Chapter 6
CURRENCY STANDARDS

I. THE CASH TRANSACTIONS STANDARD AND THE CASH BALANCES STANDARD

The new fundamental equation, which I shall propound in chapter 10, leads up, as it should, to the purchasing power of money. The quantity equations which have been in use hitherto do not, however, do so. They refer, as we shall see in chapter 14, to price levels which weight different articles, not in proportion to their importance to consumers, but in proportion to their importance in connection with the volume either of cash transactions or of cash balances—two types of currency standard, as they may be termed, which we shall call respectively the cash transactions standard and the cash balances standard.

These currency standards must necessarily differ from the purchasing power of money, because the relative importance of different articles as objects of monetary transactions is not the same as their relative importance as objects of consumption. It is evident that the systems of weighting appropriate to a consumption standard and to a currency standard respectively can differ materially from one another. An object of expenditure which passes straight from the original producer to the ultimate consumer, such as personal services for example, gives rise to a less volume of monetary transactions than an object of equal value which passes through many hands and through many stages of production, each of which involves a monetary transaction, before it reaches the consumer. These two objects of expenditure would, therefore, be weighted equally for the purposes of the consumption standard, but unequally for the purposes of a currency standard. Moreover there are many types of financial business which
CURRENCY STANDARDS

give rise to a large volume of transactions but are of little or no importance for the consumption standard; as, for example, stock exchange business or three-month treasury bills which in each three-monthly period give rise to a large volume of cheque transactions, and may be the subject of several more by reason of their changing hands during the period of their three-month currency.

Nevertheless currency standards have been not infrequently confused with the purchasing power of money itself; and even the very few writers who have got so far as to distinguish the currency standards from the purchasing power of money, have often overlooked the fact that there are two distinct types of this standard. In the first type of currency standard the different objects of expenditure are weighted in proportion to the amount of the cash transactions (payment by cheque as well as by cash, being, of course, included in this expression) to which they give rise. But in the second type the objects of expenditure are weighted by reference to the demand for bank balances or stock of money which they occasion. The two are distinct because some transactions require a greater holding of anticipatory money balances to meet them than others of equal money value, according to their regularity and the certainty with which their date and amount can be anticipated. It follows that a rise or fall in the price of certain articles causes a greater fluctuation in the amount of the cash balances of the community than a similar movement in the price of other articles which give rise to an equal volume of cash transactions.

I propose to call the first type of currency standard the cash transactions standard and the second type the cash balances standard. The significance of the distinction will be developed in chapter 14, where we shall see that the ‘Fisher’ quantity equation leads up to the former, whilst the ‘Cambridge’ quantity equation leads up to the latter.

Writers on the currency standard have generally meant by it, I think, the cash transactions standard rather than the cash
balances standard. The designation currency standard, defined as a cash transactions standard, was in fact first introduced by Professor Foxwell, who regarded it as "par excellence the measure of appreciation or depreciation" in such contexts as discussions relating to bimetallism, choice of standards, etc. The leading exposition of it, however, is not by Professor Foxwell himself but by Professor Edgeworth, on the basis of conversations with the former, in his third memorandum for the British Association, 1889 (reprinted op. cit. p. 261). Edgeworth's concluding comment is as follows: 'Upon the whole, it appears that the currency standard deserves more attention than it has received. The stone unaccountably set aside by former builders of index-numbers may become the corner-stone of future constructions.' The cash transactions standard is also important because—as mentioned above—it is the price level appropriate to Professor Irving Fisher's widely celebrated formula $PT = MV$.

It is the cash balances standard, on the other hand, which is characterised par excellence by the fact that a change in it ceteris paribus alters in the same proportion the quantity of money required by the public.

In practice the most important differences between the currency standards and the consumption standard are that the former weight goods much higher and services much lower than does the latter, and that the former includes, whilst the latter excludes, the objects of financial transactions; with the result that when the value of transactions in capital goods is moving relatively to that of consumption goods, or when the price of commodities is moving relatively to the price of services, the fluctuations of the two types of standard may be materially different. This, as we shall find, is of particular importance for the short-period economic theory of trade and credit fluctuations. It also means that the relation of the purchasing power of money to its quantity can vary without loss (or gain) of convenience even

---

1 M. Divisia ("L'Indice monetaire et la théorie de la monnaie", Revue d'Economie politique, 1925, p. 1001) has defined the value of money by reference to the cash transactions standard calculated from year to year by the chain method.
CURRENCY STANDARDS

though there is no change in banking habits and practices. But this is to anticipate the subject-matter of later chapters.

In some contexts the fluctuations of the wholesale standard may be nearer to those of the currency standards than are those of the consumption standard; but the fact that the currency standards are influenced by capital transactions whilst the wholesale standard is not, makes it impossible to place any reliance on such correspondence.

II. IS THERE SUCH A THING AS AN 'OBJECTIVE MEAN VARIATION OF GENERAL PRICES'?

There is, however, a kind of currency standard different from the above, which has played an important part in the history of the subject and has exercised a very great influence on the prevailing conceptions of the nature of index numbers of prices. The first economist effectively to introduce index numbers of prices into monetary science (though like other original geniuses not without precursors), namely Jevons, did not contemplate his idea from any of the angles from which it has been viewed above—neither from that of the purchasing power of money nor from that of the currency standards as just defined. Nor did Edgeworth exclusively, either in his earliest or in his latest contributions to the problem over a space of forty years. Nor has Dr Bowley—at least not unequivocally in his theoretical treatment. The name of Cournot, the great parent of so many brilliant errors based on false analogies between the moral and the physical sciences, should also be mentioned here, inasmuch as he illustrated the variation in prices due to a change on the part of money by that change in the position of the earth with respect to the stars which is due to the motion of the earth. Some of these eminent authorities have been of course, as familiar as any one else with the conception of the index number of prices as being the price of a composite commodity, and with the appropriateness of different composite commodities to different times, places
and purposes. Nor would they necessarily differ on any substantial point from what I have written above. Nevertheless, Jevons certainly, and Edgeworth and Dr Bowley to the best of my understanding, have also pursued something distinct from the purchasing power of money, something reached in quite a different way, something which has to do with what they might describe as the value of money as such or, as Cournot called it, the ‘intrinsic value of money’. 1 I have long believed that this is a will-o’-the-wisp, a circle-squaring expedition which has given an elusive taint, difficult to touch or catch, to the treatment of the theory of price index numbers traditional in England. This is not equally true of America. The methods of approach characteristic of C. M. Walsh, Irving Fisher and Wesley Mitchell are virtually free from the ‘taint’ which I attribute to Jevons, Edgeworth and Dr Bowley. Nevertheless, whilst the Americans have not worshipped the mythical creature, they have not (with the exception, perhaps, of Mr Walsh) actively combated him or dragged him out of the twilit cave where Edgeworth judiciously kept him. 2 At any rate it is necessary for the completeness of this discussion that I should endeavour to make my point explicit, and to bring the difference, if there is one, to a head. 3

According to the Jevons–Edgeworth conception, the fluctuations in the prices of individual things are subject to two distinct sets of influences—one set due to ‘changes on the side of money’ which (subject to friction in the dimension of time) affect

1 As distinguished from what he called the ‘power of money’ or, in modern terminology, the ‘purchasing power of money’.

2 In the long controversy waged between Mr Walsh and Edgeworth, in the pages of the Economic Journal and elsewhere, on the appropriateness of the application to price index numbers of certain ideas drawn from the calculus of probabilities, I am, in main substance, on the side of the former. Professor Allyn Young, who was previously inclined to lean slightly to the ‘tainted’ British school, subsequently (1923) went over to the other side (see his Economic Problems, pp. 294–6). On the Continent, in Italy Professor Gini (Metron, 1925) and in Austria Dr Haberler (op. cit., 1927) are ‘taint-free’; whilst in France Lucien March (Metron, 1921) is ‘tainted’, but Divisia (op. cit. pp. 847–58) notably free. From certain allusions I believe Marshall to have been free; but he never discussed the matter in explicit terms.

3 I first endeavoured to deal with this point, though inadequately, in an essay on index numbers which gained the Adam Smith Prize in the University of Cambridge in the year 1907 [JMK, vol. xii].
all prices equally in direction and in degree, the other set due to ‘changes on the side of the things’ which affect prices relatively to one another. Now as regards the second set, changes in the prices of things relatively to one another can involve no absolute change in the value of money itself. Changes in relative prices may, of course, affect partial index numbers which represent price changes in particular classes of things, e.g. the index of the cost of living of the working classes. But such changes cannot affect the price level ‘as a whole’ or the value of money in itself. By a change in the value of money in itself or in the price level as a whole, they mean the amount of the uniform residual movement due to ‘changes on the side of money’ after we have ‘averaged out’ the chaotic but compensatory movements in individual prices due to their movements relatively to one another and to the price level. For the purpose of isolating ‘changes on the side of money’ they employ the doctrine of averages based on the theory of probability. If we take enough unbiased observations of individual prices, their relative movements will, it is argued, cancel out in accordance with the law of error, and we shall be left—subject to a probable error calculated in the usual way—with a reasonably satisfactory index of the residual movement of the price level itself which is our *quaestum*.¹

Three quotations from Jevons, Dr Bowley² and Edgeworth respectively will indicate the line of thought which I am trying to describe.

**Jevons, Investigations in Currency and Finance, p. 181:**
The geometric mean seems likely to give in the most accurate manner such general change in prices as is due to a change on the part of gold. For any change in gold will affect all prices in an equal ratio; and if other disturbing

¹ This *quaestum* is the same as Edgeworth’s *indefinite standard* in sections VIII and XI of his memorandum prepared for the British Association in 1887 (reprinted in his *Papers relating to Political Economy*, vol. 1, pp. 233 et seq.). His section VIII seeks the ‘determination of an index irrespective of the quantities of commodities: upon the hypothesis that there is a numerous group of articles whose prices vary after the manner of a perfect market, with changes affecting the supply of money’. Section IX seeks the ‘Determination of an index utilising quantities of commodities: upon the hypothesis that a common cause has produced a general variation of prices’.

² Cf. also the first part of Dr Bowley’s ‘Notes on Index Numbers’ (*Economic Journal*, June 1928).
THE PURE THEORY OF MONEY

causes may be considered proportional to the ratio of change of price they produce in one or more commodities, then all the individual variations of prices will be correctly balanced off against each other in the geometric mean, and the true variation of the value of gold will be detected.

Bowley, Elements of Statistics (5th ed.), p. 198:
Thus if we start out to measure prices in general...in order that the resulting index number should be subject to the analysis of the law of error, the samples should be random and independent in their fluctuations from the general movement; dependence increases the number of samples necessary for an assigned precision...If the number of independent quantities is at all considerable, any reasonable system of weights is likely to give as good a result as the conditions of the problem allow.

Edgeworth, Papers relating to Political Economy, vol. 1, p. 247:
We have seen that, upon the supposition of a change in the supply of money, Jevons’ method of combining the variations of prices without regard to the corresponding volumes of transactions is by no means so absurd as has been thought by some. The case is, as if we wanted to discover the change in the length of shadows, due to the advance of day. If the objects casting shadows were unsteady—waving trees, for instance—a single measurement might be insufficient. We might have to take the mean of several shadows. Now for our purpose the breadth of the upright object casting the shadow would be unimportant. The ‘wide-spreading beech’ and the mast-like pine would serve equally well as a rude chronometer.

Again, p. 256:
There seem to be combined in popular thought two elements which we have sought to distinguish in analysis, namely, the conception of an objective mean variation of general prices, and the change in the power of money to purchase advantages.

We have, in short, to this way of thinking, a typical problem in the combination of observations, where each individual observation is subject to a disturbing factor which it is our business to eliminate. We mean by the rise or fall ‘in the value of money’ the hypothetical movement which would have been brought about if the ‘changes on the side of money’, i.e. the changes which tend to affect all prices equally, had been the only changes operating
and there had been no forces present ‘on the side of the things’
tending to change their prices relatively to one another.

The problem being of this character, it is supposed that what
we need as a sound scientific basis for our calculations are numerous observations of individual prices, particularly of prices which
are subject to ‘independent’ influences, though we may, if we like, indulge in some rough weighting, to counterbalance a possible want of a full measure of independence. Such weighting
can do no harm, but will, on the other hand, if our observations
are a numerous and random selection, make but little difference
to the final result, and is therefore, on the whole, more trouble
than it is worth. Having obtained a numerous and random selec-
tion of individual prices, our next task is to determine the most
appropriate method of combining them. What is the law accord-
ing to which the relative movements are most likely to distribute
themselves round the bull’s eye? Will it be such that the geo-
métrical average of the individual prices will be nearest to the
mark, as Jevons believed? Or is the arithmetical average good
enough, as most computers have supposed, for no better reason,
perhaps, than that it is easier to add than to multiply? Or is the
mode on the whole preferable, as Edgeworth inclined to think?
Or are there good arguments for ‘fancy’ formulae like the har-
monic average, or the root of the mean square, or another?1

Now, whilst the conception of a price index as being the price
of a composite commodity (Edgeworth’s ‘power of money to

1 Some authors have tried to settle this question by observing whether the dispersions of
individual prices which actually occur distribute themselves along the Gaussian curve
corresponding to the arithmetic mean or along the curve corresponding to the geometric
mean, and so forth. For a good account of the results of this method see Olivier, Les Nombres
Indices, chapter 4; see also Bowley, ‘Notes on Index Numbers’ (Economic Journal, June 1928, pp. 217–20). But the method seems to me to be misconceived, except for
negative purposes, i.e. to show that there is no regularity in the shape of the dispersion,
unless it were to be applied to a great number of cases. To apply it in a few cases, as its
exponents have done, proves nothing, except as a corroboration of something we have
reason to expect a priori. If it were to be shown that the curve of dispersion is of the same
type in a great number of different contexts, then one would take notice; but the investi-
gations, so far as they have gone, show nothing of the kind. It is worth mentioning, how-
ever, that M. Olivier and Professor Bowley both conclude that, as a matter of curve-
fitting, the geometric curve fits better, in the cases which they have examined, than the
arithmetic.
THE PURE THEORY OF MONEY

purchase advantages’) has been becoming increasingly prevalent (all the old-fashioned index numbers were almost entirely un-weighted, whilst the best new ones, as for example the U.S. Bureau of Labour index, are carefully and elaborately weighted), yet this other conception has not been rooted out and still maintains a demi-sway, a traditional influence over the statistical world. The conclusion of the British Association Committee of 1888 (in spite of their recommending a weighted index number for practical purposes as ‘commanding more confidence’), that ‘the scientific evidence is in favour of the kind of index number used by Prof. Jevons, provided there is a large number of articles’, has never been expressly repudiated by the economic world.

Nevertheless I venture to maintain that such ideas, which I have endeavoured to expound above as fairly and as plausibly as I can, are root-and-branch erroneous. The ‘errors of observation’, the ‘faulty shots aimed at a single bull’s eye’ conception of the index number of prices, Edgeworth’s ‘objective mean variation of general prices’, is the result of a confusion of thought. There is no bull’s eye. There is no moving but unique centre, to be called the general price level or the objective mean variation of general prices, round which are scattered the moving price levels of individual things. There are all the various, quite definite, conceptions of price-levels of composite commodities appropriate for various purposes and inquiries which have been scheduled above, and many others too. There is nothing else. Jevons was pursuing a mirage.

What is the flaw in the argument? In the first place it is assumed that the fluctuations of individual prices round the ‘mean’ are ‘random’ in the sense required by the theory of the combination of independent observations. In this theory the divergence of one ‘observation’ from the true position is assumed to have no influence on the divergences of other ‘observations’. But in the case of prices a movement in the price of one commodity necessarily influences the movement in the prices of other commodi-
CURRENCY STANDARDS

ties, whilst the magnitudes of these compensatory movements depend on the magnitude of the change in expenditure on the first commodity as compared with the importance of the expenditure on the commodities secondarily affected. Thus, instead of 'independence', there is between the 'errors' in the successive 'observations' what some writers on probability have called 'connexity', or, as Lexis expressed it, there is 'sub-normal dispersion'.

We cannot, therefore, proceed further until we have enunciated the appropriate law of connexity. But the law of connexity cannot be enunciated without reference to the relative importance of the commodities affected—which brings us back to the problem that we have been trying to avoid, of weighting the items of a composite commodity. If we mean by 'influences on the side of money being unchanged' that the total volume of monetary transactions remains the same, then the index number in question is the one which I have catalogued above under the name of the cash transactions standard. Or if we mean that the total stock of money remains the same, then the index number is the cash balances standard. Thus our *quaesitum*, namely a measure of the 'intrinsic value' of money, has no separate existence, but is merely one of the currency index numbers over again.

The point of view under criticism makes the mistake of assuming that there is a meaning of price level, as a measure in some sense or another of the value of money, which retains its value unaltered when only relative prices have changed. The abstraction between the two sets of forces, which seemed momentarily plausible when we made it, is a false abstraction, because the thing under observation, namely the price level, is itself a function of relative prices and liable to change its value whenever, and merely because, relative prices have changed.

1 Divisia ('L'Indice monetaire', *Revue d'Économie politique*, 1925, p. 858) has been one of the very few writers to point this out quite clearly. See also Olivier, *Les Nombres Indices*, pp. 106, 107. M. Divisia shows, not only that the non-independence of relative price changes is conclusive against the applicability of the Gaussian law of error, but also that it is a gratuitous assumption that a so-called 'monetary' cause, however defined, will affect all prices equally.
THE PURE THEORY OF MONEY

The hypothetical change in the price level, which would have occurred if there had been no changes in relative prices, is no longer relevant if relative prices have in fact changed—for the change in relative prices has in itself affected the price level.

I conclude, therefore, that the unweighted (or rather the randomly weighted) index number of prices—Edgeworth’s ‘indefinite’ index number—which shall in some way measure the value of money ‘as such’ or the amount of influence on general prices exerted by ‘changes on the side of money’ or the ‘objective mean variation of general prices’ as distinguished from the ‘change in the power of money to purchase advantages’, has no place whatever in a rightly conceived discussion of the problems of price levels. There is nothing left of the conception under criticism over and above one of the currency index numbers already defined, which is, like all other price indexes, the price of a composite commodity.

The Jevonian conception would have been intellectually delightful and of great scientific convenience if it had been based on a true analysis. It is one of several quasi-mathematical economic conceptions, borrowed by analogy from the physical sciences, which seemed likely to be so fruitful when they were first devised fifty or sixty years ago, but which have had to be discarded on further reflection, in whole or in part.