Industrial Production and Investment in Pakistan

by

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Development in Pakistan so far has been largely sustained by a rapidly growing industrial sector. From 1953 to 1960, the index for manufacturing has grown more rapidly in Pakistan than in any other country for which United-Nations statistics are published, except Japan. Admittedly, the reliability of such comparisons is limited and the high rate of Pakistan's industrial growth is partly a function of the low initial level of industrial development—if you start at zero, any increase means an infinite rate. But the United-Nations index starts in the middle 1950's when Pakistan already had a respectable industrial sector and the statistics are sufficiently reliable so one can say with some confidence that Pakistan had a rate of industrial growth matched by few countries in the recent past.

A reasonably accurate measure of the growth in industrial production and investment in Pakistan is, therefore, of particular importance to economic analysis, policy formulation, or planning. The dynamism of the industrial sector has been due to what is called " large scale industry ". No reasonably reliable information exists on value added in "small scale industry", but various official and unofficial guesses on its growth rate have ranged from a decline to a 3.5-per-cent annual increase. There would be near-universal agreement that "large scale industry" has grown much more rapidly than "small scale". The Survey, discussed later in this paper, confirms this conclusion. From 1947 to 1959, the value added by firms with assets of less than one million rupees increased only five-fold, while that added by larger firms increased more than fifteen times.

So called "large scale" industry includes many small units. It is defined by the Central Statistical Office as including any unit using power and employing more than twenty workers on any day in the year. In fact, it includes a large number of firms that report fewer workers—perhaps they had twenty workers in some earlier year—though the value added by these firms is small. "Small scale industry", therefore, includes mainly handicrafts, workshops, village units processing agricultural products and handlooms. This paper is concerned with "large scale" industry.

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The Survey

For this part of Pakistan's industry, information on value added and investment can be derived from a survey carried out in 1960 and 1961 by the author[1]. These data can then be compared with similar information published by the Central Statistical Office (CSO) and the Planning Commission.

For the purposes of the Survey, lengthy interviews were held with a stratified random sample of 255 industrialists. The universe comprised all firms covered by the 1958 Census of Manufacturing Industry (CMI) of the Central Statistical Office. The 3,170 firms in that universe were stratified according to their location (East Pakistan, West Pakistan, or Karachi), their industry (using the 72 industry classification of the CSO) and their size (20-99 workers, 100-249 workers, 250-499 workers, 500 and-up workers). From each cell defined by these three characteristics, a random sample of firms was taken. Normally, 100 per cent of the largest category of firms was included in the sample, and 67 per cent, 20 per cent, and 3 per cent of the categories with progressively smaller firms. The only exception was industries that included 10 per cent or more of all the firms in a particular area and size category (*e.g.*, cotton-textile mills of the largest size in Karachi, or jute and match factories of the largest size in East Pakistan). In that case, the sample percentage was reduced.

The sample firms selected on this basis turned out to include firms in a variety of locations all over Pakistan and in most industries that are of significance to Pakistan. There were 294 firms in the original sample. Of these, information on 10 government-owned firms (mostly small railway workshops) was received too late to be included in the data that was processed. However, a check against the processed data indicated that the inclusion of these, generally small, government enterprises would have made little difference to final results, since they were similar to firms in the sample in the same industries. Another three firms were dropped as not belonging in a survey of manufacturing industry (electricity production and petroleum refining). Thirteen units listed as separate

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[1] The survey was carried out as part of a larger study on the role of government and private enterprise in economic development, supported by the Ford Foundation. The US Department of State made available rupee funds which made it possible to expand the scope of the survey and the size of the sample.

A number of people share the credit for this Survey, but three need to be mentioned specifically. Dr. A. Farouk of Dacca University carried out about one-third of the interviews in East Pakistan and Karachi. Dr. S. A. Abbas of the University of the Panjab covered about the same proportion in West Pakistan. The remaining third were done by the author. Mr. A. Rab of the Pakistan Institute of Development Economics did most of the preparatory work and of the coding.

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firms turned out to be parts of another firm (*e.g.*, individual tea factories operated by the same company), and the resulting amalgamation reduced the number of sample firms.

Of the 268 firms remaining in the original sample, all but 15 were interviewed. One of these had gone out of existence and one could not be located and may have been bogus. Reserve firms, with the same characteristics, were substituted for these two firms. Thirteen firms could not be interviewed. One printing press refused cooperation. Ten rice mills or cotton gins were closed down because it was out of season. They often had no regular owner, but had been Hindu-owned and were rented on a yearly basis from the government agency controlling them. The owners of a few could not be located. The other two were workshops. All of the 13 firms left out were small and the value added by the processes involved would be very limited. In all cases, there were several firms in the same categories in the sample. In short, nonresponse was not a serious problem.

Since it was unheard of in the 1950's for an industrial firm to go out of business and very few changed hands, the Survey results are not biased in earlier years by covering only firms in existence in 1958.

Interviews included a number of questions which permitted a check for internal consistency. The schedules were also checked against each other (for instance, whether one textile mill reported implicit wage rates that were twice those of others) and against two to four other sources of information.

To derive figures for the universe, the data for each sample firm were multiplied by the reciprocal of the percentage it represented of the number of firms in the same cell. For example, if there were ten textile mills of the largest category in Karachi and five of these were included in the sample that was interviewed, the value added of these five firms would be doubled to obtain value added by large textile mills in Karachi.

Since the sample included a very high proportion of large units and a very low proportion of the smaller units, the Survey included firms producing nearly three-fifths of the value added in all of Pakistan large-scale industry, as reported to the Census of Manufacturing Industries (CMI).

TABLE I

CMI AND SAMPLE SURVEY COVERAGE[2]

	1958 CMI	Sample Survey	Sample as per cent of CMI
Number of firms	3,170	255	8
Value added (*crore rupees*)	123	71	58

Survey Estimates of Value Added

Sample firms were asked for their sales for all years that they were in production. For 1958, details on costs and returns were also obtained. Value added in 1958 was calculated from the latter data. For each firm, the value added in 1958 was calculated as a percentage of 1958 sales. The same percentage was applied to reported sales for other years to obtain value added. Obviously, this procedure introduces possible error. If the value added as a proportion of sales changed over time, for instance because of changes in profit rates, taxes, wage rates, or technology, the estimate of value added for years other than 1958 would be inaccurate. Technology of particular firms has changed little over the decade or so that most firms have been in existence [1]. Wages have changed little [2]. Tax rates have increased and profit rates have come down [1]. Both have also fluctuated from year to year as prices of inputs and outputs often did not move together. Clearly, the possibility that value added as a percentage of sales proceeds changed over time could be a source of error in the Survey results.

Note, however, that this percentage was calculated separately for each firm. The procedure, therefore, does not introduce error if the mix of industries changes, or if the technology of firms established in one period differs from the technology of firms established in other periods. For the five CMI's available, value added as a proportion of sales varied only between 32 per cent and 36 per cent, suggesting that the relationship is quite stable.

Survey estimates of value added are at market prices. They include excise and sales taxes paid by the industrial firm as well as labour costs, profits, depreciation charges, income and profits taxes, management fees and interest charges.

[2] For the benefit of readers unfamiliar with subcontinental usage, it may be useful to point out that a lakh is a unit of 100,000, and that a crore is a unit of 10,000,000. Commas are differently placed, accordingly. Thus, a number which would be written in Western Europe as 170,200,000 may be written in the subcontinent, and in this *Review*, as 17,02,00,000, and be read "seventeen crores, two lakhs". One crore of rupees is the equivalent of $ 2.1 million.

The Survey, like other sources of information on Pakistan industry, does not cover all industrial firms. A substantial number of firms do not report to the CMI and were not included in the universe for the Survey. An adjustment needs to be made to take account of this underreporting.

The CSO obtained information in 1959/60 from all firms that were registered under the Factories Act and had failed to report to the CMI. On the basis of this information, the CSO estimated the extent of underreporting in the CMI at 7 per cent of value added, 6 per cent for West Pakistan and 9 per cent for East Pakistan. Since the Survey is based on the firms reporting to the CMI, (though in 1958), the same percentage for underreporting has been assumed for it also. A check on the CSO estimate of underreporting is discussed in Appendix A. If the universe from which the sample was drawn excludes firms with 7 per cent of value added in one year, one can assume that the same percentage was omitted in other years as well. In other words, the assumption is that the firms not included in the universe and not covered by the sample increased their output at the same rate over the years 1947 to 1959 as the sample firms.

A further adjustment needs to be made in the Survey. The value added in 1959 is understated, since firms that came into operation in 1958 and 1959 were not included in the sample. About 200 new factories were registered between 1958 and 1959. This figure is consistent with changes between 1958 and 1959 in the firms reporting to the CMI. However, most of these firms would produce at a fraction of capacity in their first year. If it is assumed that these firms would eventually average the same value added per firm as those operating in 1958, but that they produced at only 40 per cent of their eventual production in their first year, the underestimation due to their exclusion would be four crores[3]. This has been added to the value-added figure for 1959.

Using the adjusted value-added figure from the Survey for 1959 as a base, a special revision by A. Bergan of the Index of Industrial Production of the CSO has been used to estimate value added for 1959/60 to 1963/64. The index is in constant prices. The CSO wholesale-price index for manufactures has been used to estimate current prices for these years[4].

Industrial value-added needs to be estimated in constant prices for many purposes. The current-price figures from the Survey for 1951/52 to 1959/60 have been adjusted by the use of a wholesale-price index for manufactured goods prepared by W. Tims (*see*, Appendix C). This index uses the wholesale prices

[3] Two hundred excluded new firms is 6.3 per cent of the 3,200 firms in the universe. 6.3 per cent of the 165 crores of value added is 10.4 crores. Forty per cent of this is four crores.

[4] All the calculations are shown in Appendix B.

and weights given for manufactured goods in the index prepared by the Pakistan Institute of Development Economics. No suitable price data seem to be available for the period before 1951/52. In any case, the total value added by industry during this early period is not very large and price adjustments would make relatively little difference. What little information exists from the cost of living index, (for clothing, footwear and miscellaneous) does not suggest any clear price trends for domestically produced manufactures before 1951/52. Therefore, the 1951/52 prices index has been used for earlier years.

Adjusted Survey results for value added can now be summarized.

TABLE II

SURVEY ESTIMATES OF VALUE ADDED

Current prices[a]		Current prices, on split years[b]		Price Index[c]	Constant prices[d] (split years) (1959/60 = 100)
	(*crores of rupees*)		(*crores of rupees*)		(*crores of rupees*)
1947	15	1947/48	17	93.0	18
1948	18	1948/49	21	93.0	23
1949	24	1949/50	28	93.0	30
1950	32	1950/51	38	93.0	41
1951	44	1951/52	50	93.0	54
1952	56	1952/53	63	96.0	66
1953	71	1953/54	81	101.0	80
1954	92	1954/55	98	89.0	110
1955	104	1955/56	113	88.0	128
1956	123	1956/57	131	92.0	143
1957	139	1957/58	145	92.0	158
1958	152	1958/59	166	91.0	183
1959	181	1959/60*	192	100.0	192
		1960/61*	216	101.5	215
		1961/62*	247	102.5	244
		1962/63*	277	105.0	267
		1963/64*	346	106.0	328

Note:
*1959/60 onwards represents the growth rate of A. Bergan's index applied to the 1959-Survey results.

Sources:
a) *See*, Appendix B.
b) Average of two adjoining years. For 1960/61 onwards derived from constant price figures, by use of price index.
c) *See*, Appendix C.
d) Up to 1958/59 from *b*) and *c*). For 1960/61 onwards, *see*, Appendix B.

Comparison of Survey and Other Data for Value Added

Basic data for other estimates of value added have come from the Census of Manufacturing Industries (CMI), which has been published almost every

year since 1953. The earlier years suffered greatly from underreporting and the failure of reporting firms to take the whole procedure seriously. (One industrialist said that he had a clerk fill in the forms, with instructions to increase all figures each year by ten per cent over the previous year.) Both difficulties had been reduced, though by no means eliminated, by the 1959/60 Census. The CSO now uses the 1959/60 Census as a base, and estimates value added in other years by applying the index of industrial production to it. The first step in any comparison, therefore, is to compare the Survey results and the 1959/60 Census. Since earlier CMIs are less reliable and are not being used by the CSO itself for the national accounts, a comparison with other years would be of less value.

There are several differences between the two estimates. As already noted, the Survey includes in value added the sales and excise taxes paid. The CMI "as far as possible" excludes these taxes. In fact, they sometimes are included by reporting firms, though by 1959/60 the confusion seems to have been largely eliminated. *Second,* the reports made to the CMI by industrial firms did not include such costs as "maintenance and repair charges, advertisement and legal charges" and other selling, office (telephone, postage), and transport costs. These costs could not be deducted from gross value added, and it was, therefore, overstated. In its latest 1959/60 estimates, the CSO has made an arbitrary 5 per cent deduction from value added for these miscellaneous charges. The Survey attempted to take account of these costs specifically and separately, though it could not always do so. *Third,* the Survey includes railway workshops and similar government enterprises (but not defence establishments), which are excluded from CMI. The Survey also includes tea factories (not gardens), although these are fully included in the CMI only in some years[5].

The Survey showed excise and sales taxes of thirty crores in 1958[6]. For 1959/60, these taxes are estimated at thirty-six crores, by calculating them at the same proportion of total sales and exicse taxes as in 1958. If estimated indirect taxes are subtracted from the Survey estimate for 1959/60 (192 crores), the Survey estimate for value added at factor costs of 156 crores is practically

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5 *E.g.*, in 1954 and 1955 over 100 units are listed, subsequently only six or seven.

6 This estimate is about nine crores smaller than the figure given by Lewis and Qureshi in another article in this journal. The Survey excludes smaller salt works (about 1.5 crores of taxes), processing of tobacco and cigars (about 6.5 crores of taxes), and petroleum refining (about 3.5 crores). If these are subtracted from the Lewis-Qureshi data, the Survey actually shows excise and sales-tax payments by the manufacturing sector that are about 2.5 crores larger than collections by the Central Board of Revenue. This difference may well be due to overstatement in the Survey, or time lag between the record of payment and of collection, or both.

identical with the CSO estimate of 157 crores[7]. The two estimates are so close that it should make one suspicious. In fact, there are two balancing discrepancies which account for it. According to the Survey, the deduction for various minor expenses should not have been eight crores (that is the 5 per cent used by CSO), but thirteen crores. The full deductions of these minor expenses by the Survey has been balanced by the inclusion of railway and similar workshops.

The identity of the two estimates is accidental, but they are remarkably close, even if the above two adjustments are taken into account. This adds somewhat to one's confidence in both sets of estimates. Since earlier CMIs are much less reliable than that of 1959/60, the Survey results may be particularly useful for the earlier years. Even for 1959/60, the Survey has the advantage that it specifically covered various miscellaneous costs.

Since the CSO considers the production index more reliable than the CMI, it will be useful to compare an index derived from the Survey with the production index. To be comparable, the Survey index has to be in constant prices.

For most years the two indices are remarkably close together, the difference being less than 10 per cent. The major discrepancies can be readily explained. The production index is based on reports for a few industries only. In the old index, which covered the period to 1959/60, the contribution of each industry was weighted by the value added in the 1954 Census of Manufacturing Industries. Cotton textiles contributed almost 40 per cent of value added in that year. This industry, and several others represented and heavily weighted in the index (cigarettes, paper, hydrogenated vegetable oil, matches) grew especially rapidly in the middle 1950's. Other industries, given little or no weight in the index (chemicals, metal working, machinery) grew more slowly than industry as a whole. Thus, the index, based primarily on the rapidly growing industries, especially cotton textiles, had an upward bias in the middle 1950's. The 1954 weighting had the opposite effect subsequently, as growth in textiles slowed down and the industries not represented in the index grew more rapidly. The Interim Revised Index corrected this downward bias to some extent, but not adequately. (*see*, [3]). Since the index derived from the Survey is not based on a few industries only, this particular problem of weighting bias was avoided and the two series diverge in some years.

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[7] The CMI itself reports 154 crores. This was adjusted upward by 7 per cent to take account of underreporting and downward by 5 per cent to take account of miscellaneous unreported costs.

TABLE III

CSO PRODUCTION INDEX AND SURVEY RESULTS FOR MANUFACTURING

Year	Index of Survey* value added in constant prices (1959/60 = 100)[a]	CSO index of production (1959/60 = 100)[b]
1947/48	9	
1948/49	12	
1949/50	16	
1950/51	21	22
1951/52	28	28
1952/53	34	36
1953/54	42	47
1954/55	57	61
1955/56	67	73
1956/57	74	80
1957/58	82	84
1958/59	95	92
1959/60*	100	100
1960/61	112	107**
1961/62	127	119**
1962/63	139	133**
1963/64	171	157**

Notes :
*From 1959/60 on figures are derived from the A. Bergan index, not the Survey.
**1959/60 onwards: Interim Revised Index.

Sources :
a) Index of value added data from Table II.
b) CSO, *Statistical Bulletin* (monthly). The index to 1959/60 is the old index, arithmetically changed to 1959/60=100. Average of adjoining calendar years taken for split year.

Conclusion: The close correspondence between CSO and Survey estimates, both for value added in 1959/60 and for the rate of increase in earlier years, somewhat increases confidence in both estimates. The degree of undercoverage of both and the extent to which both suffer from mis-statements due to ignorance or deceit can, of course, not be determined. The CSO estimates also have some

bias due to constant weights and involve a guess on minor expenses. On both counts, the Survey should be more reliable.

Survey Estimates of Investment

The Survey data are for assets, at cost. Assets include not only fixed and working capital (stocks of raw materials, finished and semi-finished goods, cash, receivables), but also reserves of various kinds (for taxes, for depreciation, and general reserves), plus investment in other units which are part of the assets of a particular industrial unit. The latter amount is small, but reserves of various kinds amounted to seventy-eight crores or about 15 per cent of total assets in 1958, according to the Survey. However, some of these reserves were in fact used as working capital. The remaining reserves, given by the difference between total capital at cost and assets in 1958 was twenty-three crores. This part of the reserves (largely cash or short-term securities held until foreign exchange becomes available for investment) needs to be subtracted from asset figures to obtain actual capital employed in industry.

No good basis exists for distributing the accumulation of reserves over time. One can guess that it occurred principally in years when imports of machinery were sharply restricted while profits in industry were high. The Planning Commission has published estimates on machinery available to the private sector by years from 1951/52 onward, before import restrictions became serious. By assuming that reserves were largely accumulated in years when the difference was greatest between the accumulation of assets and the availability of machinery, the reserves can be roughly allocated to different years (*see*, Appendix D).

A special adjustment in the Survey figures is necessary for 1959. Investment in that year is greatly underestimated, because only firms in operation in 1958 are included in the sample. Even in 1958 and earlier years, there is some understatement, as significant investment begins one to three, or even four, years before a factory starts production. On the basis of average investment per factory in 1958, adjustments can be made for this understatement for 1959 and earlier years (*see*, Appendix D). It must be recognized, however, that the Survey results for 1959 are much less reliable than for earlier years. Finally, a 7-per-cent increase for underreporting needs to be made in the investment, as well as value-added data. The reasons for this have been discussed previously.

It is obviously desirable for many purposes to estimate investment in constant prices. To construct a suitable price index is particularly difficult. Prices of investment can move quite differently from other prices and a general wholesale-price index, for instance, would not be suitable to deflate investment in current prices.

TABLE V

SURVEY ESTIMATES OF INVESTMENT AND CAPITAL STOCK (GROSS)

Year	Current prices[a]	Year	Current prices[b]	Constant prices[c] (1959/60)	Capital stock in constant prices[d]
	(crore rupees)		(.....*in crore rupees*.....)		
1947	62	1947/48	67	89	89
1948	+ 9	1948/49	+ 13	+ 18	107
1949	+ 17	1949/50	+ 18	+ 24	131
1950	+ 19	1950/51	+ 23	+ 30	161
1951	+ 28	1951/52	+ 34	+ 44	205
1952	+ 39	1952/53	+ 38	+ 47	252
1953	+ 37	1953/54	+ 58	+ 72	324
1954	+ 80	1954/55	+ 74	+ 96	420
1955	+ 67	1955/56	+ 55	+ 65	485
1956	+ 44	1956/57	+ 45	+ 50	535
1957	+ 46	1957/58	+ 55	+ 59	594
1958	+ 63	1958/59	+ 60	+ 63	657
1959	+ 57				
Capital stock	568		540	657	657

Note: 1947 and 1947/48 figures are capital stock in all cases.

Source: *a*) *See*, Appendix D.

b) Average of two adjoining years.

c) Deflated by price index from Table IV.

shows depreciated capital as 366 crores in 1958, while the CMI shows it to be 302 crores in that year. However, working capital other than stocks (*e.g.*,

bank balances) are not included in the CMI and are estimated at sixty-one crores in the Survey. The Survey and CMI estimates for book value are, therefore, extremely close in that year. Changes between different CMIs for different years bear no relation to Survey investment-estimates. This is not surprising, since the changes in the year-to-year CMI figures are the net of new investment on the one hand and depreciation on total capital stock on the other, with depreciation fluctuating erratically as the law changes.

Another set of industrial investment estimates is derived by Mahbubul Haq[6] from Planning-Commission data[7]. While Haq gives figures for 1949/50 to 1959/60, the first two and the last of these years involve straight extrapolation. The assumption is that these years did not differ too much from the years that followed or preceded them respectively. However, the Survey suggests that in 1949 to 1951 investment was considerably lower than in 1952. According to the Survey, annual investment nearly doubled between 1949/50 and 1951/52, while Haq extrapolates investment at only 15 per cent less in the earlier year. The extrapolated data is best ignored, therefore, in any comparison.

By some heroic manipulation, (*see*, Appendix F), dangerous with essentially fragile data, the Haq estimates for the remaining years can be made comparable with Survey figures in current prices.

TABLE VI

COMPARISON OF SURVEY AND HAQ ESTIMATES OF INVESTMENT

current prices

Year	Survey[a]		Haq[b]	
	Annual	Average	Annual	Average
	(.....*in crore rupees*.....)			
1951/52	34		44	
1952/53	38	43	52	51
1953/54	58		57	
1954/55	74		64	
1955/56	55	58	75	69
1956/57	45		69	
1957/58	55		70	
1958/59	60	57.5	63	66.5

Sources: *a*) From Table V.
b) Appendix F.

There are at least four possible reasons for the consistently higher figures in the Haq estimates:

1) Haq's estimate includes all industry, while the Survey includes only so-called large-scale industry. Investment by units with fewer than twenty workers or not using power would account for some part of the discrepancy, though it is hard to say how much. The Second Plan estimates private investment in small-scale industry at twenty-five crores over five years. If this is anywhere near the mark and if similar investment took place in other years, the inclusion of investment in small-scale industry in Haq's figures would explain about half of the difference with the Survey figures.

2) The estimate of total investment was divided by Haq into investment in industry, transport and construction. But the total, as a result of its derivation from available investment goods, includes investment in such other fields as agriculture, trade and services. If this investment had been subtracted from totals, the share of industry would have been smaller.

3) The share of industrial investment in total private investment had to be a guess. From the basic data, it is not possible to distinguish, for instance, whether cement and steel was used for industrial construction or other construction. Investment in nonindustrial construction may be underestimated, and that in industry overestimated.

4) The Haq/Planning Commission estimates are derived from an estimate of total available imported and domestically produced investment goods, from which the investment goods used by government are subtracted. It is quite possible that investment goods used by the public sector have been underestimated and private investment, therefore, overestimated.

The Haq/Planning Commission figures are also quite different from the Survey figures if a year-by-year comparison is made. This might be expected. Since the former are a multiple of investment goods available, investment is recorded in the year in which customs authorities record the arrival of the goods or the CMI records their production. The Survey records the investment at the time an asset is actually acquired by an industrialist. The timing of these two actions may well differ.

The yearly investment figures, from either source, have little validity. The averages for several clearly marked periods are similar in both estimates, and should be more reliable. Until 1951 industrial investment was small, but increasing rapidly. 1952 saw a larger increase as trade profits and foreign-exchange earnings from the Korean boom were invested. The real spurt came later—1954 and 1955 in the Survey and 1954/55 to 1957/58 in the Haq estimates—as sharply reduced imports made industrial investment highly profitable.

Conclusion: The reasonable similarity in pattern and the plausibility of the reasons advanced for a possible overstatement in the Haq figures give some support to the Survey results. They undoubtedly have a large margin of error, but they may have validity as indications of overall magnitudes.

Falsification and Ignorance

A number of uncertainties about the Survey results and other estimates of value added and investment have already been discussed. In addition, both sets of estimates suffer from what is elegantly called bias and more accurately called cheating.

Investment figures are sometimes deliberately overestimated. In the first place, exaggerating the cost of capital-goods imports gives the individual importer extra foreign exchange that can be banked abroad or sold on the black market. *Second,* an overstatement of total capital costs greatly reduces taxes, since it increases the amount of depreciation that can be charged. *Third,* if stock in the firm is sold at a later time, an overstatement can result in greater proceeds. For all these reasons, industrialists have mentioned overstatements that on occasion were equal to 50 per cent of real cost. (Naturally, they were reporting purported overstatements by others).

On the other hand, output and, therefore, value added, are sometimes understated. A large proportion of industrial output in Pakistan is subject to high excise and sales taxes and avoiding these taxes is very profitable. Some tax inspectors may prefer that something like one quarter of the potential tax be paid to them personally, rather than that the full tax be paid to the government. Underreporting also reduces profit and income taxes.

Both overstatement of investment and understatement of output have their limits. Obviously, these limits cannot easily be estimated. All one can say is that as a result of deliberate bias, output is probably somewhat larger and investment somewhat smaller than shown by the statistics.

The estimates also suffer from ignorance about some facts by those who supply the data originally. The original investment at cost is usually not known when firms have changed hands, at Partition or later. For some firms, especially small ones, only the vaguest notion exists of the value of inventories. In some firms, accounting is nonexistent and various costs are known only in general terms.

In short, if one adds to the inaccuracies inherent in the process of data collection, the ignorance of some of the sources of the data, and their deliberate falsification, one has to reach the conclusion that the resulting estimates are not exactly models of accuracy.

Estimates based on partial Survey results or involving further manipulation of these results should be particularly suspect. This additional caveat applies to capital-output ratios and regional estimates.

Capital-Output Ratios

Capital-output ratio calculations have a wider margin of error than the two basic series, both because ratios are always subject to greater error than either of their components and because the biases in the two series re-enforce each other. This should be kept in mind in using the capital-output ratios given below. It must also be remembered that this ratio is greatly affected by below-capacity operation of existing investment. Since operation far below capacity has been dictated by inadequate raw-material imports, as well as other factors, and the supply of imported goods has changed from time to time, industrial capital-output ratios are of very limited use in predicting output from planned investment.

In this case, the biases in responses on investment and output are presumably systematic and affect all years, especially after foreign-exchange restrictions were imposed in 1951/52. The shortcomings in the basic data, particularly the price indices, introduce an erratic element of unknown direction and extent. Despite this, the average capital-output ratio calculated from Survey estimates is remarkably consistent, if capital and value added in the same year are compared. In the early years, the ratio is naturally high, as output from the large capital stock in place was disrupted by the effects of Partition. It steadily declines, thereafter to 1951/52 as these effects are overcome. This is the year of maximum imports, when none of the installed investment needed to remain idle for lack of imported raw materials and spares. The ratio then rises to 1953/54. As imports of raw materials dropped sharply over this two-year period and investment continued to increase rapidly, idle capacity was bound to increase. After that it remained essentially at 3.7.

TABLE VII

AVERAGE CAPITAL-OUTPUT RATIOS FROM SURVEY

(Constant prices: same year ratio)

year	Ratio of value added to capital stock	Year	Ratio of value added to capital stock
1947/48	4.9	1953/54	4.3
1948/49	4.7	1954/55	3.8
1949/50	4.4	1955/56	3.8
1950/51	3.9	1956/57	3.7
1951/52	3.8	1957/58	3.8
1952/53	3.8	1958/59	3.6

This comparison is in terms of total capital stock in one year and the value added during that year. No time lag has been assumed. However, the investment in a particular year includes investment in incomplete units which will produce only with a time lag. Starting with 1949/50, after the effects of Partition had largely worn off and when price indices are somewhat more reliable, and using investment totals for several years to even out erratic fluctuations, one can estimate the output effect of additional investment with a time lag. One could make other assumptions about the time lag between investment and increase in output, but not much purpose would be served by further arithmetic.

TABLE VIII

INCREMENTAL CAPITAL-OUTPUT RATIOS FROM SURVEY—CONSTANT PRICES

Year	Investment (*a*)	Year	Value added (*b*)	Ratio Col (*a*)/Col (*b*)
	(*crores of rupees*)		(*crores of rupees*)	
1949-50 to 1952-53	+ 145	1950-51 to 1953-54	+ 34	4.3
1952-53 to 1955-56	+ 280	1953-54 to 1956-57	+ 68	4.1
1955-56 to 1959-60	+ 287	1956-57 to 1960-61	+ 70	4.1

If investment is significantly overstated and value added significantly understated, as suggested earlier, the ratios between the two would change substantially. Assuming only a ten-per-cent over- and understatement respectively, the average ratio without time lag would be 3 for 1959/60. The incremental ratio, assuming a time lag, would be 3.4 for the final period. These are low ratios for industry, especially if it is remembered that value added would have been greater if supplies of imported goods had been adequate. The low ratio reflects the mix of Pakistan industry, with many lines very labour intensive, the low capital costs due to undervaluation of foreign exchange, and the very high profit rates.

Regional Value Added

If the Survey figures for value added are accepted as reasonably reliable, the corresponding regional data will be of some use. As in any sample survey, the more the results are broken down, the greater the margin of error. Too much reliance should, therefore, not be put on regional figures.

The basic Survey-figures have been adjusted for underreporting, by using the CSO estimate that this requires an adjustment of 6 per cent in West Pakistan and 9 per cent in East Pakistan (Appendix G). This is consistent with Appendix A which suggests that underreporting is greater in East Pakistan. As expected the results show quite unequal rates of growth until 1953. After that year, the rates of growth in East about equalled that of West, though absolute increases were, of course, less because of the smaller base.

TABLE IX

REGIONAL VALUE ADDED

(current price)

Year	Karachi	Other West	Total West	East
	(.....*in crores of rupees*.....)			
1947	1	7	8	7
1948	2	9	11	7
1949	3	12	15	9
1950	4	14	18	14
1951	7	19	26	17
1952	10	28	38	18
1953	16	33	49	22
1954	29	37	66	26
1955	30	45	75	29
1956	35	52	87	35
1957	41	60	101	38
1958	44	67	111	41
1959	53	75	128	52

East Pakistan inherited at independence an industrial plant almost as large as that of West Pakistan. It is in post-independence investment that it has been left far behind, so that by 1959 value added by large-scale industry in that province was only 40 per cent of that in West Pakistan. A large part of the difference is due to the phenomenal growth in Karachi. The reasons for these disparate growth rates are complex. They are discussed in a forthcoming publication.

Using the regional price indices (Appendix C), the figures in current prices can readily be deflated to obtain estimates in constant prices.

TABLE X

REGIONAL VALUE ADDED—CONSTANT PRICES

Year	West	East	Year	West	East
	(in crore rupees)			*(in crore rupees)*	
1947/48	10	7	1953/54	56	25
1948/49	14	8	1954/55	79	31
1949/50	18	12	1955/56	93	35
1950/51	24	16	1956/57	102	40
1951/52	35	18	1957/58	116	43
1952/53	46	20	1958/59	130	52

Since no wholesale-price index for manufactures exists before 1951/52, the index for that year has been applied to earlier years. The index for East Pakistan is 98.9 and that for West Pakistan 90.6, thus increasing value added in constant prices significantly over the estimates in current prices for West Pakistan, but not for East Pakistan. Since nothing is known about prices for these years, this is a highly doubtful procedure.

Summing-up

This paper is essentially an exercise in making tolerably bad figures out of very bad ones. The data on large-scale industry derived from the Survey need to be liberally mixed with salt before use. The margin of error is great. Still, the Survey results are probably more reliable than alternative estimates, or similar data for other fields, though this is not saying very much. The estimates of value added should be better than nearly all other estimates for large sectors in the national accounts. The investment estimates are less reliable and of little value for any particular year, though the general magnitude and trend may not be too far off.

Clearly, Pakistan's modern industry has grown very rapidly and the growth in Karachi has been nothing short of phenomenal. Clearly, investment has continued at a high rate, though it was slowed down in the late 1950's, presumably by shortage of foreign exchange. The details may be questionable—the nature of the development is clear.

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Appendix A

ESTIMATE OF UNDERREPORTING IN CMI AND THE SURVEY

In the text and calculations, the CSO's estimate for underreporting of seven per cent for 1959/60 was taken also to apply to 1958. This estimate was checked by an alternative procedure.

It had to be assumed that the registration of firms under the Factory Act is nearly complete for the kind of firms covered by the Survey. Since, without registration, firms cannot get import licences and may find it difficult to get land, power, telephones, *etc.*, there undoubtedly are firms registered that are bogus, or have gone out of business or are closed down, but it is not likely that many existing firms are unregistered.

1) The list of firms registered, but not reporting to the CMI, was examined. The names of forty-one indicated the industry. They were largely carrying on very simple processing (cotton gins, grain milling, furniture making, *etc.*), where value added is low, and which is usually done by small units. For nineteen of these firms, the number of workers was available and all but three were small firms, with less than one hundred workers. This examination provides some indirect evidence that the nonreporting firms average smaller investment and value added than the reporting firms.

2) A sample of fourteen nonreporting firms in Dacca was actually interviewed. Of these, two were not producing, six employed between one and sixteen workers in 1959, four more were small, with twenty/twenty-eight workers, one was medium-sized and one very large.

If the fourteen firms sampled in East Pakistan were typical of the 818 nonreporting firms registered in the country, the extent of underreporting would be very large indeed. Each of the sample firms should stand for 58.5 firms in the universe of nonreporting firms and since there was one large firm in the sample, there would be 58.5 very large firms among those that did not report to the CMI. This seems unlikely. In the first place, the sample was taken in Dacca, with a higher proportion of large firms than are found in the countryside. *Second*, the really large firms find their reports to the CMI less onerous than small firms and they also run more risk of prosecution for failure to report, so they are less likely to be nonreporting. *Third*, the CMI coverage seems to be much better in West Pakistan (Table A-1). The fourteen-firm sample is for East Pakistan; it would be more likely that a large firm would escape the CMI in the East Wing than in the West.

TABLE A-1

REGISTERED AND REPORTING FIRMS : 1958

	Registered (1)	Reporting to CMI (2)	Col. (2) as per cent of Col. (1) (3)
East Pakistan	896	638	71
West Pakistan	2088	1703	82
Karachi	1004	829	83
Total	3988	3170	79

Source: [2].

Finally, the 1958 CMI reports were made under the Martial-Law regime when industrialists were very much afraid of possible drastic punishment. Very small firms or those that had gone out of business may not have been too concerned but big firms certainly were. For all these reasons, it has been assumed that the one large firm in the fourteen-firm sample was exceptional and that only four large firms did not report to the CMI throughout the country. In the remaining sample of thirteen firms, each firm needs to be multiplied by 62.6 to get information on the universe of 814 remaining nonreporting firms. This is done in Table A-2.

TABLE A-2

SAMPLE OF NONREPORTING FIRMS

	Workers	Value added	Assets	Multiplier	Contribution to	
					Value added	Assets
		(*in thousand rupees*)			(*in thousand rupees*)	
a) 6 firms	1—16	83	3,11	376	3,12,00	11,69,00
b) 4 firms	20—28	1,03	4,15	250	2,57,00	10,37,00
c) 1 firm	2,00	2,90	2,73	63	1,83,00	1,72,00
d) 1 firm	17,00	49,00	1,42,00	4	1,96,00	5,68,00
e) 2 firms	0	0	0	125	0	0
Total: 14				818	9,48,00	29,46,00

	Number	*Value added*	*Assets*
Nonreporting firms as per cent of reporting firms:	26	6	6

Note: Firms with less than twenty workers in fact are included in this table because they are also included in the CMI, so long as they report under Section 2(j). More than one-third of all establishments reporting to the 1958 CMI averaged less than twenty workers. They may have had twenty workers or more on some day during that or earlier years.

Conclusion: This estimate of underreporting is quite close to that of the CSO but it depends on an arbitrary assumption about the number of nonreporting large firms so it is not too valuable.

Appendix B

VALUE ADDED BY LARGE-SCALE INDUSTRY

Year	Survey (current prices)	Adjustment for underreporting (7 per cent)	Adjusted figures (current prices)
	(.....*in crores of rupees*.....)		
1947	14	+ 1	15
1948	17	+ 1	18
1949	22	+ 2	24
1950	30	+ 2	32
1951	41	+ 3	44
1952	52	+ 4	56
1953	66	+ 5	71
1954	86	+ 6	92
1955	97	+ 7	104
1956	115	+ 8	123
1957	130	+ 9	139
1958	142	+ 10	152
1959	165	+ 16[a]	181

The CSO Revised Index of Industrial Production further revised by Bergan [4]:

Year	*Index*	*Value added in constant (1959/60) prices*
		(*in crore rupees*)
1959/60	100	192[b]
1960/61	112	215
1961/62	127	244
1962/63	139	267
1963/64[c]	171	328

Notes:

a) Including 4 crores addition for special undercoverage. *See* text.

b) 1959/60 is 1959 Survey-figures *plus* 6 per cent which is one-half the increase in the Production Index for 1959/60 to 1960/61.

c) October-December 1962 equalled the average for 1962/63. October-December 1963, therefore, has been used for 1963/64.

Appendix C

WHOLESALE-PRICE INDEX FOR MANUFACTURES

(1959/60=100)

Year	East Pakistan	West Pakistan	Total
1951/52	98.8	90.6	92.9
1952/53	98.5	95.0	96.0
1953/54	97.5	103.0	101.4
1954/55	87.8	89.6	89.1
1955/56	91.0	87.0	88.1
1956/57	92.3	91.8	91.9
1957/58	92.1	91.5	91.7
1958/59	87.9	91.8	90.7
1959/60	100.0	100.0	100.0
1960/61	107.3	99.2	101.5
1961/62	105.4	101.3	102.5
1962/63	102.8	105.6	104.8
1963/64	102.1	107.2	105.7

Sources: *i*) For 1951/52 to 1959/60: data from the Pakistan Institute of Development Economics [8]. Recompiled by W. Tims by using weights and prices for manufactures only. Weights:1959/60. Regional indices weighted 1: 2.5 according to value added in the two provinces.

ii) For 1959/60 to 1963/64: The "Manufactures" part of the CSO Wholesale-Price Index was used. (Still weighted 1: 2.5 for the two provinces). For 1963/64 data for only ten months were available. These were averaged.

Appendix D

SURVEY ESTIMATES OF INDUSTRIAL INVESTMENT

Year	Assets[a]	Deduction for reserves[b]	Adjustment for exclusion of new firms[c]	Adjustment for nonreporting firms[d] (7%)	Revised Survey estimates (capital stock)[e]
	(.....*in crores of rupees*.....)				
1947	58			4	62
1948	+ 9			0.5	71.5
1949	+ 16			1	88.5
1950	+ 18	—0.5		1.5	107.5
1951	+ 27	—1		2	135.5
1952	+ 38	—2		2.5	174
1953	+ 37	—2.5		2.5	211
1954	+ 81	—6		5	291
1955	+ 67	—4		4.5	358.5
1956	+ 42	—1.5		3	402
1957	+ 42	—1.5	+ 3	3	448.5
1958	+ 49	—2	+ 12	4	511.5
1959	+ 20	—2	+ 35	3.5	568
Total 1947—59	504	—23	+ 50	+37	568

a) The figure for 1947 is for assets then in existence. Subsequent years is assets added.

b) For the years 1951/52 to 1958/59 machinery imports were taken from [7]. Average figures for two adjoining split years were taken as the figures for the corresponding calendar year. Ten per cent rounded, of the difference between this figure and asset growth according to the Survey was taken as addition to reserves.

c) Total capital stock in 1958 of 512 crores was divided by the universe of 3,170 firms, to give an average investment of 16 lakhs. According to the CMI, the number of firms reporting to the CMI increased by 300 between 1958 and 1959/60. Their investment, if they are "average" would be 48 crores. Since this is over an 18-month period, the additional annual investment would be 32 crores. Of course, not all the investment in these firms would be made in 1959. Some was made earlier and some will be made later, even after they have come into production. On the other hand a greater number of firms coming into production after 1959/60 would have made investments in 1959 and earlier years. Therefore, additional investment, by new firms of 35 crores has been assumed for 1959 and progressively smaller investments for earlier years. (On the assumption that the average investment involves 10 per cent in the first year, 40 per cent in the second year and 50 per cent in the third year, when production begins).

d) This adjustment is the same percentage as for value added. It is to correct for nonreporting firms left out of the universe from which the sample was drawn.

e) Total for 1959/60 is on the assumption that investment in the first half of 1960 was slightly larger than in 1959.

Appendix E

PRICE INDEX FOR MACHINERY

Year	GATT[a]	Adjusted for devaluation of Pakistan rupee[b]	Extrapolated[c]	Split Year[d]	
1947			42	1947/48	42
1948			43	1948/49	43
1949			44	1949/50	44
1950	65	45	45	1950/51	47
1951	71	49	49	1951/52	52
1952	80	56	56	1952/53	57
1953	83	58	58	1953/54	58
1954	83	58	58	1954/55	59[e]
1955	85	72[e]	72[e]	1955/56	87[e]
1956	89	89	89	1956/57	91
1957	93	93	93	1957/58	95
1958	97	97	97	1958/59	98
1959	100	100	100	1959/60	100
1960			100	1960/61	100
1961			100	1961/62	100
1962			100	1962/63	100
1963			100	1963/64	100
1964			100		

a) GATT index has 1953=100. This has been changed to 1959=100.

b) The index before July 1, 1955 has been divided by 144 per cent to take account of the devaluation of the Pakistan rupee from 3.34 to 4.75 to the dollar.

c) For 1947-49 a slow increase has been projected, in line with later changes.
For 1960-64, no change has been assumed since the wholesale-price index (CSO) for machinery remains unchanged in both East and West Pakistan.

d) Average of two adjoining years except for 1954/55 and 1955/56.

e) Devaluation occurred in 1955, after June 30, the end of the trade year 1954/55. Therefore, the figure used for 1954/55 is the one for 1954, *plus* a slight upward adjustment to take account of the increase in 1955 in the basic series, *before* adjustment for devaluation. For similar reasons, the 1955/56 figures used are the basic series, ignoring the devaluation adjustment for 1955.

Appendix F

HAQ AND PLANNING-COMMISSION INVESTMENT ESTIMATES

Year	Fixed investment at constant prices (1955/56)[a]	Price index[b] (1959/60) =100	Price index[b] (1955/56) =100	Fixed investment at current prices[c]	Public investment in PIDC[d]	Investment in inventories[e]	Total industrial investment[f] (current prices)
	(in crore rupees)			(.....*in crore rupees*.....)			
1949/50	33	68	94	31		4	35
1950/51	33	67	93	31		6	37
1951/52	37	71	99	37		7	44
1952/53	36	66	61	33	9	10	52
1953/54	40	62	81	34	5	18	57
1954/55	59	53	74	44	10	10	64
1955/56	45	72	100	45	11	19	75
1956/57	31	92	128	40	14	15	69
1957/58	31	92	128	40	23	7	70
1958/59	29	96	133	39	15	9	63
1959/60	29	100	139	40	15(?)	29	84

a) From [6]. Table C-2 gives industrial investment in 1955/56 prices.

b) [6, Table A-10] Shows gross investment in current prices in 1959/60 prices. Comparing the two gives the price index used with 1959/60 equal to 100. This is arithmetically changed to an index with 1955/56 as 100.

c) Using price index from *b*) applied to constant price estimates from *a*).

d) [6, Table A-7].

e) [6, Table A-9].

f) Cols. (3) + (4) + (5).

Appendix G

REGIONAL VALUE ADDED IN CURRENT PRICES

Year	Karachi		West Pakistan		East Pakistan	
	Survey	+ 6%	Survey	+ 6%	Survey	+ 9%
	(.....*in crore rupees*.....)					
1947	1.3	1.4	6.5	6.9	6.1	6.7
1948	1.7	1.8	8.2	8.7	6.6	7.2
1949	2.4	2.5	11.1	11.8	8.6	9.4
1950	3.8	4.0	13.1	13.9	12.7	13.8
1951	7.0	7.4	17.8	18.9	15.9	17.3
1952	9.2	9.8	26.4	28.0	16.6	18.1
1953	14.9	15.8	31.1	33.0	20.1	21.9
1954	26.9	28.5	35.3	37.4	23.7	25.8
1955	28.2	29.9	42.5	45.1	26.3	28.7
1956	32.8	34.8	49.3	52.3	32.4	35.3
1957	38.4	40.7	56.9	60.3	35.1	38.3
1958	41.2	43.7	63.6	67.4	37.3	40.7
1959*	49.1	52.0+0.7	69.3	73.5+1.5	46.2	50.4+1.5

*Total of four crores needs to be added in 1959 to compensate for special underreporting in that year (*see*, text and Appendix B). This has been allocated according to the percentage of new firms registered between 1958 and 1959. (Karachi 5%, West Wing 6%, East Wing 9%, of firms registered in 1958). Taking these percentages of 1958 value-added, and taking one-third of the results to take account of below-capacity operation in the first year gives:

Karachi 0.7
West Wing 1.5
East Wing 1.5

as the underestimation for 1959. This has been added.