

**Interindustry Forecasting Project
University of Maryland**

**Research Memorandum No. 3
Equipment Investment Series for Manufacturing Industries**

By

**David Curry
11 July 1967**

Equipment Investment Series for Manufacturing Industries

This memorandum explains the derivation of the historical investment series used in estimating the equations for manufacturing equipment investment demand. Throughout we shall use "investment" to mean "equipment investment" unless otherwise specified. The primary sources for these series were the Bureau of the Census's Census of Manufactures and Annual Survey of Manufactures.

There are, however, three problems in using this data:

Problem 1. Prior to 1958, the data were published in sufficient detail only for establishments in operation. These data had to be adjusted to allow for machinery and equipment expenditures in plants under construction. Since 1958, the published data has included these plants.

For the years 1951-1957, all-establishment data were available in two-digit detail. The detailed investment series were inflated to an all-establishment level on the basis of the two-digit ratios. Establishments-in-operation data were available for the years 1947-57 with the exception of 1948. This one-year gap was filled by a simple linear interpolation between 1947 and 1949. The all-establishment blank before 1950, on the other hand, was filled by inflating plants-in-operation data at the two-digit level by the ratio: $(\text{All-establishment investment in 1951 and 1952}) / (\text{plants in operation investment in 1951 and 1952})$. The detailed investment series were inflated to an all-establishment level on the basis of the two-digit ratios.

Problem 2. The revision of the SIC code in 1957 causes problems in comparing pre-1958 data with post-1958 data. To compensate for the code revision, a crude attempt was made to achieve some measure of comparability between the two data groupings.

Section 5, volume I, Census of Manufactures, 1958, provides conversion data for 1954 in most industries. The ratio of investment by new SIC to investment by old SIC for each industry, in 1954, was applied to the pre-1958 data to adjust for comparability.

Where conversion data were not provided in Section 5 of volume I, appendix C was used to estimate 1954 investment for the new classification. The fractions of old industries, in terms of value added, attributable to new SIC classifications were used to allocate 1954 investment of an old SIC industry among the appropriate new industries. When a part of the value added in each new SIC industry was not attributable to a specific old industry, an inflation factor based on percentage of value added was applied to obtain the final estimates.

For example, 1954 investment for new SIC 2099 is not given in section 5. But, from Appendix C we know that 87% of old 2099 and all of old 2091 went into new 2099, and that these two contributions account for 99.8 % of value added in new 2099. Therefore, investment in 2099 for pre-1958 years was calculated as the sum of old 2091 investment and 87% of old 2099 investment. This sum was then inflated by the factor 1.002 to obtain the final estimate.

Due to a lack of information in pre-1958 years, investment in certain SIC industries was calculated by the formulas listed below, where SIC numbers indicate investment by those industries.

$$(1) \text{ new } 345_t = \frac{1}{8} \left(\sum_{i=58}^{65} \left(\frac{\text{new } 345}{\text{new } 345 + 349} \right)_i \right) \text{ old } 349_t = 47,57$$

$$(2) \text{ new } 349_t = \text{old } 349_t - \text{new } 345_t, \text{ calculated above} \quad t = 47,57$$

$$(3) \text{ new } 3491_t = \frac{1}{8} \left(\sum_{i=58}^{65} \left(\frac{\text{new } 3491}{\text{new } 345 + 349}_i \right) \right) \text{old } 349_t \quad t = 47,57$$

$$(4) \text{ new } 366_t = \frac{1}{8} \left(\sum_{i=58}^{65} \left(\frac{\text{new } 366}{\text{new } 366 + \text{new } 367}_i \right) \right) \text{old } 366_t \quad t = 47,57$$

$$(5) \text{ new } 367_t = \text{old } 366_t - \text{new } 366_t, \text{ calculated above} \quad t = 47,57$$

$$(6) \text{ new } 3392 = \frac{1}{8} \sum_{i=58}^{65} \left(\frac{\text{new } 3392}{\text{new } 339}_i \right) \text{old } 339_t \quad t = 47,57$$

Problem 3. Some I-0 sectors are composed of industries on a four-digit level, but the Annual Survey of Manufacturers only provides three-digit detail for equipment investment.

The four-digit series were obtained by calculating the four-digit fraction of three-digit plant and equipment as given in the summary statistics of the Annual Survey. These fractions were then applied to the three-digit machinery and equipment expenditures to obtain the final estimates.