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The Price Data: Procedures, Characteristics, and Limitations

It was necessary to collect a new body of price data for the various purposes of this study. The field work began in the fall of 1965, was the primary occupation of the authors in 1966 and continued on a part-time basis in the first half of 1967. The data collection methods are recounted in some detail because our procedures and decisions have certain important biases, which are not identical to those in the BLS price data.

THE PERIOD COVERED

Price data were collected back to 1957 when possible but reporters who preserved records for so long a period were in the minority. The price series were carried forward usually to the time of the interview, and a considerable number of reporters subsequently sent us prices to the end of 1966 on a second-round request.

The number of price series on which our work is based is not an unequivocal number. A substantial number of reporters supplied from two to twenty price series for closely related products: window glass of different sizes; gasoline purchases in various cities in a state, etc. Unweighted index numbers must be used in much of the work, for reasons discussed later, so including multiple series would implicitly

TABLE 3-1

Number of Price Series Collected by the National Bureau of Economic Research

Year	Number of Price Series Reported in Both June and July	Year	Number of Price Series Reported in Both June and July
1957	601	1962	1,097
1958	663	1963	1,155
1959	731	1964	1,233
1960	842	1965	1,240
1961	1,022	1966	957

involve multiple weighting of the respondents who provided multiple series. The multiple series were therefore combined into a single series, by the same procedures as the prices of various reporters were combined into a single commodity index (however, using weights of the individual series where available). Each consolidated price series is counted as only one series. The number of price series reporting in both June and July of each year are tabulated in Table 3-1. The peak number of price series was 1,240 in 1965; the minimum number was 601 in 1957.

THE COMMODITIES COVERED

The commodities which are currently included in the wholesale price reporting of the Bureau of Labor Statistics are chosen, partly explicitly and partly implicitly, on the basis of

1. Importance, measured by value;
2. Availability of price data;
3. Representativeness—a commodity is preferred if its price history probably represents that of other commodities;
4. Persistent specifiability—a commodity which cannot be described or for which the description will not remain essentially unchanged for a time, is not included. There are exceptions, such as various types of machinery;

5. Historical inertia—a price series, once included, is generally kept until prices become difficult to collect.

It will be observed that there is no sampling of a formal statistical variety in the selection of commodities. The universe of which BLS wholesale prices is a sample cannot be described in economic terms; it is the product of criteria such as those just listed.

The present study, with its primary purpose of determining the actual transaction prices of industrial goods, necessarily follows the BLS, for these prices are the object of validation. Nevertheless, the present selection differs in important respects from that of the BLS.

1. We naturally pay special attention to the areas in which the charge of inflexible prices has been heard most frequently: ferrous and nonferrous metals, chemicals, and drugs. Accordingly, we omit certain areas in which no such charge seems important (foods generally and certain textiles) or where price behavior reflects different forces (charges by public utilities).
2. The BLS commodity list is compelled by the nonstandardization and rapid change in product characteristics to omit or under-represent most machinery, construction, electronic goods, and custom work. We go even further in excluding almost all such commodities because the problem of measuring change in the quality of products is *the* major unsolved task of all price collection. Any attempt to deal with it would completely swallow up the basic purpose of this study, the collection of genuine transaction prices. This is a grave limitation on the present study, whose effect, we suspect, is to lead to a substantial understatement of the average flexibility of industrial prices.

A list of the commodities is presented in Table 3-2, together with the December 1961 relative weights which the BLS assigned to these categories. Our index covers 14.3 per cent of the BLS weights, or 18.9 per cent of the BLS universe excluding farm and processed food prices.

THE PRICE SOURCES

The price data were obtained from both buyers and sellers. The sellers were negligible in number. Industrial companies are generally reticent to report selling prices other than list prices. (It should be observed that

TABLE 3-2

Commodities Included in the NBER Study, with Their Weights in the Wholesale Price Index, December 1961

Commodity Name	BLS Codes	Relative Weight
Steel		
Sheet and strip, cold-rolled	1014-47, 51	.497
Sheet and strip, hot-rolled	1014-45, 46, 53	.304
Tinplate	1014-68, 69, 70, 73	.321
Plates	1014-26, 27	.246
Bars and rods, hot-rolled	1014-39	.206
Carbon steel pipe	1014-56	.097
Tubing	1014-63	.085
Oil well casing	1014-59	.062
Steel wire	1014-76	.156
Stainless steel sheet and strip	1014-49, 52	.124
Alloy steel bars, cold- and hot-rolled	1014-37	.068
Nonferrous Metals		
Aluminum		
Ingot and shot	1022-01, 1024-01	.270
Sheet and strip	1025-01, 07, 08, 09	.340
Wire and cable	1026-41	.038
Copper		
Ingot	1022-06, 1024-21	.279
Pipe and tubing	1025-51, 52, 53	.139
Wire and cable, bare	1026-01	.065
Insulated wire	1026-06, 11, 17, 21	.237
Magnet wire	1026-46, 47	.058
Zinc products	1022-31, 33	.069
Brass		
Bars and rods	1025-13	.074
Fuels and Related Products		
Petroleum Products		
Gasoline, regular	0571-00	2.378
Diesel and distillate oil No. 2	0573-00	.713
Residual fuel oil No. 6	0574-00	.399
Coal	0512-05	.064
Rubber and Allied Products		
Passenger car tires	0721-01	.287
Truck and bus tires	0721-11	.184
SBR, hot and cold	0712-11, 12	.096

TABLE 3-2 (Continued)

Commodity Name	BLS Codes	Relative Weight
Rubber and Allied Products (Cont.)		
Neoprene	0712-03	.033
Belting	0733-11	.004
Paper		
Book, magazine, etc.	0931-11, 21, 22	.409
Newsprint	0932-01	.340
Kraft papers (coarse paper and bags)	0931-51, 61 and 0952-01	.361
Paper board, unfabricated	0941-00, 0942-00, 0943-00	.412
Paper boxes and shipping containers, fabricated	0953-00	1.406
Bond	0931-31, 41	.280
Chemicals		
Sulfuric acid, bulk	0611-09	.101
Caustic soda, liquid	0611-69	.073
Titanium dioxide	0622-21	.091
Chlorine, bulk	0611-35	.074
Oxygen, pipeline, tonnage	0611-49	.036
Ammonia, bulk	0611-13	.036
Acetone	0612-01	.031
Acetylene	0612-03	.046
Benzene	0612-25	.028
Styrene monomer	0612-89	.038
Ethyl alcohol, tech.	0612-14, 15	.025
Methyl alcohol	0612-17	.047
Glycerine, natural and synthetic	0622-62	.015
Phthalic anhydride	0622-71	.048
Phenol	0612-83	.027
Polyethylene	[a]	[a]
Polystyrene	0673-31	.109
Polyvinyl chloride	0673-01	.109
Phenolics, i.e., phenolic resins	0673-11	.039
Drugs		
Antibiotics	0635-1	.148
Tranquilizers	0635-4	.057

(Continued)

TABLE 3-2 (Concluded)

Commodity Name	BLS Codes	Relative Weight
Drugs (Cont.)		
Cardiac glycosides	0635-6	.020 [b]
Miscellaneous		
Paint	0621-00	.311
Cement		
Portland cement	1322-30	.375
Glass Products		
Plate glass	{1311-01} {1313-01}	.136
Safety and flat (window) glass	{1312-01} {1313-02}	.104
Electrical Machinery and Equipment		
Electric motors, excluding DC	1173-13, 14, 32, 34	.360
Batteries	1178-15	.007
Wood		
Plywood (softwood)	0831-00	.213
Flooring	0812-01	.006

[a] Not included among BLS products.
[b] Maximum.

seldom did a firm assert that its sales were predominantly and continuously at the quoted prices.) The reticence no doubt stemmed partly from reasons of commercial interest, despite our promise of complete confidentiality, but potential legal complications also discouraged the reporting of selling prices. The Robinson-Patman Act places a substantial burden upon any seller to justify differences in price (by cost differences, meeting competition in good faith, etc.) where the effect may be to reduce competition, and it was often cited to us as a reason for noncooperation.

Buyers, on the other hand, had fewer legal or commercial doubts and cooperation was much greater. Our data sources include:

1. Some thirty-three governments and governmental agencies: federal, state, and local. A half dozen others refused to cooperate because of the press of duties, inaccessibility of records, and other factors.

2. Some 137 industrial, utility, and transportation companies. Without important exception the respondents were large companies, and include many of the nation's largest enterprises. In addition some 100 companies did not cooperate, sometimes rejecting our request categorically and sometimes after a discussion deciding that they did not buy appreciable amounts of any commodity on our list or did not keep appropriate records. Another fifty companies sent unusable data, usually rejected because the period covered was short.
3. Some nine hospitals provided data on drug prices. A dozen more did not supply data, usually because their records were inadequate.

Given the fact that at least half of the inquiries for data were simple formal requests to corporate heads to whom the authors had no introduction, the response appears very good. Nevertheless it poses the question: how did nonresponse affect our results?

One type of nonresponse (even from cooperating companies) worked to overstate price levels and probably to understate price flexibility. This was the refusal to give information on commodities for which an extraordinarily favorable deal had been consummated: we were emphatically told by a retail chain, for example, that it would not give us the price of an automobile accessory whose price was remarkably low. There was no conceivable reason for suppressing information when prices were the published list prices, on the other hand, so a very pronounced bias could be introduced by this self-selection.

A second, but infrequent, source of nonresponse could on balance have worked toward omission of list-price buyers. In several cases, purchasing agents in effect refused to cooperate even though their company heads had instructed them to do so. Unnecessary fear of the detection of chicanery or incompetence (unnecessary because a few instances of demonstrable incompetence which we encountered were left undisturbed), as well as indolence, are possible explanations—no attempt was made to pursue these sources.

The sizes of the companies and other respondents who cooperated with our study are given in Tables 3-3 and 3-4. The overwhelming reliance of our study on large companies and institutions is obvious, although often these reporters bought only small quantities of the commodities for which prices were reported. A corresponding description

TABLE 3-3

Sizes of Companies Supplying Price Data

Company Size ($ millions) [a]	Number of Respondents [b]
Over 1,000	25
500–1,000	28
100–500	44
10–100	33
Under 10	6
Not Available	1
Total	137

[a] 1962 assets.

[b] Including seventeen railroads of which six are in the over $1,000 million class, nine are in the $500 million to $1,000 million class, and two are in the $100 million to $500 million class.

TABLE 3-4

Noncompany Sources of Price Data

Type of Reporter	Number of Respondents
Federal agencies	9
State governments	9
Local governments	12
1960 population under 1,000,000	7
1960 population over 1,000,000	5
Local government agencies	3
Hospitals	9

of nonrespondents cannot be given because nonresponse proved extremely difficult to identify. The lack of data might be due to great costs of exhuming records, or to lack of records, or the lack of purchases of items on our list, or to frequent changes in specifications—or the refusal may simply have been cloaked with such explanations. The nonrespondents were also consistently large.

The effect upon our price indexes of our reliance upon large buyers is discussed in Chapter 4.

OTHER PRICE SOURCES

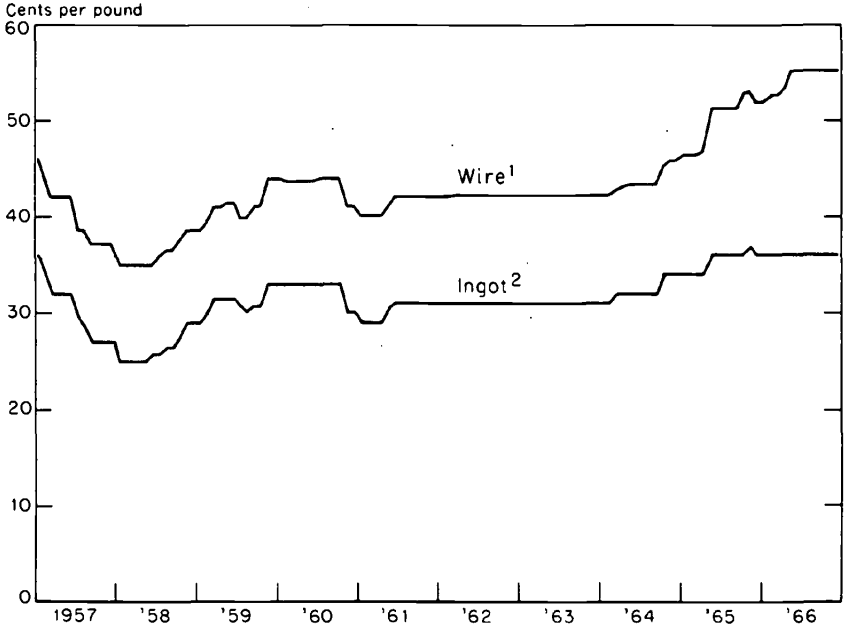
Our analysis of the BLS price indexes will be based exclusively upon the price quotations which were collected for the present study. There exist other important sources of information which could contribute to the appraisal of the validity of the BLS prices. They will be briefly described and illustrated, and the reasons for excluding them from the present study will be given.

(1) The internal structure of prices published by the BLS is a

neglected source of information. Two related examples may be given; both are concerned with the "guideline" price ceilings which were imposed upon copper ingot prices in November 1965 (if not earlier). The price of copper ingots traditionally had a fairly close relationship to the price of moderately fabricated copper products such as bare copper wire. With the imposition of the price ceiling the series moved apart (see Figure 3-1) and we may infer that copper ingot was severely rationed to unintegrated pipe and tubing manufacturers buying at posted prices. As a second example, consider the price of prime copper scrap and copper ingots (Figure 3-2). The cost of refining the scrap is roughly one cent per pound, yet scrap prices reached a level 63 per cent above ingot prices. The existence of rationing on a nonprice basis, and hence the inaccuracy of the posted price of ingots, is again evident.

Figure 3-1

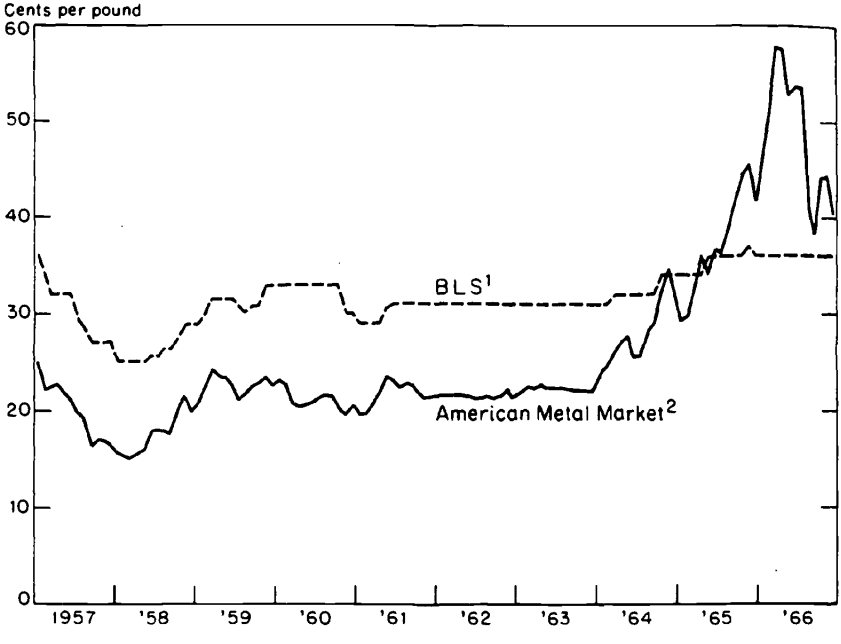
BLS Price of Copper Ingots and Copper Wire, Monthly, 1957–66



[1] Bare, solid, #8AWG, hard drawn, 30,000 lb. carlots.
[2] Electrolytic, producer's price, delivered f.o.b. cars, destination in U.S.A.

Figure 3-2

BLS Price of Copper Ingots and Market Price of Copper Scrap, Monthly, 1957–66



[1] Copper ingot, electrolytic, producer's price, delivered f.o.b. cars, destination in U.S.A.
[2] Dealer's buying prices at New York for No. 1 heavy copper scrap.

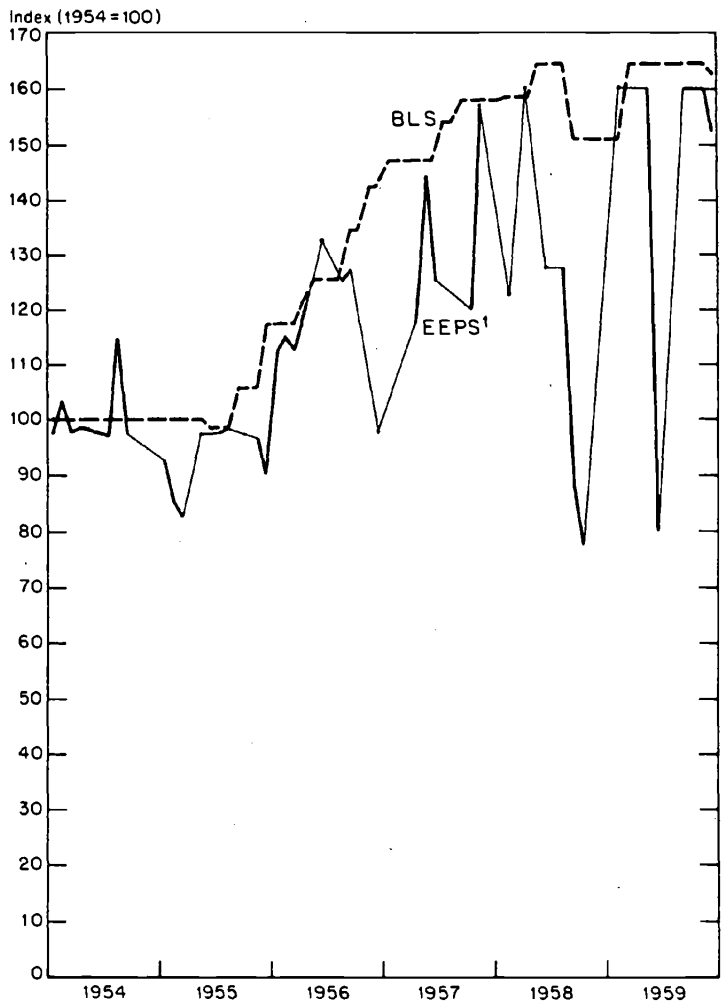
(2) Several intensive studies have been made of particular prices in connection with antitrust and other legal proceedings. An example is provided by the study of prices of electrical generating and distributing equipment by Charles R. Dean and Horace J. De Podwin.[1] The quoted and realized sales prices for large circuit breakers for the years 1954–59 are reproduced from their study (Figure 3-3).

(3) An essentially unlimited supply of more or less informed commentary on market prices is presented in published trade sources. Scarcely a trade journal fails to remark on deviations from list prices from time to time. One use of our data, indeed, could be to investigate

[1] "Product Variation and Price Indexes", a paper presented to the American Statistical Association, December 29, 1961.

Figure 3-3

Price Indexes of 23 KV Large Outdoor Circuit Breakers (Specified in BLS Code 11.75-32.03); as Reported in BLS-WPI and *Electrical Equipment Price Study*



SOURCE: Charles R. Dean and Horace De Podwin, *Product Variation and Price Indexes: A Case Study in Electrical Apparatus*, General Electric Company; data supplied by Mr. De Podwin.

[1] Thin line indicates no orders for this circuit breaker.

TABLE 3-5

Tinplate for Beer Cans [a]

Date [b]	Price per Ton [c] (dollars)	Cans per Ton	Price per 1,000 Cans (dollars)
April 1957	208	16,000	13.00
Jan. 1958	224	17,067	13.12
Jan. 11, 1959	212	17,067	12.42
Jan. 1960	221	17,067	12.95
Jan. 1961	224	21,333	10.50
Jan. 1962	238	23,273	10.23
Jan. 1963	238	23,273	10.23
Jan. 1964	238	23,273	10.23
Jan. 1965	238	23,273	10.23
April 1966	248	23,273	10.66

[a] Data supplied by a steel producer.
[b] As of the first of the month, unless noted.
[c] Delivered, Los Angeles.

this source of information: does the trade press comment upon any substantial price reductions that are reported by us but not by the BLS?

(4) We have encountered numerous examples of price reduction by the route of quality improvement. One example will suffice: the number of beer cans (including ends) which can be made from a ton of tinplate has risen sufficiently to reverse the direction of cost of tinplate per can (see Table 3-5).

These types of evidence of price flexibility are all potentially as important as the kind of price data we have collected for this study. Nevertheless they are unreliable for a test of the validity of price quotations for two reasons. The first, and lesser, reason is that some of the information is nonquantitative; not only the trade press commentary but much of the quality change information is of this sort.

The second reason for exclusion is that two of these information sources are biased. The trade press will not comment continuously on strict adherence to quoted prices, and conversely price studies inspired by antitrust actions are likely to pertain to periods of collusive pricing. Formally, at least, there is no such bias in analyses of the internal

structure of prices, nor need the quality changes in products all be improvements, although as an empirical matter economists are generally agreed that they are preponderantly so.

Although we shall henceforth ignore these other sources of price information in our discussion, the full appraisal of the published prices should of course take them into consideration.