determinants. Moreover, the appropriations series does not eliminate other serious data deficiencies that now impede investment studies based on time periods of less than one year.

The predictions obtained from anticipations data also would seem susceptible to improvement. A principal concern of this conference was, in fact, trying to improve predictions based on anticipations data by placing these predictions in a conditional format; that is, by trying to specify in advance the correct eventual value of explanatory variables other than anticipations.[1] The obvious next step in utilizing conditional estimation procedures is to "close" the system by specifying those functions that relate the future endogenous values not only to one another but also to predetermined variables that are either exogenous or present values of endogenous variables. This would remove in effect the restraints or limitations on the conditional predictions.

Full specification of the economic structure in this fashion is the correct formal, or ultimate objective. However, the record to date indicates that empirical realization of the objective is extremely difficult. When predictions obtained from fully specified economic models are compared with ones obtained from simple (e.g. one equation, least squares estimated) models, the latter as often as not yield superior predictions. The basic rationale of the simple approach is to discover as many regularities as possible in previous economic behavior and then to assume that these regularities persist into the future.

A similar reliance on established regularities could be used to improve the unconditional forecasts[2] with which anticipations surveys are usually concerned. The regularities could be well established empirical generalizations discovered by methods other than surveys, or additional discoveries made by analyzing the data generated as part of the survey procedure.

The basic analytical problem in utilizing the results of any survey is the proper weighting of the responses. As a rule, two-stage weighting

[1] Examples of this viewpoint will be found in Arthur Okun's paper in this volume; see also Franco Modigliani and H. M. Weingartner, "Forecasting Uses of Anticipatory Data on Investment and Sales," *Quarterly Journal of Economics*, February 1958; and James Tobin, "On the Predictive Value of Consumer Intentions and Attitudes," *Review of Economics and Statistics*, February 1959.

Suggestions on how to improve unconditional predictions similar in some ways to mine will be found in the papers by Robert A. Levine, Eva L. Mueller, George Katona, and Murray F. Foss and Vito Natrella, also in this volume.

[2] An unconditional forecast will be defined as one that ignores (or at least minimizes the importance of) interactions occurring between predicted variables and other variables during the prediction period that modify the predicted values.

procedures are used. First, a simple unitary weighting of the individual responses is employed to obtain the sums within specified sample groups. (By group is meant an industry, product group, income class, or similar category.) Next, the simple sums of sample results usually are "blown up" according to some ratio relationship.

This scheme might be improved by modifying unitary weighting to take into account any historical reportorial biases. Firms that consistently underestimate should be appropriately marked up and firms that consistently overestimate should be marked down.[3] The implicit assumption of traditional weighting procedures is that errors of estimate cancel out. However, experience suggests that there is more underestimation than overestimation. Illustrative of this is the tendency of survey aggregates to be underestimates of actual developments on cyclical upswings and to be reasonably accurate on downswings.[4] On the downswing, the underestimation apparently is eliminated by the revision of plans as the extent of the decline becomes better known. One possible explanation of consistent individual differences in response patterns is the wish to provide for contingencies. Cohen notes that "capital appropriations may contain an allowance for overstatement and understatement, such as plus or minus 10 per cent." Other circumstances that might bear on the question of bias are whether or not the report is based on solid, well established capital budgeting procedures; whether the report is completed by one who is high or one who is low in the managerial hierarchy; and whether the report is completed early or late in a firm's budget preparation period.

The ratio markup of sample results can also be performed too casually. For example, no allowance usually is made for differences in investment patterns for different size firms at different points in the business cycle. Such an approach discards available information. As a rule, the small firms' percentage of total investment in an industry falls in a recession. This suggests that it might be useful to stratify firms by size within industry groups,[5] as is done, for example, in the SEC–Commerce survey.

[3] Such a weighting for consistent reportorial bias would appear to be equivalent to the γ term in Levine's equation 2.

[4] Modigliani and Weingartner think that much of this underestimation on the upswing is attributable to the failure of business planners to allow for future price increases. They present some reasonably convincing empirical evidence to this effect (Tables 1-A and 1-B). However, two objections to their conclusion and findings might be offered. (1) The rather long delay that often occurs between the actual ordering of materials and equipment and the recording of such acquisitions suggests that the records should be corrected by a price index that is a weighted average of previous prices rather than a current value index as used by Modigliani and Weingartner. The use of a "distributed lag" index would reduce the amount of reduction effectuated by price deflation of the investment values in inflationary periods. (2) There is good evidence that business planners often make a contingency allowance for price increases in times of inflation, so price deflation again would understate the final results. Still, it seems highly probable that price changes account for some inaccuracies in investment anticipations.

[5] If industry groups are stratified according to exhibited differences in investment

However, survey samples often have very little or no coverage of smaller firms.[6] This is clearly the case, for example, with the NICB survey. Consequently, the relationship between the firms included and excluded from the survey is likely to change with the business cycle and the final adjustment between the sample and total groups should take this into account.

Available information about interdependencies within the economic system also might be used to improve the adjustment between the survey and overall totals. Although the firms not included in the basic surveys are usually small, Cohen points out that "satellite and other lesser companies often gear their investment programs to those of major companies." Again the question arises of why this information shouldn't be used to obtain better forecasts. The plans of some small and medium-sized firms are probably more closely related to those of some large firms than to others. For example, the capital equipment needs of small automobile parts producers in the transportation equipment industry are probably more closely tied to the investment plans of large automobile parts producers than they are to the plans of large rail equipment and aircraft producers. This suggests a modified input-output approach in marking up sample totals to industry totals.

Unfortunately, any effort to apply these suggested improvements to the NICB estimates will encounter special problems. The greatest weakness of the appropriation series is its lack of time dimension without which it is impossible to predict actual capital outlays in some future period. The cancellation series provides a partial solution to this problem but it is questionable how complete that series is.

What is needed, of course, is a determination of the lead time between the making of an appropriation and the actual outlay. In other words, it is necessary to find the distributed lag function relating capital outlays to lagged appropriations. Of course, other variables—like material shortages, money market conditions, changes in expectations—may influence this relationship and must be taken into account. In addition to this econometric or statistical approach, respondent firms should be asked to estimate, to the best of their ability, the time that elapses between appropriation and outlay. At a minimum, these responses would provide a check on the results obtained from the more formal statistical procedures.

A special type of weighting problem, seasonal adjustment, arises when

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patterns, the differences would be reflected in the industry total. Without such stratification, the industry totals are likely to be biased, the extent of the bias depending on how similar the year chosen for determining the ratio benchmark is to the year to be estimated.

[6] The greater variability of small firm investment plans raises serious questions about the legitimacy of the much heavier weighting given large firms in most survey samples. The basic tenet of stratified sampling is that sample size in a stratum should increase both with the stratum's variance and its importance in the total to be estimated.

time periods of less than a year are employed, as they are in the NICB study. Cohen notes that appropriations data apparently have a different seasonal pattern than investment outlays. There are no special problems created by these differences if the two seasonals are reasonably stable. However, there are signs in the NICB data that the seasonality in the appropriations series has been changing, and rather drastically, in the last few years. The evidence can be found by inspecting Tables 4, 5, and 6. Such changes are not too surprising since capital budgeting procedures, like most new techniques, are being rapidly improved. Those compiling questionnaire responses based on these procedures therefore must be especially alert.

There are, in sum, substantive and difficult problems to be solved before the full potential of the NICB appropriations survey, or any other survey, can be fully utilized. The most promising source of improvement would appear to be the integration of established empirical regularities into the estimation procedure. Such an integration would also illustrate the basic complementarity between the survey technique and other empirical methods in economics.