

NOTES AND BOOK REVIEWS

Comments on "RECENT DEVELOPMENTS IN THE MEASUREMENT OF PRICE INDEXES FOR FIXED CAPITAL GOODS"*

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The major point of Dr. Gordon's paper is that wholesale price indexes contain deficiencies which make them unsuitable as deflators for fixed capital. He contends that as a result measures of fixed capital stocks and fixed capital investment have been biased. This conclusion is based primarily on a comparison of wholesale price and unit value indexes, which presupposes the validity of the unit value indexes as measures of transaction prices. Although this assumption is crucial to the analysis, little justification is presented to support its acceptance. The most recent source of information on the relative reliability of unit values is contained in the Report of the Pricing Subcommittee of the United States Interagency Committee on the Measurement of Real Output (the Searle Report). Gordon minimizes the relevance of this report to his study for two reasons: (1) insufficient product overlap and (2) emphasis in his study on tightly specified goods. It is true that only three products overlap, but many of the product-categories used by Gordon are broadly defined and are thus susceptible to the quality-mix problem suffered by unit values. Examples of broadly defined products are internal combustion engines (comparison number 7, SIC 3519), metalworking machinery (comparison number 33, SIC 354), and electric typewriters (comparison number 43, SIC 3572001). For this reason, the results of two reports to the Subcommittee should be of interest.

The first study attempted to test the assertion, also subscribed to by Gordon in his paper, that unit value changes "include changes in actual transaction prices, reflecting changes in market conditions and bargaining power, that should be but are not reflected in Wholesale Price Index quotations." Two major results were reported. First, the differences between WPI and unit value indexes are not due to the fact that Census covers more products, but result rather from price measurements for products common to both being different. Secondly, to test the extent to which the WPI reflects transaction prices, a correlation study was made of unit value *vs* price change. Production increase, used as a proxy for demand increase, was the major independent variable. The expected result was a negative correlation between the difference—price less unit value—and quantity change. However, the tests showed the opposite in most cases.¹ The study did not contend that this proved the WPI's ability to reflect transaction prices but rather concluded that "whatever effect transaction prices have on the comparison are being submerged in the product mix problem" which plagues unit values. An interesting example provided in the study explained in the following way the 8 percentage point difference between the price of pan bread and its unit value:

- (i) 1.7 points due to different coverage.
- (ii) 2.8 points due definitely to product mix shift.
- (iii) 3.3 points due to some combination of an unrepresentative BLS sample and the product mix problem.

Thus, at least 35 percent and perhaps up to 76 percent of the difference was attributable to product mix shift. The point of this example, even though the product itself is not

*Revision received May, 1971. Gordon's paper appeared in 17/2, this journal.

¹Gordon also reported (p. II-12) an inability to obtain a significant coefficient on a cyclical variable in his regressions on the unit value/list price ratio.

relevant, is to demonstrate that the product mix problem can plague even a narrowly defined commodity.

The second Pricing Subcommittee study consists of an analysis in depth—at the establishment level on a number of cases—of 25 items at the 7-digit Census product level of detail. Even at this narrowly defined level of classification, the major finding was a persistent tendency of unit values to reflect shifts in product mix, usually toward the lower end of the quality or price line, over the particular period of study—1958–1963.

Three of the product lines included in this study were also used by Gordon in his discussion. The first, freight elevators, were used in the same form in both studies. The second, gasoline engines, were a part of Gordon's "all internal combustion engines" classification, a classification which it is hard to think of as narrowly defined.² Finally, the Subcommittee study included air compressors of 16–100 hp, while the Gordon paper included those of 16–25 hp. It is interesting to note the difficulties represented by these products as perhaps, indicative of the general product-mix problem affecting unit values.

(A) For freight elevators, Census Code 3534013, the BLS index (1958 = 100) in 1963 was 103.0; the unit value index was 141.1. The study cites this product as a "classic example" to illustrate the inadequacy of unit values reporting for highly fabricated products. "Unlike any other of the 25 selected items for this special study, unit values for freight elevators were tri-modal in the 1963 reporting to the Census. The mean price of the Census universe (\$10,394 per unit) . . . is virtually stripped of meaning, since over one quarter of the total value was reported at an average price of \$6,000, another quarter at an average price of \$23,000, and a third quarter at an average price of \$13,000. . . . Obviously, what we have here is a mixture of price lines."

(B) For gasoline engines the study compared the unit value change, 1958 to 1963, for Census 3519100 national averages with the closest matching WPI products (1958 = 100).

WPI			Census		
Code	Size Class	Index	Code	Size Class	Index
11-94-01-02	5.1-12 hp	105.4	3519100	7-10.9 hp	107.6
11-94-01-03	40-65 hp	106.1	3519100	40-65 hp	117.4
11-94-01-04	86-104 hp	102.5	3519100	86-104 hp	121.0

The higher Census unit values are indicative of quality increase in each class. However, for the combined index the published WPI is 104.9 while the national unit value is 98.9. There is an "obvious implication of a strong downward bias in the national unit value resulting from the extraordinary growth in the production of the smaller engines (of less than 7 hp), which accounted for about 87 percent of the quantities and 45 percent of the values in the 1963 statistics."

(C) For air compressors (Census Code 3561415, BLS Code 11-41-01-41), the BLS index in 1963 was 111.0, the unit value 80.3; for the matched establishments the indexes were 112.8 and 96.0 respectively. Here the observation was that "the Census figures undoubtedly reflect a relatively larger increase in production of the engines at the lower end of the class." This problem would affect Gordon's analysis of this commodity only to the extent that it occurred not only in the total 16–100 hp class but also in the 16–25 hp class.

The findings of the two studies outlined above raise two serious questions about Gordon's study. First, if the product-mix problem affecting unit values is truly as serious as indicated above, then we cannot conclude that the unit values which Gordon

²Gordon also includes several more tightly specified categories of gasoline and diesel internal combustion engines.

used in his analysis are unbiased measures of transaction prices, nor can we conclude from a comparison of possibly biased unit values and the WPI that it is the wholesale price indexes that are biased. Secondly, a question is raised about the validity of using unit value indexes as producers' durable equipment deflators and thus also about the revised deflators constructed by Gordon in part IV-D. Basically, it appears that more substantial proof that unit values are not subject to serious product-mix problems is required. The evidence from the Searle Report implies that they are.

In conclusion, the above comments are not meant to minimize the problems related to WPI specification pricing techniques. Greater effort is needed to develop an increased ability to obtain actual transaction prices and to insure the representativeness of the BLS samples. The Pricing Subcommittee readily admits that in several areas where price indexes are unsuitable, unit values might provide a viable alternative. However, acknowledging the difficulties related to wholesale price indexes, the Subcommittee makes the following point: "Nevertheless, because of their [the Subcommittee studies] indications concerning the shortcomings of unit values derived from commodity quantity and value data as well as the general recognition that the specification method of pricing is conceptually the most appropriate method to obtain measures of price changes, the conclusion of the Subcommittee is that the specification price data . . . should be used more extensively as deflators in the absence of positive evidence showing their unsuitability in individual instances." The seriousness with which the shortcomings of the unit value indexes are viewed is indicated by the fact that this "recommendation represents a change in the order of preference from the present [Census] practice which provides for using unit values except where they seem unreasonable."