

SHORTER NOTICES

The Making of Index Numbers. By Irving Fisher. Boston and New York, Houghton Mifflin Company, 1922. xxxi and 526 pages.

This book is an elaborate inductive study of price index numbers, the prime object being the discovery of the best, or at least the most accurate index number. To begin with, six fundamental types are considered, the arithmetic, geometric, harmonic, median, mode and aggregative. Each of these may be weighted in different ways, thus giving rise to 24 non-identical formulas. According to Fisher an index number should satisfy two chief tests. Since an index number implies two dates, one of which is the base year, the interchange of years yields a second formula called the *time antithesis* of the first. If P_{01} represents the first index number, the time antithesis is $1/P_{10}$, and the first test or *time reversal* test is $P_{01} \cdot P_{10} = 1$.

The second test, original with Professor Fisher, is called the *factor reversal* test, and assumes that index formulas should give consistent results if applied to prices and to quantities. That is

$$P_{01} \cdot Q_{01} = V_{01} = \frac{\sum p_1 q_1}{\sum p_0 q_0}$$

where p_0, p_1 represent prices and q_1, q_0 quantities in the years 0 and 1 respectively. Q_{01} is obtained from P_{01} by interchanging the p 's and q 's. V_{01} is called the value index. $V_{01} \div Q_{01}$ is called the *factor antithesis* of P_{01} .

Each time antithesis and each factor antithesis is an index number, and after dropping out identicals, 22 new formulas are added to the list making now a total of 46. But only four of these satisfy the first test and none the second. Taking the geometric mean of a pair of time antitheses or of a pair of factor antitheses gives an index number which conforms to the first or to the second test respectively. Performing both operations gives a number which satisfies both tests. By these means the number of formulas is increased to 96 and forms the main series of index numbers discussed in the book. Certain other supplementary formulas giving slight variations to those in the main series are derived by a process called "crossing the weights" and bring the total to 134.

These 134 index numbers now go through a sifting process to find the best one. First all unweighted formulas and all formulas based upon the median or the mode are ruled out because of freakishness