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THE commodity price index number has been defined as a "figure which shows the average percentage change in the prices of a number of representative goods from one point of time to another." [1] In the preceding article it has been argued that the use of the index number in private contracts as a method of expressing stable values is not prohibited by the gold-clause resolution of June 5, 1933; that in the decisions of the United States Supreme Court sustaining this legislation there is nothing to indicate that such contracts would run counter to the Government's policies in the control of the currency; and that the commodity price index is now the only effective instrument remaining to private parties for protecting themselves against major changes in the value of money.[2]

The economic and statistical problems involved in the construction of price-indices have produced an extensive literature.[3] Much of the discussion of the price-index has centered around its use as a general measure of change in the purchasing power of money. The initial difficulty here, as in most studies of price behavior, has been to define the group of prices that is to be chosen as really representative. The choices required for this purpose depend ultimately on an analysis of some very complex economic phenomena; they also involve, to an important degree, certain basic postulates as to the economic functions of money.[3]

It is unnecessary to consider in this article the whole debate as to

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[1] FISHER, THE MONEY ILLUSION 19 (1928). See also BRADFORD, MONEY AND BANKING 190-191 (1934): "Price index numbers are series of abstract numbers which express the relative changes in the magnitude of statistical averages or aggregates of prices."

[2] Dawson, "The Gold Clause Decisions," supra, p. 647.

[3] See the study by MILLS, THE BEHAVIOR OF PRICES (1927); also MILLS, STATISTICAL METHODS APPLIED TO ECONOMICS AND BUSINESS 221-229 (1924). The remarks of Keynes are illuminating. 1 KEYNES, A TREATISE ON MONEY 53-64 (1930).

the value of price-indices in measuring the purchasing power of money in general.[4] It is enough here to extract from recent controversies the important conclusion that no price-index can completely represent all the price changes that might require or deserve some special study. An index of wholesale commodity prices will not reveal (as many economists too readily assumed) the movement of retail prices and wages.[5] A composite index which includes these additional groups of prices cannot be safely used in drawing all the inferences that might be useful for economic theory or political action. In short, there is no magic in index numbers themselves. At every stage in their construction the purposes for which they are intended will determine the technical methods to be used. Their utility for other purposes will likewise depend upon how closely those purposes coincide with the purposes which led to their formulation.[6]

The effort to formulate stable standards of value for private contracts need not await the outcome of governmental efforts to achieve monetary stability. Whether or not currencies can be "managed" so as to limit fluctuations in their purchasing power, private parties can

He starts from the assumption that the purchasing power of money should ultimately be defined in terms of the power of the consumer to purchase goods and services for final consumption. He therefore criticizes the common resort to wholesale commodity prices as a measure of the purchasing power of money. He offers evidence to show that a composite index, including wages, retail prices and rent, would reveal a very different level of prices from the years 1875-1926 than that indicated by a wholesale price-index alone. For a recent expression of views very similar to those of Keynes see Tucker, "Gold and the General Price Level," 16 REVIEW OF ECONOMIC STATISTICS 8-9 (1934).

[4] Among the important contributions on this subject are Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 7 (1921); FISHER, THE MAKING OF INDEX NUMBERS (1923); MILLS, STATISTICAL METHODS APPLIED TO ECONOMICS AND BUSINESS (1924); MILLS, THE BEHAVIOR OF PRICES (1927); SNYDER, BUSINESS CYCLES AND BUSINESS MEASUREMENTS (1927); KING, INDEX NUMBERS ELUCIDATED (1930); 1 KEYNES, A TREATISE ON MONEY 53-120 (1930). For a brief account see BRADFORD, MONEY AND BANKING 186-203 (1934).

[5] See the references above, note 3.

[6] Professor Irving Fisher has been the chief protagonist of the view that there is one "best form of index number" for measuring the purchasing power of money in general. See FISHER, THE MAKING OF INDEX NUMBERS 365-369 (1923). His views are criticized by Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 7 at 23-25 (1921), and his "ideal" formula is critically examined by the same author, pages 91-93. Professor Fisher's contention is likewise rejected by KING, INDEX NUMBERS ELUCIDATED 53-55 (1930). On the whole problem of determining "the" purchasing power of money the remarks of Keynes are suggestive. 1 KEYNES, A TREATISE ON MONEY 79-88 (1930).

attempt to protect themselves against the hardship and injustice which result from such fluctuations. The stabilization of contracts would promote and not defeat the broader purpose of stabilizing money. Nor is it a reflection on the good faith or determination of any government for private parties to assume that some fluctuation in money values will continue for some time to come; or if they conclude that political factors, beyond human foresight or control, may frustrate this undertaking. The objects of this article will therefore be to suggest how the existing resources of economic science can be used to stabilize monetary standards in private contracts, and to discuss the legal difficulties which might arise if commodity price-indices were the standards adopted for this purpose.

I

PRICE INDICES AVAILABLE

The numerous series of index numbers now regularly published offer a wide range of choice to the parties to private contracts. The best known, most reliable, and most comprehensive of the series published in this country are the indices of the United States Bureau of Labor Statistics. The Bureau's index of wholesale prices with 1926 as a base includes 784 commodities divided into 10 different classes: farm products, foods, hides and leather products, textiles, fuel and lighting, metal and metal products, building materials, chemicals and drugs, house-furnishing goods, and miscellaneous. It is published both weekly and monthly in a number of magazines.[7] The Bureau also compiles a bi-weekly retail food price-index of 42 food items from 51 different cities,[8] and a cost-of-living index from 32 cities.[9] Among other indices published by government agencies are a weekly and monthly index of farm prices published by the United States Bureau of Agricultural Economics,[10] Snyder's weighted index of the general price level,[11]

[7] The official publication of the Department of Labor is the MONTHLY LABOR REVIEW, but this comes out so late that its value is small for this purpose. The figures are more than a month late. Weekly figures of the Bureau are published promptly, however, in SURVEY OF CURRENT BUSINESS SUPPLEMENT, COMMERCE AND FINANCE, COMMERCIAL AND FINANCIAL CHRONICLE, and BUSINESS WEEK. Monthly index numbers of the Bureau may be found in DUN AND BRADSTREET MONTHLY REVIEW, MAGAZINE OF WALL STREET, REVIEW OF ECONOMIC STATISTICS, FEDERAL RESERVE BULLETIN, and SURVEY OF CURRENT BUSINESS.

[8] This may be found in SURVEY OF CURRENT BUSINESS, COMMERCIAL AND FINANCIAL CHRONICLE, and MONTHLY LABOR REVIEW.

[9] See current issues of MONTHLY LABOR REVIEW.

[10] Published in COMMERCIAL AND FINANCIAL CHRONICLE, and SURVEY OF CURRENT BUSINESS.

[11] This includes wholesale commodity prices, farm prices, retail food prices, rents,

and the price-index of 20 basic commodities of the Federal Reserve Bank of New York.[12]

There are several general-purpose index numbers of wholesale prices currently compiled and published. Fisher's index, based upon 120 wholesale commodities of which 30 are agricultural, is comprehensive and appears promptly each week.[13] Dun's index, which determines the cost for one individual of a year's supply of about 300 staple commodities based on the prices for the first day of each month, has been criticized as giving too much weight to foodstuffs, but is considered a good measure of wholesale price changes.[14] Bradstreet's index is the sum of the actual prices per pound on the first day of each month of 96 staple articles of commerce.[15] Because it gives prominence to certain commodities such as cotton and textiles, it has been thought a better business barometer than the indices of either the Bureau of Labor Statistics or Dun's.[16] The Annalist index is based upon more than 72 commodities and is promptly published.[17] In addition to these should be mentioned the price-index of 10 sensitive commodities of the Harvard Economic Society,[18] Babson's weekly index of 26 wholesale commodities,[19] Dun and Bradstreet's daily weighted index of 30 basic commodities,[20] Dun and Bradstreet's weekly food index,[21] and the National Industrial Conference Board's cost-of-living index.[22]

transportation costs, realty values, security prices, equipment and machinery prices, hardware prices, automobile prices, and wages. It is published in MONTHLY REVIEW OF CREDIT AND BUSINESS CONDITIONS.

[12] MONTHLY REVIEW OF CREDIT AND BUSINESS CONDITIONS.

[13] See current issues of SURVEY OF CURRENT BUSINESS SUPPLEMENT, and BUSINESS WEEK.

[14] Published in DUN AND BRADSTREET MONTHLY REVIEW, and COMMERCE AND FINANCE. For discussion of this series, see MILLS, STATISTICAL METHODS APPLIED TO ECONOMICS AND BUSINESS 236-237 (1924); HARDY and COX, FORECASTING BUSINESS CONDITIONS 288-289 (1927).

[15] Published in DUN AND BRADSTREET MONTHLY REVIEW, and COMMERCE AND FINANCE.

[16] Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 7 at 108-112 (1921); MILLS, STATISTICAL METHODS APPLIED TO ECONOMICS AND BUSINESS 234-236 (1924).

[17] For weekly figures, see ANNALIST, DUN AND BRADSTREET MONTHLY REVIEW, COMMERCE AND FINANCE, and COMMERCIAL AND FINANCIAL CHRONICLE.

[18] REVIEW OF ECONOMIC STATISTICS.

[19] BABSON'S REPORTS.

[20] DUN AND BRADSTREET MONTHLY REVIEW.

[21] DUN AND BRADSTREET MONTHLY REVIEW, COMMERCE AND FINANCE.

[22] SURVEY OF CURRENT BUSINESS.

For a good description of several American index numbers, see HARDY and COX, FORECASTING BUSINESS CONDITIONS 286-314 (1927).

With so wide a field for choice it is imperative that any contract adopting the price-index method of calculation expressly state what series will be used in the particular contract. In periods of relative stability the results of several well-known series would not depart very widely from each other.[23] But even then there would be important variations as between price-indices concentrating on different price-groups; litigation for the purpose of deciding which index number would be most appropriate would be costly and often fruitless. In periods when prices were moving rapidly in either an upward or downward direction, the discrepancies between different series might be considerable.[24] In any event, serious inconvenience and expense can be

[23] The following table of index numbers from several well-known series from January 1934 to January 1935 indicates how closely they correspond. The data are from the SURVEY OF CURRENT BUSINESS, February 1935 and March 1935.

	Jan. 1934	Apr. 1934	July 1934	Oct. 1934	Jan. 1935	Change in one year
Wholesale Base—1926						
Bur. Lab. Statis.	72.2	73.3	74.8	76.5	78.8	9%
Bradstreet's	69.7	70.9	72.1	71.8	75.7	9%
Dun's	87.2	85.5	89.0	89.1	93.7	7%
Fisher's	74.2				81.1	9%
Retail Base—1913						
Bur. Lab. Statis.	105.	107.	110.	116.	119.	13%
Cost of Living						
Nat. Ind. Conf. B.	77.5	78.4	79.1	80.9	81.6	5%

[24] Professor Mitchell has analyzed in detail the results reached by three leading series for the period from 1890 to 1918. Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 7 at 94-114 (1921). His general conclusion is that during this whole period the discrepancies between the three index numbers never exceeded 8 per cent, and that the average discrepancies from year to year were 3.4 per cent. For the year 1917, a period of general and fairly sustained rise in prices, the index numbers of the three series were as follows (p. 106):

	(1913 = 100)		
	Bureau of Labor Statistics	Bradstreet's	Dun's
January, 1917	150	155	142
February	155	157	149
March	160	161	155
April	172	166	164
May	181	171	173
June	185	176	175
July	185	182	177
August	185	185	178
September	182	188	179
October	180	190	181
November	183	194	181
December	182	199	182

avoided by specifying in the contract itself the particular series that will be used and by providing for the substitution of another series if the one selected is discontinued.[25]

II

TECHNICAL REQUIREMENTS

In selecting any particular price-index as a standard for private contract there are certain technical requirements that should be considered at the outset. First of all, it is essential that the price-data on which the index is based be carefully and accurately compiled. This requirement, whose importance is obvious but whose satisfaction is by no means easy,[26] is probably met by all the price-indices now regularly published. Second, the organization which compiles the data and reports its findings must be wholly impartial, reliable, and free from manipulation by government or interested groups. Third, there should be some assurance that the series will be published continuously, at least until the performance of the particular contract has been completed. Fourth, an important requirement is speed in the publication of results. The longer the interval between the collection of price-data and the publication of the index number, the greater the risk of an intervening change in the value of money. Short intervals may be provided for by referring back to a period prior to the date when payment is due. With most of the price-indices now currently published there would be no serious inconvenience on this score, in view of the speed achieved in publication.

The price-groups that should be included in the index will depend, as is later pointed out, on the economic setting of the particular transaction. In this connection it should be said, however, that a price-index will be more accurate, up to a certain point, the more prices it includes. Professor Irving Fisher has concluded that for measurements of the purchasing power of money in general at least 50 commodities should

[25] In most cases the appropriate device would be an express provision for arbitration in case the selected index number were discontinued. The selection of a substitute would ordinarily be in itself a simple process. Nor is it likely that the difficulty would arise at all if the index selected were one of the well-known and widely used series, many of which have been regularly published for a number of years.

In the corporate bond which is presented below for purposes of illustration, the trustee of the mortgage is suggested as the appropriate impartial agency for the selection of a substitute index.

[26] See the account of the difficulties in collecting reliable price data in Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 7 at 25-31 (1921).

be used, and that after that point the added time and labor in computation are not justified by the increase in reliability.[27] Professor Mitchell has pointed out, however, that a relatively small group of prices may be more representative than a much larger group, if the commodities included are carefully chosen.[28]

The mathematical formulas for computing index numbers have been the subject of intensive study. All formulas fall into one of five families, depending on the kind of average employed—arithmetic, harmonic, geometric, median, or mode. They are computed with a certain year or group of years as a base.[29] The technical difficulties are greatly increased by the necessity for weighting. In some of the earlier price-indices, constructed by cruder methods, commodities whose economic importance was small were given the same influence as the major staples and the index was thus thrown off balance.[30] But weighting not only requires some kind of a judgment as to the relative economic importance of the commodities involved, but it greatly complicates the statistical methods to be used. The usual method of weighting is merely to multiply the price paid in each case by the quantity sold.[31] By using different types of averages (of the five types above

[27] FISHER, THE MAKING OF INDEX NUMBERS 340 (1923). The price-index compiled under Professor Fisher's direction includes, however, 120 commodities.

[28] See the detailed analysis by Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 7 at 33-59 (1921). The remarkable fact that emerges from his discussion is the striking similarity in results of the well-known series there analyzed, in spite of the different price groups on which they depend.

[29] It is also possible to have index numbers with a "chain base." By this method each year is taken as the base for calculating the index number of the next, and the resulting figures are then linked together to form a "chain" of figures. FISHER, THE MAKING OF INDEX NUMBERS 18-24 (1923); Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 7 at 81-91 (1921).

[30] The classic example of unscientific weighting appeared in the Aldrich Report of 1893, where 25 different kinds of pocketknives were listed and were given the weight of wheat, corn, and coal put together. See Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 59-68 (1921), and the briefer discussion in BRADFORD, MONEY AND BANKING 194 (1934).

[31] There are four primary systems of weighting. Since there are always two dates implied in an index number, the methods of weighting usually used are the base year price times the base year quantity, the base year price times the given year quantity, the given year price times the base year quantity and the given year price times the given year quantity. As the aggregate type consists of a ratio of the sums of the prices themselves, the prices are already included in the formulas so the weights must be either the quantities of the base year or of the given year. FISHER, THE MAKING OF INDEX NUMBERS 43-61 (1923).

referred to), by the use of aggregate formulas, and by different methods of weighting and rectifying, it is obvious that a large number of formulas can be derived. Professor Fisher has examined 134 formulas carefully and has selected eleven which he calls superlative from the standpoint of accuracy, speed, and simplicity.[32] But he concludes that there are almost 50 formulas which agree more closely with each other than the standards of ordinary statistical practice require and which produce a very small variation in results when applied to the same basic data.[33]

III

SELECTION OF AN APPROPRIATE INDEX

No single price-index can be formulated which will serve all the conceivable purposes of every kind of private contract. Some can be used more widely than others. But the choice must ultimately be determined by the interests of the parties themselves, balanced and reconciled through free negotiation.

In most of the contracts where price-indices might be used, a basic conflict of interest may be anticipated. The stable purchasing power which each party will aim to ensure will not always be a purchasing power in relation to the same group of commodities. The creditor, receiving payment in money, will as a rule be primarily interested in its purchasing power as to ultimate consumption goods, defined, that is, in terms of retail prices. The debtor's *capacity to pay*, however, may be determined by prices which move on another level. A rise or fall of retail prices may lag by wide margins behind the level of wholesale prices.[34] Wage costs may deviate still more widely. The loss or gain to either party through such price movements would usually be thought to fall within the range of ordinary business risks. The extent of such

[32] FISHER, THE MAKING OF INDEX NUMBERS 245-247 (1923). His "ideal" formula is the one he describes as No. 353. Others who have advocated the use of this formula include A. C. PIGOU, THE ECONOMICS OF WELFARE 84 (1920); C. M. WALSH, PROBLEM OF ESTIMATION 102 (1921); Young, "The Measurement of Changes of the General Price Level," QUAR. J. OF ECON., August 1921, pp. 557, 572.

[33] FISHER, THE MAKING OF INDEX NUMBERS 219 (1923).

[34] Price-indices from September 1931 to July 1934 illustrate the lag of retail behind wholesale prices. Both retail prices (measured by the index of the National Industrial Conference Board) and wholesale prices (measured by the index of the United States Bureau of Labor Statistics) were declining through 1932. The trend was reversed in the wholesale field in February 1933, while it was not until two months later that retail prices started to climb. Wholesale prices shot up from a ratio of about 84 in February 1933 to 105 in July 1934; retail prices rose from 84 in April 1933 to 93 in July 1934. See the charts in FISHER, STABLE MONEY 326-327 (1934).

risks is partly concealed by the use of a unitary standard of value, the national currency. But with the adoption of the price-index as a more accurate and stable measure of value, these risks are clearly revealed and can be brought to a greater extent within the control of the contracting parties. The methods by which this may be done will need to be discussed in connection with particular types of contracts.

1. *Wage Agreements*

The use of price-indices for stabilizing wages is by no means a novel experiment. In the United States after the Great War a number of concerns used index numbers for computing wages.[35] It was to a commodity price-index that President Roosevelt was authorized to resort in determining the wage scale of Government employees after the cuts of 1933.[36]

Flexible devices for adjusting wages to changes in the general price level would avoid social friction and protect workers against one of the major hazards of the modern economic system. In periods of rapid depreciation of money one of the sources of grave injustice would be to a large extent cut off. At the same time one of the important incentives to entrepreneurs in inflation periods would be removed — the opportunity to exploit the wage-earning classes and thereby to secure for themselves a disproportionate gain.[37]

The conflict of interest which was suggested above appears most clearly, perhaps, in the case of wage agreements. The price-index best suited for the protection of wage-earning classes would seem to be a cost-of-living index, laying chief emphasis on the retail prices of the necessities of life and also including rents.[38] In periods of rising prices most manufacturing concerns could afford to pay wages determined by such a scale, for the prices of their products would rise at least as fast as the prices in a cost-of-living index. But the automatic rise in wage costs might cause difficulty for public utilities and other enterprises whose income rose more slowly. On the other hand, in periods of fall-

[35] Richard H. Tingley in the LITERARY DIGEST, vol. 66, Sept. 4, 1920, pp. 83-84; FISHER, STABLE MONEY 59 (1934). See the argument in favor of this device by Theodore H. Price, "The Index Number Wage," 121 OUTLOOK 742 at 747 (April 30, 1919).

[36] Economy Act of 1933, 48 Stat. 8 at 13 (1933).

[37] See MITCHELL, A HISTORY OF THE GREENBACKS, pp. 380-391 (1903).

[38] For this purpose the best available index now regularly published would seem to be either the index of the National Industrial Conference Board, published regularly in the SURVEY OF CURRENT BUSINESS, or the United States Bureau of Labor Statistics index of the cost of living in 32 cities, published in the MONTHLY LABOR REVIEW.

ing prices a more rapid drop in the prices of wholesale goods and manufactured products might leave wage costs, fixed in terms of the cost of living, at a considerably higher level.[39]

This brief discussion is not meant as an argument that price-indices cannot be used for the stabilization of wages or that a cost-of-living index would not be, from a social point of view, the most desirable. It is meant rather to indicate that the main purpose in contracting with reference to an index of some kind would be to emancipate wage-earners from the risk of monetary change. A cost-of-living index would be adopted if there were the additional purpose of guaranteeing them a predetermined standard of living and thus to free them from the ordinary risks of business management.

2. *Long-Term Mortgages and Leases*

The long-term mortgage or lease of land provides another field where the price-index can perform an important service in stabilizing money values. In Australia such contracts have recently been drafted with an adjustable currency debt, determined by a weighted index number. The index used is based on prices of food and house-rents in the six capital cities of Australia, as published by the Quarterly Summary of Australian Statistics.[40]

As to the price-groups to be emphasized there would be a somewhat wider range of choice in mortgages and leases than in wage agreements. If the capacity to pay of the mortgagor or lessee were alone considered, a price-index based on the commodities from which his income was derived could be adopted. In a mortgage or lease of agricultural land, an index of farm prices (such as the one published by the United States Bureau of Agricultural Economics) would provide a measure of the debtor's general economic position. If the creditor were willing to take so great a risk, an even smaller group of farm products could be used. In the case of urban land, the choice of an index might depend on whether the debtor's income was derived from a particular type of business enterprise or was based on earnings in the form of

[39] It should be pointed out, however, that the lag of wages behind wholesale and retail prices in general now produces this result to a very considerable extent in periods of falling prices. The quicker response that would be secured through price-index methods of calculation should therefore recommend this device to employers during periods of deflation, though it would not increase its popularity with employees.

[40] Watts, " 'Inflation' Clauses in Mortgages and Leases," 4 AUSTRALIAN L. J. 315 at 318 (1931). The lease agreement there set out provides for an alteration in the nominal rent due only in the event of a 20 per cent variation in the index number chosen.

wages or a salary.[41] On the other hand, the creditor in none of these cases would ordinarily wish to be too closely linked with the economic fortunes of the debtor. From the creditor's point of view an index with a broader base would usually be preferable. In short, in this whole class of transactions no single index, of the many indices available, would serve for every case; the choice would depend on the particular facts and would have to be left to agreement by the parties.

3. *Corporate Bonds*

Recent experience has clearly shown the need in long-term corporate financing for the stable standards of value which the price-index might provide. Again a choice is presented: between the special interests of the corporate obligor and the interest of the bondholder, determined largely by the uses to which the proceeds of the bond would be applied. None of the indices now published would confine the range of price movements analyzed as narrowly as obligors might desire.[42] On the other hand, an important function of the long-term

[41] Eventually the success of the price-index method of contracting would depend on its extension over a wide area of economic relationships. In the case of mortgages on urban residential property, for example, the capacity of debtors to pay would fluctuate over a large number of cases with the general level of wages and salaries. If a cost-of-living index were adopted widely as the basis for calculating wages and salaries, it would seem that a cost-of-living index would also be a suitable standard for mortgages (and also leases) of residential property. From a general economic point of view likewise a cost-of-living index would have much to recommend it. The prices reflected in a cost-of-living index would not go through the full cycle of rise and decline to which wholesale prices are subjected. Their use as a standard in money obligations would thus produce an even greater stability. The objection to the use of cost-of-living indices lies on another plane — the extreme difficulty in selecting the class whose expenditure will be considered typical and the changes in wants of consumers, which require constant revision of the commodity groups included. On the practical difficulties in formulating a generalized cost-of-living index, see 1 KEYNES, A TREATISE ON MONEY 95-120 (1930).

The whole subject of government obligations is neglected in the text, though the economic importance of such obligations requires that they receive some attention. Again it would be possible to say that the price-index adopted should reflect the debtor's capacity to pay, so that a price-group should be selected that would indicate the prospects for tax-collections. In this case, however, the debtor's capacity to pay would lie to an unusual degree within the control of the debtor itself, through the possibility of an increase or decrease in the tax rate. Here, as in the case of corporate obligations, it would seem that the interest of the creditor should be consulted first. If a cost-of-living index defined the creditor's interest too narrowly (or if the practical difficulties in formulating a generalized cost-of-living index were thought insurmountable), at least it would seem that principal emphasis should be laid in the index on retail prices of consumption goods.

[42] Commodities differ widely in the amplitude and frequency of their price movements and there are important regional differences. MILLS, THE BEHAVIOR OF PRICES

bond is to free the holder from the risk of fluctuations in corporate income, providing merely a stable return in the form of interest. In a large corporate bond issue it would seem essential to adopt an index with the broadest possible base, which would reflect adequately the purchasing power of money in general but would at the same time lay considerable emphasis on the retail prices of consumption goods.[43]

The 30-year debenture bonds of the Rand-Kardex Company, adopting the price-index method of calculation, have received considerable attention. But the practical operation of these bonds was never determined. The unfamiliarity of the investing public with price-indices led to the withdrawal of the bonds after a reorganization of the issuing corporation.[44] The price-index employed was the index of wholesale prices of the United States Bureau of Labor Statistics. The bonds contained one provision that might be found convenient for general use. The bonds declared that any change in the index number of less than 10 per cent was to be ignored. This limitation would seem at first sight to deprive the parties of the full security that they could readily be given. But until the investing public has been educated in the calculation of values through price-indices, a provision of this kind might avoid inconvenience and prevent dispute.

In order to suggest a method of defining monetary values by means of price-indices, the following language is suggested, appropriate for use in a corporate bond:

"On the first day of March, 19 55, for value received, the *AB* Company . . . promises to pay the bearer such sum of money

161-212 (1927); FISHER, THE MAKING OF INDEX NUMBERS 11-14 (1923); Mitchell, "The Making and Using of Index Numbers," BULLETIN No. 284 OF THE UNITED STATES BUREAU OF LABOR STATISTICS 11 ff. (1921). It would be to the interest of a corporate obligor to select the group of commodity prices in terms of which its costs and income were chiefly determined. Thus a corporation dealing in farming machinery might wish to use an index of agricultural implement prices; a manufacturer of automobiles might wish to use an index reflecting general business activity, an index of a small number of wholesale prices, or even an index of automobile prices. Whether the investing public could be persuaded to assume a share in the ordinary business risks of the issuing corporation is another question.

[43] See the excellent discussion by KING, INDEX NUMBERS ELUCIDATED 209-216 (1930). It is there pointed out that no single index can exactly adjust the quantum of the debt to the needs of *every* creditor, and that the standard should therefore be as inclusive as possible, though the retail prices of goods intended for final consumption should receive the greatest weight.

[44] RAND, ASSURING BUSINESS PROFITS 223 (1926); FISHER, STABLE MONEY 112, 388 (1934); Nebolsine, "The Gold Clause in Private Contracts," 42 YALE L. J. 1051 at 1093-1094 (1933).

as is equivalent to the present purchasing power of One Thousand Dollars and to pay interest at Six per cent per annum . . . , both principal and interest to be measured by the index numbers of wholesale commodity prices as hereinafter provided. . . .

"The sum to be paid at the maturity of this bond shall be equal to $1000.00 multiplied by the latest index number of wholesale commodity prices which has been published by the selected agency ten days or more before payment is to be made, and shall be divided by the index number of wholesale commodity prices published by the selected agency for the week preceding the week in which this bond is issued. The sum to be paid on each interest date of this bond shall be equal to $60.00 multiplied by the latest index number of wholesale commodity prices which has been published by the selected agency ten days or more before payment is to be made, and shall be divided by the index number of wholesale commodity prices published by the Bureau or other selected agency for the week preceding the week in which this bond is issued.[45]

"The index numbers to be employed are the index numbers of wholesale commodity prices prepared by the United States Bureau of Labor Statistics and now published weekly in the periodicals entitled Commerce and Finance, Commercial and Financial Chronicle, and Business Week.[46] If said Bureau shall cease to prepare and publish said index numbers, the Trustee under the said mortgage shall select such other regularly published index number as in the opinion of the Trustee most closely resembles the index number of said Bureau." [47]

[45] To illustrate the processes of computation that would be involved in applying the provision above suggested, let us suppose that the index number was 91 when the bond was issued and that at the time the first interest payment was due the index number had declined to 82. The sum in currency required to pay the interest on the bond would be $60 multiplied by the fraction $^{82}/_{91}$ or $54.07. Suppose, then, that at the maturity of the bond the index number had risen to 123. The principal sum due would then be $1000 multiplied by the fraction $^{123}/_{91}$, or $1351.65.

[46] The wholesale price index of the United States Bureau of Labor Statistics is here suggested because it is widely known and easily accessible. It does not include retail prices, rents, stock and bond prices, etc., and therefore fails to give an adequate index of the general price level. For this purpose, which would be especially important in a large corporate bond issue, Snyder's index (published in the MONTHLY REVIEW OF CREDIT AND BUSINESS CONDITIONS) would be preferable.

[47] As was suggested above, note 25, the selection of a substitute for a discontinued index could be accomplished through arbitrators in ordinary cases. It would probably be wise, if arbitration were the method used, to require that each party select one arbitrator and that the two so selected be empowered to choose a third. If the price-index of the United States Bureau of Labor Statistics were the one used, the discontinuance of the

Since the sums of money due on bonds which include provisions of this type would not be ascertainable until shortly before the dates when payments were due, it seems fairly clear that the bonds would not be negotiable.[48] In analogous cases courts have enforced the requirement of the Uniform Negotiable Instruments Law and held instruments non-negotiable where they did not provide for a "sum certain."[49] The most that can be said in favor of negotiability is that these instruments would have a commercial, if not a mathematical, certainty.[50] Since this argument would be likely to fail, there would be two remaining avenues: legislation might expressly provide for negotiability in this type of agreement,[51] or else the equivalent of negotiability could be achieved by express provisions in the contract. As to the latter possibility, it is true that the language of some decisions has indicated that negotiability cannot be achieved by mere agreement, but where the point has been expressly raised it has usually been held that a clearly expressed intent

series is so unlikely in the foreseeable future that the provision here made might be thought an excess of caution.

The suggestion that price-indices be used for the principal and interest on the bonds would also be applicable to the redemption price.

[48] This has been pointed out by Nebolsine, "The Gold Clause in Private Contracts," 42 YALE L. J. 1051 at 1093 (1933). See also 29 ILL. L. REV. 635 at 638-640 (1935).

[49] Uniform Negotiable Instruments Law, Sec. 1. Thus instruments payable in a certain sum "and all other sums that may be due" [Smith v. Nightingale, 2 Stark. 375, 171 Eng. Rep. 677 (1818)], "and taxes" [Smith v. Myers, 207 Ill. 126, 69 N. E. 858 (1904); Mechanics' Bank v. Johnson, 104 Conn. 696, 134 Atl. 231 (1926)], "and such additional premium as may become due on policy No. 28171" [Marrett v. Equitable Ins. Co., 54 Me. 537 (1867)] have been held non-negotiable. The effect of tax-exemption and tax refunding provisions on negotiability is discussed at length in 29 MICH. L. REV. 77 (1930).

[50] This argument has prevailed in some courts with respect to notes on which a discount is allowed if paid within a certain time before maturity [Farmers' Loan & Trust Co. v. Planck, 98 Neb. 225, 152 N. W. 390 (1915). *Contra,* Waterhouse v. Chouinard, 128 Me. 505, 149 Atl. 21 (1930).], and notes "with current exchange" upon another place [First Nat. Bank v. Nordstrom, 70 Kan. 485, 78 Pac. 804 (1904); Haslach v. Wolf, 66 Neb. 600, 92 N. W. 574 (1902). *Contra,* Lowe v. Bliss, 24 Ill. 168 (1860). Sec. 2 of the Uniform Negotiable Instruments Law declares that the "sum payable is a sum certain within the meaning of this act, although it is to be paid . . . (4) With exchange, whether at a fixed rate or at the current rate. . . ."].

[51] It was necessary to resort to this procedure as to corporate bonds in New York, where prior court decisions had held certain types non-negotiable under the Uniform Negotiable Instruments Law. A statute was enacted declaring them negotiable. See New York Personal Property Law (1930), art. 8, sec's. 260-262 (Cahill's Consol. N. Y. Laws, 1930, pp. 1760-1761). See also 40 YALE L. J. 261 (1930); and Steffen, "A Proposed Uniform Act Making Investment Instruments Negotiable," 34 COL. L. REV. 632 at 636 (1934).

can be enforced for particular purposes.[52] As an illustration of the language that promises most in this direction, the following clause is suggested:

> "This bond is issued subject to the conditions above mentioned, and every holder hereof by accepting the same agrees with every subsequent holder and with the obligor that this bond shall be treated as a negotiable instrument and all rights and duties of any holder and of the Corporation and of the Trustee shall be determined by the laws applicable to negotiable instruments."

It seems convenient to consider also at this point the complicated problems in corporate accounting that would arise through the constant fluctuation in the nominal sums due on corporate obligations. A recent writer has pointed out that the resultant complications in the accounting field constitute one of the most serious objections to the price-index device.[53] Clearly an increased flexibility in accounting methods would be required. The debiting of interest payments would not seem to present insuperable difficulties if the change in the value of money were not rapid and extreme.[54] With payments of principal at maturity,

[52] Certain decisions have been occasionally cited as saying that a non-negotiable instrument cannot be made negotiable by contract. American Nat. Bank. v. Sommerville, 191 Cal. 364, 216 Pac. 376 (1923); Enoch v. Brandon, 249 N. Y. 263, 164 N. E. 45 (1928); Motor Contract Co. v. Van Der Volgen, 162 Wash. 449, 298 Pac. 705 (1931); Ornbaun v. First Nat. Bank, 215 Cal. 72, 8 Pac. (2d) 470 (1932). See 22 ILL. B. J. 82 (1933); 78 UNIV. PA. L. REV. 258 (1929). But in most of these cases the point was not squarely raised. See Beutel, "Negotiability by Contract," 28 ILL. L. REV. 205 at 220 (1933); 33 YALE L. J. 302 (1924). In those cases where the point has been raised, courts have held the clauses effectual for the purposes intended by the parties. Morgan Brothers v. Dayton Coal & Iron Co., 134 Tenn. 228, 183 S. W. 1019 (1916); Anglo-California Trust Co. v. Hall, 61 Utah 223, 211 Pac. 991 (1922); Gray v. Gardner, 12 Pa. D. & C. Rep. 449 (1929). On this whole question see Aigler, "Recognition of New Types of Negotiable Instruments," 24 COL. L. REV. 563 at 591 (1924); Beutel, "Negotiability by Contract," 28 ILL. L. REV. 205 (1933). The latter writer suggests a somewhat longer clause than the one proposed in the text, for the purpose of securing negotiability by contract. 28 ILL. L. REV. 205 at 217.

[53] See Nebolsine, "The Gold Clause in Private Contracts," 42 YALE L. J. 1051 at 1093 (1933). While the inconveniences in the field of corporate accounting are serious, the writers cannot agree that they are insurmountable.

[54] Assuming annual interest periods, the interest payments could be handled by debiting the proper expense account for the amount actually paid out during the accounting period. Thus if the index number was 100 when the bonds were sold and the interest for one period had to be paid on the basis of an index number of 120, that particular period would be the one to bear the additional burden since it had the advantage of the money at a time when the price level was such that it was probably capable of earning more. Of course this is not universally true since the income of each enterprise will not necessarily fluctuate with the changing index number. Where the

however, any considerable movement of prices would have more serious consequences. So long as the change in the index number remained within fairly narrow limits, its fluctuations could merely be recorded in a footnote to the balance sheet. Since it could not be predicted with certainty at any time that the index number would move up or down, it might be assumed by the accountant that it would remain the same, and the bonds be carried at their nominal principal amount on the balance sheet, with a footnote explaining how much currency it would have taken to pay them if they had matured on the date of the statement. Then as bonds approached maturity and it could be seen that there was going to be a material error, the required adjustment could be made by charging or crediting surplus. If this device were thought inadequate an account could be set up entitled, "Reserve for Fluctuation of Bonds." At the end of each accounting period, that account would be debited or credited with an amount adjusted according to the index number, with a proportionate entry in some surplus account so that at the end of each period the actual state of the business would be correctly portrayed. Thus if 10-year bonds were sold when the index number was 100 and at the end of the first year it had risen to 110, $10 for every $100 bond would be credited to "Reserve for Fluctuation of Bonds" and charged to "Surplus." Then if at the end of the next accounting period the index number had fallen to 90, it would be necessary, for every $100 bond, to debit "Reserve for Fluctuation of Bonds" by $20, credit "Surplus" by $10 and credit an account entitled perhaps "Capital and Surplus Adjustment for Fluctuations" by $10. This latter operation would be required in order that it be kept clear that that $10 was not to be used for the purpose of paying dividends.[55]

The most satisfactory method of readjusting corporate books to changes in the purchasing power of money would be a periodic revaluation of corporate assets and liabilities. There has been a strong movement in modern accounting theory in favor of this practice, even in

semi-annual interest payment periods do not coincide with the calendar year, the current liability item of accrued interest would have to be estimated. But this would be no more difficult than estimating taxes, which is frequently necessary.

[55] Sinking fund obligations would not cause much if any difficulty over the period the bonds were outstanding. Since the Corporation is obligated to use these funds for purposes of redemption within a relatively short period of time after payment thereof to the Trustee, there would be no accumulations. The Corporation's obligation to retire bonds through the application of sinking fund moneys, so that there shall be a percentage retirement by maturity, would probably work out fairly accurately, since the variations of the price-indices would usually equalize themselves.

periods of monetary stability. The orthodox view has been to regard actual costs as the sole basis for the valuation of fixed assets.[56] An able group of accountants has strongly urged instead that replacement values be used as the basis.[57] Stable-value clauses are primarily intended, of course, for periods when monetary values are undergoing rapid change. In such periods a revaluation of assets in terms of replacement values becomes, for independent reasons, a practical necessity. The use of the price-index to define the quantum of long-term corporate obligations would merely add one additional reason for periodic appraisal of corporate assets. To state an extreme illustration of this, if a German corporation having 100,000 marks of assets had made a note for 1 mark in 1920 to be repaid in three years in an amount equal to the then purchasing power of the mark based on index numbers, at maturity it would have been forced to pay more than 11,000,000,000 marks.[58] Upon unadjusted book values it would have been hopelessly insolvent. A readjustment of its inventory would be imperatively required. This might be made by an appraisal, which has the virtue of being accurate since the location, obsolescence, suitability, efficiency, and depreciation of the specific property are taken account of. Or it might be made by the less accurate method of index numbers of prices, which is inexpensive, rapid and simple.[59] Under this latter method, if a machine cost $400 when the index number of machinery prices was 100, it could be carried on the books at $600 with an adjusted reserve for depreciation when the index number reached 150.[60]

[56] See PATON, ACCOUNTANTS' HANDBOOK, 2d ed., 735 ff. (1932); Jensen, "Costs and Depreciation," 7 N. A. C. A. BULLETIN No. 17, sec. 1, p. 626 (May 1, 1926); HATFIELD, ACCOUNTING 77-78 (1932).

[57] PATON and STEVENSON, PRINCIPLES OF ACCOUNTING 451-469 (1918); BALDWIN, ACCOUNTING FOR VALUE AS WELL AS ORIGINAL COST 67-111 (1927).

[58] This is based on a price-index of 400 commodities with 1913 as a base. The ratio is 1,486 in 1920, 1,911 in 1921, 34,182 in 1922, and 16,620,000,000,000 in 1923. WARREN and PEARSON, PRICES 17 (1933).

[59] For a comparison of the appraisal and the index number methods, see Sweeney, "Approximation of Appraisal Values by Index Numbers," 13 HARV. BUS. REV. 108-115 (Oct. 1934). See also Daines, "The Changing Objectives of Accounting," 4 ACCOUNTING REV. 94 at 101 ff. (1929).

[60] Price-indices have been used by some commissions and courts to eliminate the cost and delay of inventories in order to determine the cost of reproduction in fixing public utility rates. See note in 34 COL. L. REV. 778 (1934).

It is apparent that if the Corporation's accounts payable bulked larger than its accounts receivable, some adjustment of values on a price-index basis would be necessary from any accounting point of view.

On accounting methods for adjusting inventories to depreciation of corporate assets, see *infra* the comment in this issue on "Corporations—Depreciation and Net Profits for Dividend Purposes."

Whichever method is adopted, recent experience with a declining price level has abundantly shown the necessity for a readjustment of balance sheet items to an important change in the value of money. If corporate obligations were to be defined in terms of price-indices, there would be merely one additional factor pointing toward a procedure which has distinct advantages even in periods of relative stability and which cannot be avoided in periods of monetary change.

IV

OBLIGATIONS UNSUITED TO THE USE OF A PRICE-INDEX STANDARD

The discussion up to this point has indicated that the special economic position of the obligor must be kept in mind in selecting the price-index to be used in each case. A brief reference should now be made to certain types of money obligation in which the obligor's economic situation would probably preclude the adoption of the price-index device.

Prominent in this group are the obligations of public utilities. Here we meet in exaggerated form the difficulty that appears to some extent in nearly every attempt to place money debts on a price-index basis. The income of the obligor may not respond to the rise or fall of the general price level. In a period of rising prices an automatic increase in the currency debts of such obligors might subject them to serious strain before their capacity to pay had increased to a corresponding degree. In the case of public utilities, rate regulation would effectively prevent the prompt readjustment of corporate income which would be necessary to meet price-index obligations. The ultimate remedy, of course, would be the adoption of price-indices in determining the rate-base of public utilities. There has recently been a tentative movement in this direction, but the practical difficulties encountered will probably prevent a general resort to this device for some time to come.[61]

The same obstacle appears in the case of banks and insurance companies. Their assets consist primarily of money obligations. Unless their assets can themselves be placed on a price-index basis, these obligors would find their liabilities automatically increased without any corresponding appreciation in their assets. At the present time neither banks nor insurance companies are seriously prejudiced by a change in the purchasing power of money, since a change in either direction will have the same effect on both sides of the ledger. The deposit

[61] See Re Chesapeake & Potomac Telephone Co. of Baltimore City, [1934] 1 P. U. R. (N. S.) 346 (1933), and note in 34 COL. L. REV. 778 (1934).

liabilities of savings and commercial banks and the obligations of insurance companies can be redefined in terms of price-indices only after this form of stable-value clause has been widely adopted in credit transactions. The security which would be particularly appropriate for life-insurance obligations can come only after experience has demonstrated its feasibility in a variety of other obligations.

The adoption of the price-index would be most difficult in the case of deposit liabilities of commercial banks. The great volume of credit transactions and the rapid turnover involved in the ordinary business of commercial banks would make calculations in terms of price-indices extremely inconvenient. In general it may be anticipated that in short-term transactions (promissory notes and drafts) a stable-value clause will be adopted only if there is a prospect of rapid and extreme change in monetary values. When monetary depreciation proceeds at the rate that it reached in the German post-war inflation, some form of stable-value clause becomes imperative.[62] But until the risks involved in short-term credit transactions exceed those that we can now foresee, the inconvenience in departing from the nominal parity of money would not be justified by the additional security of the price-index.

In international transactions as well there would be some practical difficulties in the general resort to price-indices. It would be undesirable to connect the standard of value in international payments too closely with the price-structure of any particular country.[63] But in the recent past foreign creditors unprotected by stable-value clauses have suffered enormous losses through devaluation of national currencies. For them the choice now presented is a choice between the risk of governmental action, directly altering the purchasing power of money on international exchange, and the risk of a movement of prices within a particular country, to which the international position of the currency would sooner or later become adjusted. It is true that gold remains as an alternative standard of value. But the action of the United States,

[62] See the legislation of 1923 preserving negotiability in drafts in which the principal was defined in terms of commodities. REICHSGESETZBLATT, 1923, I, 407. It is well known that the rapid depreciation of the mark in Germany led in all types of commercial transactions to the use of the "multiplicator," based on an index number published by the government. For an illustration see FISHER, THE MONEY ILLUSION 48 (1928).

[63] This point is made by NUSSBAUM, VERTRAGLICHER SCHUTZ GEGEN SCHWANKUNGEN DES GELDWERTES 78 (1928). In the same place Professor Nussbaum indicates his opinion that the price-index is too inconvenient for general use in short-term transactions, although in principle there is no objection to its use, especially in transactions extending over a long term.

invalidating the gold-clause in private obligations, has indicated the hazards involved in reliance on gold, both on a national and an international scale.[64] The adoption of price-indices in international transactions has been recommended by Sir Arthur Salter, with the aid of a composite index of world prices to be compiled by the League of Nations.[65] The practical difficulties in compiling such an index and the dangers of manipulation by interested national groups lead inevitably to the conclusion that this avenue is closed for the indefinite future.[66]

In the foregoing discussion no attempt has been made to minimize the difficulties in adopting the price-index standard of monetary value. Some fundamental changes would be required in the habits of the investing public. The extension of this method over wide areas of private obligation would have to proceed slowly and by successive stages. The transition from a unitary standard of monetary value would raise new problems, both legal and economic, and require the development of some new contractual devices. In the end the willingness of private persons to submit to the inevitable inconvenience will depend on the success of monetary authorities in securing permanent stability for the monetary systems of the world. If governmental management of the currency can achieve its ultimate objective, both the price-index and other forms of stable-value clause can be abandoned.

The principal purpose of this brief survey has been to suggest that the price-index, at its present high stage of technical development, can be safely applied to certain important classes of money obligations. There is still vigorous debate among economists over the use of price-indices for the broader purposes of economic science. This debate should not be taken as evidence that the numerous series of index numbers now currently published are crudely constructed or that they fail to accomplish, with a high degree of precision, the purposes at which they aim. For legal purposes the very abundance of these series should extend the range of choice and make possible a more exact adjustment of monetary standards to the needs of particular transactions. Nor should it be forgotten that the discrepancies in results reached by the

[64] The effect of American gold-clause abrogation on international transactions has been discussed in the valuable articles by Professor Nussbaum, "Comparative and International Aspects of American Gold Clause Abrogation," 44 YALE L. J. 53 (1934), and "International Legal Effects of Dollar Depreciation," 2 UNIV. CHI. L. REV. 291 (1934).

[65] Salter, "A Year and a Half of Crisis," 22 YALE REV. 217 at 230 (Dec. 1932).

[66] See Nebolsine, "The Gold Clause in Private Contracts," 42 YALE L. J. 1051 at 1094-1095 (1933).

different series lie within a narrow range, a range far narrower than the shift in monetary values that is now in prospect in this country.

The legal complications that would result from the general use of price-indices in private contracts are serious. The quality of negotiability would probably be forfeited, though legislation could confer it if the price-index device were widely used, and express contract could preserve most of its advantages. In the field of corporate obligations, the accounting problems that would arise would necessitate some readjustments, though not to any greater degree than good accounting practice would justify. Some details would have to be worked out, such as the methods for providing a substitute on discontinuance of the index selected. Perhaps the greatest obstacle of all would be the necessity for educating the general public as to the nature and general purpose of the price-index and for instructing them in some simple arithmetical calculations. These inconveniences can be counted on to prevent the rapid spread of the price-index device in private contracts, and to limit its use in the main to long-term transactions. But in the end the choice presented is a choice of inconveniences. Against these disadvantages are to be weighed the risks involved in reliance on monetary standards, which have fluctuated widely in the past and whose stability in the future is by no means guaranteed.