EXCHANGE RATE PROBLEMS IN NATIONAL ACCOUNTING OF DEVELOPING COUNTRIES*

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Developing countries which typically have import surpluses and inflationary pressures because of insufficient savings are prone to use indirect taxes on imports (Tm) and subsidization of exports (Sx) in order to prevent deterioration of the balance of trade. If these substitutes for devaluation are included in the net indirect tax component of product at current market prices (Ym) the import surplus is likely to be understated, and Ym upward biased. This distortion will be avoided if imports and exports are measured at effective exchange rates (ER), that is, at official rates (OR) plus Tm and Sx respectively, and if (Tm − Sx) is deducted from the net indirect tax component of Ym. Only in this manner become imports and exports consistent with the other uses and resources at market prices and can be articulated with them. At base-year prices the volume index of product at OR diverges from that of ER to the degree that the composition of imports and exports in regard to tax and subsidy rates computed *ad valorem* significantly changes.

Such a case is similar to that of the price indexes of imports and exports moving in diverging proportions: the trade balance at base-year prices will differ from that at current prices. The resulting discrepancies in national accounts have led to proposals of deflating, for example, exports by the price index of imports. Suchlike approaches are incompatible with the principle of national accounting that prices are supposed already to measure substitution values. Deflating exports by import prices means reintroducing substitution values, as does, for example, deflation of incomes by a consumer price index. Correspondingly, since the trade balance at ER conceptually expresses the value of imports at domestic market prices as compared to the corresponding domestic market value of exports, and if at ER the trade balance diverges from that at OR, the former balance has an important meaning (as has the trade balance at base-year prices as compared to that at current prices) and the resulting discrepancy between the two measures should not be removed merely for the sake of accounting smoothness.

In contrast to the market price approach, the measurement of product at base-year factor cost is indifferent to the measurement of the trade balance at ER and at OR.

It is, therefore, proposed in countries in which part of import taxation and export subsidization substitutes for devaluation, to record imports and exports in the national accounts at effective exchange rates, and to correct the net indirect tax component of product correspondingly. Imports and exports at official exchange rates should be shown within the balance of payments, and the latter separately as a memorandum item.

A. THE PROBLEM

The typical situation in developing countries seems to be that the domestic resources are supplemented by import surpluses.[1] This is the natural consequence

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[1]Of developing countries—weighted by their shares in the aggregate gross product of the countries of the samples in each period, in the 1950's as well as in the 1960's—the resource uses of which were analysed in Gaathon [4], Tables 48 and 54, pp. 159 and 173 respectively, about two-thirds had import surpluses.

of the fact that the saving capacity of such countries is much too low to suffice for their needs of capital formation for expansion, so that they have to depend upon foreign aid. The insufficiency of their saving rates is, of course, connected with their low income levels as well as with their high rates of natural increase of population—high, that is, in relation to the rate of increase of their product.

The urge to provide for the rapid increases of population as well as to raise their standards of life is responsible for the tendency of governments to borrow funds as far as possible from abroad, and to expand the domestic credit volume faster than voluntary savings increase.[2] The excess demand thus created pushes prices and incomes up. The resulting inflationary pressures tend to worsen the relation of domestic to foreign price levels. There are three means of redressing such disequilibria: to introduce foreign exchange rationing; to devaluate the domestic currency; and to put additional imposts on imports and grant additional subsidies to exporters. The first two kinds of adjustment are frowned upon by the International Monetary Fund and other influential international institutions. Devaluation, in addition, is regarded as a loss of prestige by many governments. The relative ease and flexibility of the application of the third way, indirect taxation (including subsidies which are negative indirect taxes), as well as its obvious fiscal advantages over quantitative regulations, tend to make it attractive and presumably frequently applied.[3]

The resulting "total price effectively paid for a unit of foreign currency . . . whether or not it is expressly stated to be the rate of exchange" is called the effective exchange rate.[4] In developing countries the typical development of prices and costs is that the gap between the official exchange rate and the domestic price and cost levels widens over time, so that the corresponding share of indirect taxes and subsidies within the effective exchange rates also increases until the

[2]"Voluntary domestic savings are always insufficient in a country which seeks to achieve rapid progress," Lewis [6], p. 53.

[3]Attempts to correct the national accounts by replacing official by effective exchange rates have been made in Israel by Gaathon since the beginning of the fifties. Nadav Halevy ably summarized the subsequent discussion of the issues involved ([5], pp. 90–92). My own thinking on the matter is spelled out in [3]. See also Michaely [8], [9]. The only foreign example of the application of effective exchange rates (in fact though not in name) known to me is the United Kingdom. Its national accounts included for some years "imports and exports . . . at constant market prices . . . ", in fact only imports including their base-year f.o.b. values plus the taxes which they attract at base-year rates (see [1], 1956, p. 347). Subsequently, however, this practice has been abandoned in order to fall in line with the United Nations standardized system ([1], 1968, p. 66).

[4]Michaely [9], p. 5. Conceptually the effective exchange rate on imports includes all, and only those, imposts which affect the choice of a purchaser between a given domestic product and the same good imported. A tax incident upon the good irrespective of its provenance (domestic or foreign) would not qualify as a component of the effective exchange rate. Correspondingly any subsidy accruing to exports as such is part of the effective exchange rate. In practice the determination of the effective exchange rates is rather complicated by the fact that not only direct taxes on imports and direct subsidies on exports have to be taken into account, but also other measures which fulfill the same function. Examples are preferential allocation of import quotas and low-interest loans. All such indirect benefits, at unit values, are conceptually part of the effective rates. As their actual importance may differ from commodity to commodity and from country to country, we refrain from a discussion of the operational-statistical problems connected with their correct computation.

next devaluation, which in fact means the incorporation of this share, in part or in full, in the official exchange rate.[5,6] This process is the unavoidable consequence of excess demand in markets without comprehensive rationing and price control: the excess demand pushes prices and costs up, and the economy tends to price itself out of world markets by the growing gap between the price levels abroad and within the country if imports are paid for at the official exchange rate plus the existing rates of customs duties and other imposts, and if formerly competitive exports become unprofitable. The additional duties and imposts on imports are therefore only in a formal sense indirect taxes; functionally they are part of the proceeds accruing to the final seller of foreign exchange which is, in countries without freely fluctuating exchange rates, the government, and additional export subsidies are part of what the government pays to exporters for their foreign exchange earnings.

Whereas national accounting records intersectoral flows of goods and services "as far as possible at market prices" (United Nations [15], 1953, p. 8), this principle is abandoned if imports and exports are evaluated at their foreign exchange values at the official rate, and if the indirect tax components are included in the net indirect tax component of the gross product at market prices (Ym). (See Gaathon [3] and the sources cited there.) This anomaly is removed if in Ym only those indirect taxes *not* incident upon imports and exports are included, and imports and exports are evaluated at their effective exchange rates. In countries with import surpluses this procedure tends to yield larger import surpluses, and correspondingly a smaller Ym than if imports and exports are evaluated at the official exchange rates. Moreover, the difference between the two sets of exchange rates tends to grow from one devaluation to the next (as is shown for Israel in footnote 5).

The case for replacing the measurement of imports and exports, and consequently of product, with effective rates, instead of the official exchange rates rests upon the danger of the national accounts becoming distorted and leading to wrong conclusions in regard to so important derivations as public sector

[5]See Michaely [9], Table 4-3, p. 90, and Figure II, p. 91, for developments in Israel in 1949–1962. For example, the official rate was IL1.800 per U.S. $1 in 1955–1961, but the addition to this rate for imports of commodities rose from IL0.411 to IL0.804, and for exports of commodities from IL0.027 to IL0.855. In February 1962 the Israel pound was devaluated to IL3 per $1.—and the addition for imports reduced to IL0.570. The increase of the effective exchange rates over the official rate which remained constant up to the end of 1967 repeated itself in 1962–1967, and again after the devaluation from IL3 to IL3.5 per $1 in the end of 1967 over 1968–1970. (Source: Research Department, Bank of Israel.)

[6]This statement is, of course, an oversimplification. Indirect taxes are in general applied at different rates to specific import and export items, and the unitary rates in footnote 5 are *ex post* calculated weighted averages. Devaluation, however, is an across-the-board adjustment of the official exchange rate aimed at restoring overall purchasing power parity. (Multiple exchange rates are some kind of hybrid solution.) Devaluation to a new unitary rate of exchange thus anticipates that domestic market forces will adjust the prices, costs, and volumes of the individual real flows to the new price of foreign exchange, whereas the indirect taxation of imports and exports with which this article is concerned works the other way round, by dealing with each item individually. In other words, the problem dealt with here is the effects of this piecemeal approach upon the macro-economics of national accounting whereas devaluation—or, for that matter, revaluation—poses the reverse problem, namely, of the consequences of a macroeconomic change upon the economic units and flows affected. The limitation of the scope of this article also excludes other, admittedly important, aspects of foreign exchange policy such as the effects on capital flows and on the reserve position of a country.

savings and the finance of investment by foreign and domestic sources (see for Israel, Patinkin [13], pp. 92 ff.).

B. Effects of Effective Exchange Rates on National Accounts in Israel

The use of effective, instead of official exchange rates, affects, of course, the the levels of Ym less than those of the import surplus, and much less than those of gross saving. For illustration, these items as well as the shares of the import surplus in the finance of gross domestic investment are shown below for the Israel economy, all data referring to the years 1966–1970.

The use of effective exchange rates in computing Ym makes it only 2 to 4 per cent smaller than the use of official rates. However, the levels of the import surplus become 15 to 30 per cent higher. And gross saving—the difference between GPm and consumption, private and public—may become at official rates many times as large as at effective rates of exchange. (This is true also when the net saving rates are compared with net product. In that case the levels of saving ratios would be lower and mostly negative.) Correspondingly the net inflows of capital and donations, as represented by the import surplus, form significantly larger shares in the finance of gross domestic capital formation at effective exchange rates.

The correction of the national accounts by the introduction of effective exchange rates not only influences immediately important indications of economic performance but has also practical-operational significance. If a government regards the surplus of all indirect taxes over the subsidies it pays as revenue, it will have a larger budget surplus—or a smaller deficit—than if it becomes aware

TABLE 1

The Use of Official Exchange Rates (OR) and of Effective Rates (ER) in Israel's National Accounts for 1966–1970, at Current Prices

Line		1966	1967	1968	1969	1970
1	GNP at OR exceeded GNP at ER by ... per cent	3.3	2.0	3.0	4.2	3.5
2	Indirect taxes on imports as percent of imports at OR	12.8	9.5	10.7	13.2	12.4
3	Export subsidies as percent of exports at OR	3.7	6.1	5.8	6.2	8.5
4	Ratio of import surplus at ER to import surplus at OR	1.31	1.16	1.20	1.24	1.17
	Gross savings[a] as percent of					
5	GNP at OR	11.4	4.1	7.1	5.7	3.5
6	GNP at ER	8.4	2.2	4.2	1.5	0
	Share of import surplus in gross domestic capital formation, in per cent					
7	at OR	48	75	68	76	85
8	at ER	63	87	81	94	100

[a]including depreciation allowances.

Source: Bank of Israel, Research Department, unpublished data.

that part of the net indirect tax intake should be regarded as part of the sales receipts of foreign exchange and should, therefore, be paid into some sort of foreign exchange equalization fund. By not doing so, the government acts like a firm which intentionally allocates too small a share of its gross profits to reserve funds for depreciation allowances, for bad claims, and the like, in order to embellish its profit-and-loss accounts. In consequence, it is likely to encourage the parliament to incur public consumption which the economy of the country in reality cannot afford.

The overvaluation of the official exchange rate under inflationary pressures also affects the private economy directly. In such a situation one can regard the application of the official rate to imports for certain end-uses as hidden subsidies. The typical case is imported capital goods which are left tax-free in order to promote investment. The well known consequences of such distortions of relative prices are: the use of labor saving equipment even when there is surplus labor available; the hoarding of equipment as a hedge against further inflation beyond the immediate needs of the firm; neglect of proper maintenance of the under-utilized stock of equipment because of its cheapness. Last but not least, the economic structure of the economy will be distorted by the establishment of branches of production not viable under normal market conditions. It need not be elaborated that such a tendency will affect long-term productivity, that is, the creation of long-term capacity of production, a notion elaborated in [4], Chapter 5.

Symmetrically, the application of the overvaluated official exchange rate to exports can be regarded as a hidden tax on exports.

The fact that the official exchange rate cheapens imports and makes exports expensive, in relation to domestic prices, induces producers who cater for both home and export markets to impose what might be called private taxes on domestic customers and to use their proceeds for covering losses on exports. They become able to do so because the overevaluation of the official exchange rate unavoidably leads the government to restrict imports, either by curtailing the allocation of foreign exchange, or by introducing import quotas; in both cases the beneficiaries become full or quasi-monopolists.[7]

It was stated above that in developing countries import surpluses and inflationary pressures are likely to widen the gap between product at effective and at official exchange rates. In fact, line 1 of Table 1 does not show a clear trend. Of the possible factors explaining the behaviour of this ratio, changes in the import surplus—which actually very much increased in the period 1966–1970—or in the composition of imports and exports as regards the weights of high protection items are of not much general interest and will, therefore, not be discussed. At least a partial explanation is the behaviour of the ratios of import taxes and of export subsidies to the foreign exchange values of imports and exports respectively. *Ceteris paribus*, at effective rates a rise in the import tax ratio increases imports and decreases product, and a rise in export subsidies has the opposite effect. Actually the tax component in imports had in 1970 about the same level as in 1966 (line 2) whereas the ratio of export subsidies to exports at official

[7]See Michaely [9], pp. 33–39, who describes these practices in Israel from independence in 1948 up to 1962.

exchange rates more than doubled (line 3), thereby compensating any other trends for an increase of the gap.

C. Official or Effective Exchange Rate in National Accounts?

The difference between the use of official and effective exchange rates in the national accounts is best brought out by a simple numerical illustration. Suppose an economy has imports equalling exports at the official exchange rate—let's say $300 each ($ 1 = IL1 of local currency), but IL400 for imports and IL500 for exports at effective rates. Then the import duties of IL100 may be assumed to be necessary in order to bring the prices of the imported goods up to the market price and cost levels of competing domestic products; and correspondingly export subsidies of IL200 may be supposed to be necessary to cover the cost (including profit) differences between domestic and foreign markets. Such a situation would mean:

(a) The excess of the market price aggregate of exports, IL500, over imports at market prices, IL400, shows that the economy has to sacrifice net resources worth IL100 in order to keep the balance of trade at the official rate from deteriorating.

(b) The in- and outflows of real resources evaluated at effective exchange rates are the values consistent with the other components of the national accounts, and therefore can be articulated with them in the national accounts. If evaluated at the official exchange rates, their values are some kind of "intermediate" prices and therefore not comparable with the market prices which are the proper medium of national accounting. Whereas import and export values at effective exchange rates are flows on a par with the flows of consumption and capital formation, the main interest for national accounting in imports and exports at official exchange rates rests in their balance, that is, in the net change of the stock of foreign assets of the country. This seems to be the basic difference between domestic and international flows. The current output of durables and of other goods, as far as accumulated as inventories, at market prices are at the same time flows in the product account and accruals to the gross capital stock. The flows of imports and exports, however, can be integrated into the product account only at effective exchange rates—which are their market prices. Their effect on national wealth, that is, the change in net foreign assets, has to be measured at official rates.[8]

[8] In the same way, the stock of net foreign assets should be deflated by the weighted price index of each asset group, in the foreign country. The measurement of this stock change at effective rates has very little economic meaning since the changes of foreign assets and liabilities depend upon the volume of net earnings of foreign exchange. This volume in turn depends upon the quantities traded and their prices, that is, elasticities of supply within the country and of demand abroad, rather than upon the policy of taxation and subsidization. The case is similar to the measurement of real savings as the difference between income and consumption, both deflated by appropriate price indexes; the result has little connection with the change of real net assets: it shows what would have been the change in savings if wage and profit rates, on the one hand, and consumer prices, on the other, had remained at base-year levels. The change in real savings should be measured by deflating nominal savings by the price indexes of the goods acquired with the savings.

(c) The export surplus in the national accounts at effective exchange rates is offset by the lower surplus—or the higher deficit—of the sector which finances the net subsidy, presumably the government as far as it does not increase its tax revenues. As far as it does, those sectors which pay the additional taxes indirectly finance the subsidies.

Two questions might be asked at this point. First, why single out changes of relative prices versus the rest of the world, as distinguished from domestic relative prices, for special treatment in the national accounts; and second, since the overwhelming majority of countries, developed and developing alike, have fixed exchange rates, what is the special relevance of the problem for developing countries?

It was stated above that national accounting is based upon market prices. "Estimates at market prices derive their importance from the underlying assumption that, in equilibrium, the marginal productivity or marginal utility of each commodity is proportional to its market price." (Nicholson [11], p. 395.) This assumption is, of course, unrealistic for each point of time, considering the incessant fluctuations of prices and volumes around the equilibrium points, as well as the many monopoly and quasi-monopoly situations which exist, arise and disappear. Nevertheless, the assumption of perfect markets seems to be not only convenient but also for domestic markets not unreasonable: the relatively high degree of aggregation of the constructs of the national accounts, as well as the averaging-out over periods of years or at least quarters, tend to iron out upward and downward deviations. Moreover, market forces, as well as in some fields government interference against monopolistic practices, tend to work in the direction of perfect markets.[9]

In contrast to domestic transactions, the tendency of import and export prices at official exchange rates in developing countries is away from equilibrium: the price-cost spiral caused by excess demand feeds upon itself and thus makes successive increases of the indirect taxes substituting for devaluation necessary, up to the next devaluation. Since excess demand is typical for such countries, the introduction of effective exchange rates is of special importance for their national accounts.

D. Effective Exchange Rates and National Accounts at Constant Prices

The introduction of effective exchange rates into the measurement of product and the trade balance is important not only for current price data but also for their conversion into constant prices, in spite of the fact that this transformation by definition removes the changes of the indirect tax rates from the

[9]How far the perfect market condition is actually fulfilled can be checked at least in one respect, to be sure one of great importance for factor productivity estimates. We refer to equality of the rewards to factors of production and their marginal products, the main Cobb-Douglas assumption. It is fulfilled if the ratio between the distributive shares of the factors within product stays constant. In Israel, the conventional measure of gross domestic product at factor cost from the side of resources does not yield a constant factor ratio over the period 1950–1965, but if measured from the resource-use side, it nearly does. (Cf. Gaathon [4], pp. 71–72, 116–119 and Bruno's article quoted there.)

base year to the other years of the period covered, and thus at least narrows the distortions stemming from the use of official exchange rates.[10] The use of effective exchange rates helps to determine what year is the optimal base-year from the point of view of equilibrium between domestic and foreign prices. Since the difference between effective and official exchange rates aims at making domestic products competitive with foreign products, the equality of effective and official exchange rates conceptually indicates such an equilibrium. The choice of the base-year in this context is the more important, the higher the weights of imports and exports of a country are relative to gross product. Though—with the notable exception of the United States—the weight of foreign trade in developing countries in the recent past was lower than in developed countries, this is presumably due to deterioration of their terms of trade and lack of financial resources to pay for imports rather than to the smallness of their needs which obviously are relatively larger than those of developed countries.[11]

If the price indexes of exports do not move in proportion to those of imports, the deflated trade balance will differ from the balance in current prices, and a current export (or import) surplus may even turn into an import (or export) surplus at base-year prices. This phenomenon has embarrassed many national accountants who tried to remove the resulting discrepancies by various devices.[12] Obviously, the problem is the same if the indexes of effective exchange rates move in diverging directions.

It seems to me that the application of the deflator of imports to exports, and the like, though justified for certain kinds of economic analysis, runs counter to a principle inherent in national accounting seldom expressly stated,[13] namely, that national accounting is basically an *ex post* record of transactions, *ex post* meaning that the market price of each flow is supposed already to express the *ex-ante* considerations of buyers and sellers. In other words, if the prices of commodities A and B are x and y money units, the ratio x/y is assumed to show that the volumes offered and bought at these prices yield equal marginal utility, or productivity, to purchasers and suppliers. In concrete terms, the prices of A and B, x and y, are supposed, by and large, to reflect the optimal combinations of inputs and product quantities to producers, on the one hand, and the maximization of utility to consumers, on the other, over the period under review. It

[10]See footnote 16 below and the discussion on p. 242.

[11]Cf. the conclusion of Maddison [7], p. 197, "As the exports of the developing countries have been rising more slowly than their GNP, they have had difficulty in financing imports in spite of large foreign aid". See also Gaathon [4], p. 140, footnote 3.

[12]Cf. Nicholson [12], p. 609, who apparently was the first author to tackle the problem systematically. He proposes to deflate exports by the price index of imports. Stuvel [14], p. 283, proposes the product price index as deflator for the foreign trade balances, thus expressing correction for the changes in the "purchasing power of money", whereas the deflation of "each commodity flow ... by its own price index the current-year value of each [flow] is also corrected for the change in its relative price" (p. 284). The new version of the United Nations' System of National Accounts [15], 1968, para, 4.8, p. 53, speaks of two approaches to the deflation of gross national product: one, to deflate final expenditures by their appropriate price indexes and the excess of exports plus net factor incomes from abroad over imports by the price index of imports; and, two, to deflate GNP by the price indexes of domestic final uses only.

[13]It has been said that even if national accounting is used in planning or forecasting, the resulting accounts are "anticipated *ex-post* analysis". (Unfortunately, I am today not able to trace the source of this apt statement made many years ago.)

would, therefore, be wrong to impute to good B a substitution value, say, the price of A: conceptually the consumer is supposed to have already considered all possible combinations of price relations, and in the average chosen x/y, in accordance with his demand schedule of preferences. And the producer has chosen those combinations of inputs which promise the best amounts of profits to him in the given market situation. It is not consistent with the *ex-post* criterion of national accounting to introduce once more *ex-ante* considerations of, say, the income earners who decide upon the acceptability of their wage or profit earnings by comparing their utilities—in terms of consumer goods—with the disutility of work. Income is the reward for human effort. The deflation of income aims, therefore, at quantifying that effort. This should be done by a weighted average of the unit rates of wage and nonwage incomes[14] which, under the market price assumption, measures the contributions of earners to output. The question how much the earners can buy is conceptually already answered by that assumption and should not be introduced once more into the accounts.

To return to the main subject of the argument, the fact that in the example imports have a market value of IL400, and exports of IL500, although their foreign exchange value is $300 each, has economic significance. This should not be concealed by devices alien to national accounting. I believe that it would be best to show in the national accounts imports and exports at effective exchange rates, and to keep the balance of payments at official rates, or in an international currency, as a separate memorandum item outside the accounting system.

E. Effective Exchange Rates and Product at Factor Cost

So far the product concept discussed has been that at market prices. However, for some kinds of analysis, especially for productivity measurement, the factor cost concept is frequently applied. The implications of this approach can best be brought out by comparing it with the market price approach, both of them at official and at effective exchange rates. Using the following designations:

Gross (or net) product at market prices and at factor cost, respectively	Ym, Yf
Private and public consumption	C
Gross (or net) domestic capital formation	I
Exports and imports at official exchange rates	X, M
Import taxes and levies	Tm
Export subsidies	Sx
Taxes and subsidies incident upon domestic final products	Td, Sd
Official and effective exchange rates	OR, ER

[14]The statistical difficulties of computing such a deflator, in particular with respect to nonwage earnings, are, of course, admitted. They are, however, irrelevant for the conceptual argument of the text.

we can express the market price and factor cost concepts of product:

Product at market prices

$$Ym(OR) = C + I + X - M$$
$$Ym(ER) = C + I + (X + Sx) - (M + Tm)$$

which means that

$$Ym(ER) = Ym(OR) + (Sx - Tm)$$

Product at factor cost

$$Yf(OR) = C + I + X - M + (Sd + Sx) - (Td + Tm)$$
$$Yf(ER) = C + I + (X + Sx) - (M + Tm) + (Sd - Td)$$

which means that

$$Yf(ER) = Yf(OR)$$

In words, the measurement of the trade balance by effective exchange rates of imports and exports is larger by export subsidies, less import taxes, than it is at official rates. Correspondingly, product at effective rates is larger than product at official rates by (Sx − Tm), if Sx > Tm, or, as is the case in Israel, when Tm > Sx, product at effective rates becomes so much smaller than product at official rates.

At factor cost, however, product at effective rates is identical with product at official rates. This is in conformance with the definition of the term factor cost as the aggregate value of factor services, a magnitude which excludes the net indirect tax component of product.[15]

The implications of the two approaches to the measurement of productivity change can now easily be summarized. The factor inputs are obviously not affected by the alternative of calling part of the indirect taxes by another name, that is, effective exchange rate components. Product at factor cost is not affected at all, as shown above—a fact which could be used in favor of it as compared to product at market prices.

But even if product is measured at base-year market prices, its time series at effective rates would differ from the time series at official rates only to the extent that the weights of highly taxed commodity flows would significantly diverge from the weights of lightly taxed flows of final products.[16] This is so because, by definition, the base-year tax (and subsidy) rates, measured *ad valorem*, are applied also for the other years of the time series. How far changes

[15]Michaely introduces a concept "factor cost of imports" which he defines as the foreign exchange sacrificed to obtain the imports [8], p. 293, that is, as their substitution value. The argumentation against such an approach within the framework of national accounting at market prices applies also against Michaely's argument. Moreover, Michaely's definition is at variance with the generally accepted definition given in the text. Halevi comes to a similar conclusion [5], p. 92.

[16]"If the earnings of resources are the same in all activities, a mere shift in the allocation of resources from a lightly taxed to a heavily taxed commodity . . . raises the real product at market prices whereas it leaves product at factor cost unchanged." (Denison [2], p. 15.)

over time in the import- and export-mix would affect the two product volume indexes is a pragmatic question, but they are generally not likely to diverge to any large extent.

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