

The General Price Level and
the External Trading Gain

by
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The Fundamental Identity at Current Prices

The well-known national accounting identity income=product in current price terms has the advantage that the terms "income" and "product" are indistinguishable and may be used interchangeably. This is not necessarily, or even generally, the case when accounting entities are expressed at constant prices. It is necessary to have regard to some aspects of the controversial problem of accounting at constant prices because at the macro, as at the micro, level, prices and quanta are so intimately related that no price index has any objective meaning unless it can be envisaged as the deflator of a current flow. This near truism does not, unfortunately, solve the methodological problem of making price or volume index numbers: in the identity $PQ = V$ we know only V , except in the case of single, well-defined products. To a certain extent, however, the flow concept does help conceptually in defining price index numbers.

It may be well to start with the income/product identity at current prices in the given period, say a year:-

$$(1) \quad Y = C + I + X - M,$$

where Y is income, C consumption (government and private), I investment (fixed and stock changes), X exports, M imports. Exports and imports include invisibles and are, in fact, as

defined in the balance of international payments. Income Y may be gross or net, depending on whether I includes or excludes capital consumption (i.e. depreciation); Y may be at factor cost or at market prices, depending on whether C and (possibly I) have or have not been purged of indirect taxes less subsidies. On the latter point, when the identity is used in form (1) market prices are usually postulated. Identity (1) is entirely consistent and additive throughout the economy, when "exports" and "imports" are suitably defined in regard to the sectors (in whatever detail down even to the individual producer), while, of course, the elements of C and I, as final goods and services are directly additive. The fundamental property enshrined in Y as defined by (1) is that total income is the sum of sectoral incomes.

Supply at Current and Constant Prices

The concept moves nearer to the kind of reality contemplated for the constant price concept by writing (1) as

$$(2) \quad Y + M = C + I + X.$$

Each side represents the value at current prices of goods and services available in the economy which may be termed the supply; the left side describes how this value was formed, namely by the application of the services of manufacture, distribution, transport etc, the skills of the nation (given capital stock and natural resources), total Y; to imports M. The right side describes how the goods and services were distributed in the three categories specified.

It is only in a special sense that one can speak

of supply as being equal to (i) home production plus (ii) imports as distinguishable entities since Y in (2) is "home production" only by definition; it is not, in general, "production" in the sense of a visible complex of goods and services (and therefore price-deflatable) except in the trivial case of $M = 0$ *; it is only the combination of the factor services of Y combined with imports M which produce usable goods and services; the two constituents are, in general, indistinguishable in any tangible good or service; on the other hand, the three constituents on the right of (2) are each the sum of individual goods and services which can unambiguously be deflated to give a value at constant prices. The value at constant prices (i.e. the prices of the individual goods and services in some base year) of the aggregate availabilities is

$$(3) \quad C' + I' + X',$$

where primes indicate constant price values of the respective entities. It will be noted that the constant price version of availabilities can be obtained only in this way. It cannot be derived from the left side of (2). This fact marks a fundamental difference between the current and constant price concepts; in the current case each of the five macro elements specified at (2) are separately estimable and if there be a discrepancy between the two sides of (2) it is merely statistical, an aggregate of errors of estimation.

* In the non-financial sense; when net external financial claims are conceptually admissible the situation is different: see later.

Net Investment Abroad and the Trading Gain

In the constant price case it is necessary to have recourse to definition, Define national product

$$(4) \quad Y' = C' + I' + X' - M',$$

where

$$(5) \quad C' = C/p_C; \quad I' = I/p_I; \quad X' = X/p_X; \quad M' = M/p_M,$$

with the p's the appropriate price indexes, unity in the base year. If one requires the price index of national product it is derived as

$$(6) \quad p_Y = Y/Y',$$

The practice sometimes adopted in the past of estimating Y' by deflating Y by some general purposes index like that of wholesale prices, consumer prices etc was simply incorrect.

We do not deal here with the acute methodological problems involved in the making of index numbers. A cynic has remarked that, confronted with a given body of price and quantity data, there are as many different index numbers as there are index number makers. Of course, the number of price index formulae, each of which "works" in the case of one commodity and is symmetrical in the measures for individual commodities, is infinite. There is a considerable literature on the subject. In practice the simplest formulae only are used. The supreme justification of the index number maker is that ordinarily the most "reasonable" formulae yield much

the same results, that discrepancies between the results from the use of different formulae are well within the margins allowable for other sources of error, those of random sampling, quality etc. It is sound practice to use, when in a position to do so, both the Paasche as well as the Laspeyre formulae (which, from the indifference approach in the case of consumer prices, may be said to define the limits of value of the "true" index); if the two indexes are very discrepant it is time to change the weighting base of the Laspeyre, if this be the formula favoured. Many of the practical difficulties of index number making ordinarily disappear if always the base year is the previous year in relation to the current year.

The economic purist is wont to point out that the whole concept of values of individual flows, and a fortiori the concept of accounts at constant prices, is a fiction, that the only reality is the set of current values. This is correct up to a point. A situation in which between base and current periods the price of each and every commodity remained unchanged is simply inconceivable, even if, in a sense, prices on average, were unchanged. He is right in pointing out that quantities demanded are related to relative prices and that, for all its theoretical elegance, the indifference curve (or surface) analysis associated with the names of Konus, Staehle etc. is not operational. The empiricist's reply is that in a situation of generally rising or falling prices there is a challenge, and indeed a public demand, to measure on average the rise or fall, however he does it; that price and quantity have a meaning in the case of the individual commodity; that, as pointed out in the preceding paragraph, it usually does not matter much what formula for measurement is used,

These considerations apply to formula (4). It seems in the highest degree desirable to measure the quantum product of the nation, for the measurement of productivity in particular; we simply cannot be content with the current value of the product in a situation of changing prices. The formula enshrines at the national level the principle of "double deflation". It is, of course, constructed on the analogy of the current price formula (1); the full series of constant price national accounts, of which (4) is one, are so constructed. Exactly as in the case of the current series, formula (4) is consistent in that the Y' is the sum which would be obtained if one applied the formula suitably interpreted to each separate sector of the economy, however the sectorization was made, even down to the individual enterprise. The formula for Y' is surely the most "natural" way to define national product. It is now used in all countries which have the data for the calculation, by Ireland in particular*. Ireland, in fact, seems to have been the first country to adopt the concept officially, as applied to the agricultural sector. The double deflation procedure was proposed many years ago, independently by S. Fabricant, R. Wilson and R. C. Geary. Unofficial attempts to apply the concept to estimate added value at constant prices in different industrial sectors in certain countries (Ireland and Australia in particular) have not so far proved successful, principally because the CIP and price data on which the calculations were based were not sufficiently accurate. The results of the elaborate Irish experimentation are given in [1] and [3]. It has recently been suggested that the double deflation technique should be applied by individual industrial concerns to estimate the trend of their productivity [2].

* [5], [6].

Associated with the internal or production account (1) in the national accounting system is the external account at current prices

$$(7) \quad X - M = N,$$

where N is the current value of net external investment (+ or -). There is no difference in expert opinion as to the tangible reality of N in the sense that it may have a positive value due solely to the favourable movement of export, compared with import prices. On the analogy of (7) one cannot, therefore, regard $X' - M'$ as the deflated value of N simply because one would have to contemplate the absurd possibility of a negative deflated value of N, a positive value, or vice versa. The concensus is that N should be separately deflatable (like X and M) so that the deflated value is, at least, positive or negative as N is positive or negative. One then introduces a balancing item T', the trading gain, to give the external account at constant prices:-

$$(8) \quad X' + T' = M' + N'$$

T' may be positive or negative. There is no doubt about its substantial reality in any discussion on the level of incomes, prices and welfare. The trouble is its statistical determination.

Statistical difficulties are, of course, also encountered with X' and M' particularly in connection with services, fees, dividends etc but these difficulties are as nothing compared with N' (and hence T', from (8)) on which there is no concensus. A large part of the conceptual difficulty of finding a suitable price deflator p_N for the current export excess $N = X - M$ arises from the fact that N as

an entity in its own right has only a remote functional existence, when the economic process is considered in non-financial terms. Supply has to intervene between the economic realities of M and X: M is in a sense functionally related to supply, X is a constituent of the distribution of supply; M in this sense precedes X. The ultimate curb on the nation's standard of consumption the quasi-equality of X and M because unfortunately other nations will give us credit in very limited degree and not for long. When our economic policy statement is "we must export" what we really mean is "we need imports which we must pay for by exports".

Some Remarks on the Balance of Payments

The balance N is, however, meaningful as a financial concept: every payment to normal residents by others is an export and every payment by residents to others is an import. Payments in and out may, in the aggregate over a sufficiently long period, be regarded as equal. From this financial angle there is no qualitative difference between what are regarded as "capital" and "current" items in the balance of payments statement. If one had a complete record of payments and ignored this distinction between "capital" and "current" N would be zero and the difficulty about its deflation would disappear because $N' = 0$; and stocks and foreign currency have prices just as non-financial goods and services have.

As so often in statistical work, determination of the best procedure leads one inevitably to close analysis of one's basic data, in this case the balance of international payments. We cannot take on trust that the different procedures will yield much the same answer; we can only hope. The whole concept of the trading gain is of great importance in Ireland in view of the magnitude of its external trade.

In view of the uncertainty about the calculation of N' , we can, at least, agree that we have an interest in trying to make N as small as possible: in policy-making (i.e. for the future) we may plausibly take $N = 0$ which eliminates the difficulty and unambiguously gives

$$(9) \quad T' = M' - X' = M \left(\frac{1}{P_M} - \frac{1}{P_X} \right)$$

from (8) since $N' = 0$ and $M = X$.

On the wider issue, latterly the writer has come to doubt the validity of the conventional distinction between "current" and "capital" in the balance of payments. If I have £1,000 to spend in England I have a free choice to buy shares or goods; if I buy shares the entries appear in the capital part of the balance, if goods, in the current part. Is there any point in making a distinction since both scrip (the title I hold for the shares) and goods each have a value? So has currency and all have a value per unit, i.e. a price. We can, therefore, envisage a situation in which $X = M$ when all capital and current items are taken into account. In principle, every payment into and out of the State would require deflation. But, pushed to the limit such a concept would be nearly absurd on account of the sheer volume of financial transactions. Many years ago CSO, with a view to checking balance of international payments statistics, especially its concern about the nature of the ultimate "balance unaccounted for", obtained monthly returns from the banks for two years of total payments into and out of the State. Huge aggregates emerged, out of all proportion to the totals of current imports and exports. Investigation showed that the magnitude was due mainly to the transactions of the banks on their own behalf: for instance it was the practice of one bank to invest $\frac{1}{2}$ million in the London Money Market each day, sending the sum specified five minutes

after bank closing time for return next day before the bank opened. This set of transactions with 300 bank days would result in an entry for "imports" (= "exports") of £150 million based on a capital of £ $\frac{1}{2}$ million on which at 1% interest £5,000 would be earned annually. It was thought that more useful figures would emerge if bank transactions on own account were eliminated but the project had to be abandoned for want of staff. It might well be revived as part of a general project on the interaction and reconciliation of financial and non-financial flows in the economy.

A National Price Index

We may write

$$(10) \quad Z' = C' + I' + N',$$

where Z' is the quantum of goods and services in the widest sense (including in N' the base year net value of stocks and foreign currency acquired - or lost - by the nation during the year of reference). The national income = national product = expenditure on goods and services of all kinds at current prices is Y . The national price index p is accordingly

$$(11) \quad p_Z = Y/Z'.$$

Using (4) and (8) p can be expressed in a more significant manner than (11) as

$$(12) \quad p_Z = Y/(Y' + T').$$

In the denominator the Y' is national production relevant to the study of productivity. If the policy of unchanging prices is to be implemented, $p = 1$ and, if the trading gain

T' be ignored, income Y should equal national production Y'. This "truism" is explicit in most national policies. It is a "truism" which is not necessarily true. The trading gain T' cannot be ignored. In magnitude it may in its year to year changes be as large as the change in production Y' itself. Attention to the ancient precept of "buying in the cheapest and selling in the dearest market" in its national application may be as advantageous as improving productivity and may be less expensive insofar as the latter involves extension of tangible capital: the issue is really marketing v. productive efficiency. It paradoxically happens that a marked improvement in productivity may, however, be inimical to the terms of trade, for a great increase in a particular export may result in a decrease in export price. Actually a normal manner of distributing the benefits of improved productivity to the whole of humanity should be by reduction of export prices. One may surmise that the loss through the terms of trade (expressing in the negative trading gain) will be comparatively small compared to the profits in greater volume of trade. Except for particular products in particular situations, it seems unlikely that a small country can influence the prices of its imports or exports much: the little, however, may be well worth trying for.

If every cash payment out of the State be regarded as an import and every cash payment in as an export, international payments would be in balance, it is true, but not in a helpfully significant way, because the gross volume of financial payments on each side would be overwhelmingly greater than that of non-financial transactions in which interest mainly centres. The appropriate price index numbers would reflect prices of financial claims more than

those of imports and exports proper. A more useful form of statement would be one in which financial claims (the capital part of the account) was netted out, in appropriate categories. Normally the net magnitudes (+ or -) would be small relative to gross imports and exports in the capital part. As regards capital imports one would envisage yearly changes in values of external shares and currency in appropriate detail each item of which to be deflated by the price of shares; the price deflator for gold and foreign currency would be unity unless the price of gold or the exchange rate changed. As regards capital exports one could envisage a schedule of changes in direct and post-folio investments in appropriate detail by foreigners in the State, each item of which would be price-deflatable.

Values of Irish Trading and National Prices

The methodological dispute about the deflation of N has delayed the acceptance of the notion of the trading gain T' and, in turn, of national accounts at constant prices. R.W. Burge would deflate N (to find N') by p_X when $X > M$ and by p_M when $M > X$; J.L. Nicholson favours p_M in every case; S. Fabricant would use some capital price deflator; R.C. Geary would accept any deflator with the formula

$$(13) \quad p_N = ap_X + bp_M, \quad a + b = 1, \quad a \geq 0, \quad b \geq 0,$$

using the single degree of freedom to bring about consistency in terms of trade between sectors of the economy. Later Geary opted for the formula (13) with $a = b = \frac{1}{2}$, i.e.

$$(14) \quad p_N = (p_X + p_M)/2.$$

The various concepts are discussed in [4].

It was a pity that no one thought of investigating the effects of the different concepts on the statistical results. This deficiency is now remedied by reference to recent Irish macro data. Formulae for T' , using three formulae for p_N and (8), are as follows:-

Formula	p_N	T'
A	p_M	$X(p_X - p_M)/p_X p_M$
B	$(p_X + p_M)/2$	$(X' + M')(p_X - p_M)/(p_X + p_M)$
C	1	$X(p_X - 1)/p_X - M(p_M - 1)/p_M$

T'_A is formally Nicholson's position and de facto that of Burge as applied to Ireland where a positive import excess is almost endemic. T'_B is based on Geary's formula (14) above. Taking p_N as unity as at C implies that net external investment N in any year is money and the formula might be regarded as representing Fabricant's position in an extreme form.

The results are shown in the following table.

Continued...

Table 1. Estimates of the Trading Gain T' for Ireland in Each Pair of Consecutive Years 1958-59 to 1963-64

£ million

Year		Value of T' using formula -		
Base	Current	A	B	C
1958	1959	8.8	9.0	9.0
1959	1960	-5.7	-5.7	-5.7
1960	1961	-2.3	-2.3	-2.3
1961	1962	5.4	5.5	5.3
1962	1963	1.1	1.1	0.7
1963	1964	17.2	17.9	16.7

Basic source: [6]

There is no significant difference between the figures in the three columns over a testing period in which every kind of aberration in relative prices and in the net external deficit is encountered. These results are reassuring especially having regard to the uses to which T', in particular, will be put, the determination of the "true" national price level and the permissible level of non-inflationary incomes. It does not really matter what "reasonable" price deflator one uses for current net external investment N. The trading gain T' is of the same order of magnitude as year-to-year changes in real GNP (i.e. Y') and the virtual ignorance of this factor in appraisals of the economic level and trend is hazardous.

Prices in the National Accounts

If within the framework of the national income accounts one desired, ab initio, and without reference to the terms of trade, to derive the most comprehensive price index possible, it would unquestionably be that of national expenditure p_E , the deflator for the flows of consumption (personal and government) and gross capital formation (fixed and changes in stocks) in the aggregate, so that p_E may be written

$$(15) \quad p_E = (Y - X + M)/(Y' - X' + M').$$

The formula is written in this form merely for arithmetic convenience: both numerator and denominator are really the sum of identifiable flows. Table 2 shows the values of p_E together with those of p_Y and p_Z , previously encountered, on a year-to-year basis and, as regards p_E and p_Z , to the fixed base 1958 as 100.

Table 2. National Accounts Price Index Numbers. Ireland, 1947 - 1964.

Year	Previous year as 100			1958 as 100	
	100p _E	100p _Z	100p _Y	100p _E	100p _Z
1947	-	-	-	68.2	68.1
1948	103.5	103.5	106.0	70.6	70.5
1949	99.9	100.0	101.7	70.6	70.5
1950	102.5	102.4	100.7	72.3	72.2
1951	103.3	107.2	103.5	78.3	77.4
1952	107.1	108.5	110.3	83.9	83.9
1953	104.0	103.8	107.1	87.2	87.1
1954	100.1	100.1	99.5	87.3	87.3
1955	102.6	102.5	102.4	89.6	89.5
1956	103.6	103.7	102.5	92.8	92.8
1957	104.2	103.9	102.9	96.6	96.4
1958	103.5	103.7	106.5	100.0	100.0
1959	100.1	100.1	101.6	100.1	101.1
1960	101.1	101.2	100.3	101.3	101.3
1961	102.9	102.9	102.6	104.2	104.3
1962	103.6	103.8	104.5	108.0	108.2
1963	102.2	102.3	102.4	110.3	110.6
1964	107.1	107.4	109.6	118.1	118.8

Basic sources: [5] and [6].

From Table 2 the practical identity of the showing of p_E and p_Z will be noted. It would, of course, be easy to dismiss this phenomenon as arithmetical: both indexes have very largely the same arithmetical content. There is, however, much more to it than this. As regards arithmetical content, the same remark might be made about p_Y yet its year-to-year showing will be seen to be quite different from that of p_E and p_Z . For instance the latter both show a rise of 7% compared with 10% by p_Y between 1963 and 1964. The index p_Y , though formally the derived price index for gross national product at market prices Y, is an unreliable index of the global trend of prices.

The quasi-identity of p_E and p_Z is, to the writer, very satisfactory in its revealing the real role of T' , the trading gain, in the economy. If p_E represents the "true" global trend of prices and, therefore, the valid deflator for Y, the quotient Y/p_E is not Y' as defined by (4) but $(Y' + T')$ (cf. (12)) the real product of the nation. Of course, p_E and p_Z are not algebraically identical. A little algebra shows that, to make them so, it would be necessary to take p_N , the element about which controversy has raged, as equal to p_Z , so that we would formally have

$$(16) \quad p_N = p_Z = p_E.$$

To state that p_E is the most comprehensive index in the national account system implies that it can be legitimately used to deflate Y. The deflated value will be the quantum of goods (capital and current) and services obtainable by the expenditure of income Y. We therefore write:

$$(17) \quad \frac{Y}{p_E} = Y' + T''.$$

defining T'' in this way. Hence

$$(18) \quad T'' = Y/p_E - Y'$$

The values of T' and T'' are compared in Table 3.

Table 3: Comparison of Estimates of the Trading Gain T' and T'' for Ireland 1948-64, with previous year as base year

£ million		
Year	T'	T''
1948	8.3	8.3
1949	6.8	7.1
1950	-6.7	-7.3
1951	-14.0	-17.7
1952	7.4	13.1
1953	15.6	14.7
1954	-3.2	-2.9
1955	-0.7	-1.2
1956	-6.5	-5.8
1957	-5.8	-7.0
1958	15.0	14.6
1959	9.0	9.0
1960	-5.7	-5.5
1961	-2.3	-1.9
1962	5.5	6.4
1963	1.1	1.9
1964	18	20

Basic sources: [5] and [6]

As might be expected from the closeness of p_Z and p_E , there is, on the whole, an excellent correspondence between T' and T'' . Formula (17) shows what T'' (and therefore T') is: it is the increment of purchasing power over and above the real national product Y' . The writer, however, prefers p_Z to p_E as the proper deflator for Y , i.e. the national price index for its entire consistency with the external account at constant prices (8). Furthermore, as we have seen, the value of T' , depending only on the value of N' , is, from Table 1, almost invariant

to the deflator used for N, normally a small value. On the other hand, T", from formula (18), is virtually the small difference between two large aggregates and is consequently suspect arithmetically.

The Price Inflationary Effect in 1964

Following is an illustration of the kind of inference that may be drawn when the trading gain is taken into account. At 1963 prices national income in 1964 at factor cost was £699 million*. An income of this amount plus £18 million (column B, Table 1), i.e. £717 million (an advance of $2\frac{1}{3}\%$) could have obtained in 1964 without any price inflation. Of course, actual current income was far in excess of this, namely £765 million, due to a national income price rise of $6\frac{2}{3}\%$.

*This is simply a proportionality based on GNP (Y') at constant prices applied to current 1963 national income. A more accurate calculation could be made, if required.

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