WILEY

On Absolute Price, and Index Numbers of Price

Author(s): R. A. Lehfeldt

Source: *The Economic Journal*, Vol. 28, No. 109 (Mar., 1918), pp. 107-111

Published by: Wiley on behalf of the Royal Economic Society

Stable URL: <http://www.jstor.org/stable/2222126>

Accessed: 27-06-2016 02:44 UTC

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at
<http://about.jstor.org/terms>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

Royal Economic Society, Wiley are collaborating with JSTOR to digitize, preserve and extend access to
The Economic Journal

ON ABSOLUTE PRICE, AND INDEX NUMBERS OF PRICE.

I.

It is a truism that there cannot be a simultaneous rise in all values : and it is equally obvious, after a moment's thinking, that there cannot even be rises in the value of some commodities which prevail in magnitude over the falls in others, for that would mean a rise in the average value. If such a state of things appears to exist, it implies that values have not been accurately measured ; and this again is referable to the want of a proper standard of value.

To arrive at a proper standard we proceed as follows :—

Let the person a possess a quantity a_1 of a certain commodity.

„ „ a „ „ a_2 „ another „
 „ „ b „ „ b_1 „ the first „

and so on. And let the prices of these commodities, in terms of any standard, be p_1, p_2 , etc.

So that the wealth of the person a is

$$W_a = p_1 a_1 + p_2 a_2 + \dots = \Sigma p a$$

Then the total amount of the first commodity is

$$Q_1 = a_1 + b_1 + \dots$$

and the total wealth of the community is

$$W = p_1 Q_1 + p_2 Q_2 + \dots = \Sigma p Q$$

Now suppose that while the goods in existence remain the same as before, the subjective valuation of them by the people changes, for any reason ; so that the price of the first commodity, in terms of the same standard as before, becomes $p_1 + \delta p_1$ and so on.

Then the increase in the total wealth of the community is

$$\delta W = Q_1 \delta p_1 + Q_2 \delta p_2 + \dots = \Sigma Q \delta p.$$

Now in general this increase, being expressed in terms of an arbitrary standard (say for brevity, gold) will not be zero. But it seems to accord with the essential meaning of the term “ value ” that such a subjective revaluation as we have supposed should not imply a change in total wealth, but that any gain in value of some commodities is necessarily at the expense of a loss by others, such that the total is unchanged. Adopting this view, we require a new standard to which gold prices must be reduced, and we shall give to this the designation “ absolute,” and obtain Definition (1)

"Absolute price is price expressed in terms of a standard such that a revaluation of commodities, unaccompanied by any change in their amount, causes no change in the total of wealth."

Then let g be the price of gold in terms of the absolute standard, and the absolute price of any commodity be

$$\pi = gp$$

Then

$$\delta \Sigma \pi Q = 0 = \delta \Sigma gpQ$$

or

$$g \Sigma Q \delta p + \Sigma p Q \cdot \delta g = 0$$

whence

$$\frac{\delta g}{g} = - \frac{\Sigma Q \delta p}{\Sigma Q p} = - \frac{\Sigma Q \delta p}{W} \quad . \quad . \quad . \quad . \quad (1)$$

This equation enables us to express the fluctuations in the absolute price of gold, and consequently to realise the absolute standard of value (except for a constant factor, which is arbitrary and of no importance).

This definition, however, is not the only possible one, and it may be objected that when a subjective revaluation occurs, the efforts of the community will no longer be directed in the same way as before; but that insofar as the continued production of new goods is in question, the condition of unchanged production is really inconsistent with the premiss of changed values. We ought rather to suppose that production is modified to suit the new values, but that the total of productive effort remains the same as before. We then obtain Definition (2) :

"Absolute price is price expressed in terms of a standard such that a revaluation of commodities, accompanied by the consequent redistribution of effort in production, the total of effort being unchanged, causes no change in the total of wealth."

Let g' be the price of gold in terms of this new standard, and

$$\pi' = g'p$$

be the price of any commodity.

Let e_1 be the elasticity of supply of the first commodity expressed in gold prices, or

$$e_1 = \frac{p_1 dQ_1}{Q_1 dp_1}$$

Then the wealth of this kind produced under the new conditions will be $(p_1 + \delta p_1) (Q_1 + \delta Q_1)$ and will exceed the total under old conditions by

$$p_1 \delta Q_1 + Q_1 \delta p_1 = (1 + e_1) Q_1 \delta p_1$$

Similarly let ϵ_1 be the elasticity of supply expressed in absolute prices, so that the increase in the wealth of the first kind is

$$(1 + \epsilon_1) Q_1 \delta \pi_1$$

and the increase in total wealth

$$\delta W = \Sigma(1 + \epsilon) Q \delta \pi = 0$$

by definition.

[For the changes in the Q 's are not arbitrary, but are connected by the condition that their sum must be such as to save as much effort in some directions as is spent in others.]

But

$$\epsilon = \frac{\pi' \delta Q}{Q \delta \pi'} = \frac{g' p \delta Q}{Q(g' \delta p + p \delta g')}$$

so that

$$\frac{e}{\epsilon} = \frac{g' \delta p + p \delta g'}{g' \delta p}$$

Hence

$$\begin{aligned} \delta W &= \Sigma \left(1 + e \frac{g' \delta p}{g' \delta p + p \delta g'} \right) Q (p \delta g' + g' \delta p) \\ &= \Sigma Q (g' \delta p + p \delta g' + e g' \delta p) \\ &= \Sigma Q \{ p \delta g' + (1 + e) g' \delta p \} = 0 \end{aligned}$$

$$\text{Or} \quad \frac{\delta g'}{g'} = - \frac{\Sigma Q (1 + e) \delta p}{\Sigma Q p} = - \frac{\Sigma Q (1 + e) \delta p}{W} \quad \dots (2)$$

The first of these definitions may be distinguished as the "capital," the second as the "income" definition of absolute price.

Subjective revaluations in nature are not abrupt, though they may be rapid (*e.g.*, on outbreak of war); we must therefore suppose, in order to realise the first definition, that the revaluation happens in a time too short for an appreciable change in the existing stock of goods. In order to realise the second definition, it must be supposed to happen in a time too short to admit of an appreciable change in the amount of natural resources, capital, labour and enterpriser's ability in existence. The term "effort" in the definition is to be taken as including the use of the material factors available for the human effort.

If the money used by the community be not a mere means of exchange, but has value in itself, it must be counted as one of the commodities: for it, of course, $\delta p = 0$.

II.

Index numbers are based on the theory that changes in the value of gold are measured inversely by changes in the weighted

gold rose. (Money is, of course, much in request in time of crisis.) Subsequently, monetary inflation tended to neutralise the rise in value of money, while exaggerating the rise in the gold price of consumable goods.

At a later stage the assumption of a constant stock of goods involved in equation (1) is to be replaced by the assumption underlying equation (2) of constant effort turned into new directions. Later still no doubt the total of effort was increased.

The extremely high gold price of consumption goods in the later years of the war cannot be explained in accordance with equation (3) entirely by an increase in M and a decrease in Q . No doubt there is inflation of currency, not neutralised, in England at least, by hoarding; also the total output of goods is probably less than in peace time, despite greater effort. But it is worth while enquiring whether a decrease in n is not of importance too. This comes about in two ways; a great part of the effort goes to produce a commodity—military service—that is only sold once. Secondly, the difficulties placed in the way of trade, and especially of speculation, would diminish n and so tend to raise gold prices; a consequence almost ludicrously in conflict with the intentions of governments in discouraging speculation.

The phenomena observed in a commercial crisis are in many ways similar to those of the first phase of the war; commercial cycles generally afford good illustrations of the theory.

If the taxable income of the United Kingdom for the last half century¹ be graphed, it will be found to show marked inequalities of progress. If the figures be reduced by means of Sauerbeck's index number the series shows almost equal irregularities in the opposite sense. The curve is made much smoother by the use of a new index number = Sauerbeck's index + 85. This of course is far from showing that the new index is correct; but it may serve to show that for some purposes the usual indices like Sauerbeck's are incorrect.

R. A. LEHFELDT

Johannesburg,
June, 1917.

EXTRACTS FROM GERMAN PERIODICALS RELATING TO THE WAR.

THE *Annalen des Deutschen Reiches*, 1917, Nos. 1–4, gives a good analysis of the Auxiliary Service Act. The principal objects of the Act are to place supplies of labour at the disposal of the munitions industries and to set free for the Army men hitherto

¹ Stamp, J. C. : *British Incomes and Property*, p. 318.