

# NEW PRODUCTS: A DISCUSSION OF THE WELFARE EFFECTS OF THE INTRODUCTION OF NEW PRODUCTS IN DEVELOPING COUNTRIES\*

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## **Introduction**

ONE of the most important ways in which advanced countries have changed poor countries is through the impact of new products. Products designed in industrialised countries have transformed consumption and production patterns, culture and society. The significance of new products is widely recognised at a popular level and forms a central part of much informal discussion: 'good' products (vaccination, new seeds) are contrasted with the notoriously 'bad' (powdered baby milk, high tar cigarettes, sophisticated and expensive weapons). But while the effects of new products are recognised as of enormous importance at a popular level, economists have generally neglected the question. Discussions of technology transfer are mostly framed in terms of the costs of the transfer and of the production characteristics of the techniques.

The neglect of the effect of new products in LDCs in large part follows a similar neglect in advanced countries. Tens of thousands of new products are produced and marketed each year and as many more 'old' products are changed in significant respects.<sup>1</sup> Indeed, the very dynamic of oligopolistic competition requires adherence by firms to the maxim of "striving to render obsolete everything you have done before".<sup>2</sup> Yet most discussion of economic welfare ignores new products, or changing characteristics of old products.<sup>3</sup> For example, in neither of two classic works on welfare economics, Little or Graaff, is there any substantive discussion of new products. In so far as new products are discussed in traditional consumer theory, the most that is said is that—by increasing choice—consumers' welfare is potentially increased. A significant reason for this lacuna is that the traditional theoretical framework is unsuited, perhaps incapable, of dealing with the question of new products.<sup>4</sup> But the 'new' theory of

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<sup>1</sup> According to Pessemier (1977) in 1970 17% of all sales in manufacturing in the U.S.A. consisted of products less than 4 years old.

<sup>2</sup> Midgley (1977) p. 180.

<sup>3</sup> Notable exceptions are Veblen and Scitovsky—both have been treated with cold neglect by the profession. See Veblen (1899) and Scitovsky (1976).

<sup>4</sup> As Lancaster puts it, "Introduction of a new good requires that the preference function defined on  $n$  goods is thrown away and with it all the knowledge of behaviour based on it, and replaced by a brand new function defined on  $n + 1$  goods, or the fiction that the consumer has a potential preference function for all goods present and future—Neither approach gets us very far". Lancaster (1966) p. 20.

consumer demand, associated with Lancaster, which treats products as bundles of characteristics, lends itself far more readily to dealing with the question.<sup>5</sup>

The aim of this paper is to suggest a more systematic framework in which to assess the impact of new products on poor countries. To do so we consider the general conditions according to which new products are likely to increase/decrease economic welfare, looking both at 'absolute' effects and also distributional consequences. We consider the likely direction of effects when products from advanced countries are introduced into poor countries. We briefly describe and analyse eight case studies. Finally we consider some of the policy implications of our findings.

*The Lancaster framework and new products:* each product is regarded as being a bundle of characteristics, combined in a certain ratio, so that each product may be represented as some vector  $q$ , representing a certain combination and quantity of characteristics, i.e.  $q = (ia, iib, iiic. \dots)$  where  $a, b, c$ , describe the characteristic of the products (such as nourishment, beauty, etc.) and  $i, ii, iii$ , the quantity of each characteristic embodied in the product. It is assumed that consumer preferences are ordered for *characteristics* rather than for products in themselves. A new product—represented say by some vector,  $r$ —then consists in a changed bundle of characteristics. Since the consumer ordering is for characteristics, not products, the new bundle of characteristics may be compared with the old, without requiring a new consumer ordering. In contrast, in traditional theory, since consumer preferences are assumed to be for products not characteristics, a new product must involve a new ordering. Since a reordering leads to non-comparability between the two situations being considered it rules out welfare consideration of new products. This is the fundamental reason why traditional theory cannot deal with new products, but the new theory can. It should be noted that the new approach does not distinguish between changed characteristics of old products and 'new' products—both would be represented by a different vector involving a changed bundle of characteristics. This lack of distinction seems reasonable in the light of the gradual spectrum of changes which may occur, so that any classification of changed products into 'old' products with changed characteristics and 'new' products is somewhat arbitrary. In what follows, therefore, we phrase the discussion in terms of the impact of 'new' products, although the discussion also encompasses what might more normally be described as minor changes in old products. This means that the discussion has a much wider application—empirically—than a discussion of new products confined to major product innovations, such as

<sup>5</sup> Helleiner (1975) has a summary treatment of some of the effects of new products, using Lancaster's approach, on similar lines to those adopted in this article.

the motor car, the ball point pen or the micro-wave oven. Indeed it could be said that in modern societies, almost all products change in some way in a quite short time—the exceptional products are the ones that *don't* change.

While, as we show in some detail below, the framework is much more amenable to handling the question of new products, there remain problems of non-comparability when new products involve entirely *new* characteristics. Of course if characteristics are very broadly defined—e.g. nourishment, warmth, entertainment etc.—it might be possible to avoid this problem, since at the broadest level human needs—basic and base—and therefore product characteristics, remain similar over time. But with such broad definitions it may be difficult to pick up various subtle changes in product characteristics which are of significance: 'washing whiter', or 'speeding up calculations' *can* be classified under very broad categories such as 'satisfaction in appearance' or 'efficiency of operations', but something is lost in so doing. Thus where a new product involves a new characteristic we may be back to the problem of non-comparability, associated with the old approach. But this is likely to happen in a much smaller range of cases, and may be largely avoided by a broad classification of characteristics. In what follows we ignore this problem. For simplicity of presentation, we consider products with just two characteristics.

With the new approach problems of comparison arise if the introduction of a new product directly, or as the result of associated promotional efforts, alters tastes and hence consumer ordering. To start with we assume that changes in consumers' welfare are solely a function of an individual's own consumption, and that tastes are unchanged as a result of the introduction of new products. In such a situation, a new product will unambiguously improve economic welfare if it extends the range of efficient choices by creating a new bundle of characteristics, containing more of at least one characteristic for a given cost while leaving the existing range of products unaffected, in both availability and cost.

Figure 1 portrays a situation of two characteristics, 1 and 2 and two initial products, *X* and *Y*. *AB* represents the price ratio between the two goods. New product *Z* represents a combination of characteristics previously obtainable by combined consumption of *X* and *Y*. The price of *Z* is such as to extend the efficiency frontier from *AB* to *ADB*. *Z'* represents another new good which embodies a previously unobtainable combination of characteristics and thus extends the range of efficient choice. Since neither *X* nor *Y* are displaced, the introduction of either (or both) of these new goods represents a Pareto improvement irrespective of the preference pattern of consumers. However, the preference pattern of consumers will determine the *distribution* of gains from the new products. With the preference pattern shown in the diagram as *I'I'* and *I°I°*, consumers gain by the new good *Z*, but are not

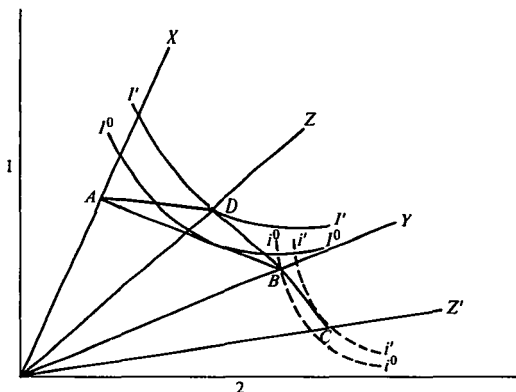


FIG. 1

affected by  $Z'$ . However, consumers with preference pattern  $i'i'$  and  $i^0i^0$  would gain by  $Z'$  but are not affected by  $Z$ .

In many situations, the introduction of a new product either totally displaces existing products, or leads to altered production and cost conditions for them. If the new product involves the same ratio of characteristics as the old product, but a greater quantity for any given cost, then its introduction is likely to lead to the displacement of the old product as 'rational' consumers will no longer consume it: since consumers will be able to consume more of both characteristics for the same cost, in a Pareto sense welfare will have improved.

But if a new product involves a *changed* combination of characteristics for a given cost (more of some characteristic and less of another), and alters the production cost and/or availability of existing products, its welfare impact is more ambiguous. Generally speaking, this is likely to happen in three types of condition. *One*, where the existing and new products compete in using the same (scarce) factor of production, and the production of the new product raises costs of production of the old product. For example, the introduction of mechanised methods of textile manufacture may have raised the price of raw cotton to traditional spinners. At a more general level, the vast array of new products (and technology) introduced over the past two hundred years has raised the price of labour to producers of existing products, increasing their costs of production. *Secondly*, where there are economies of scale, and diseconomies of small scale, so that if the demand shifts away from existing products to new products, costs of production of existing products rise.<sup>6</sup>

<sup>6</sup> An article in the *Harvard Business Review* in 1965 advised the rapid phasing out of products in the final stage of the product cycle on the grounds that they have to be produced in short uneconomical runs and also demand a disproportionate share of scarce managerial and other resources. Kotler (1965).

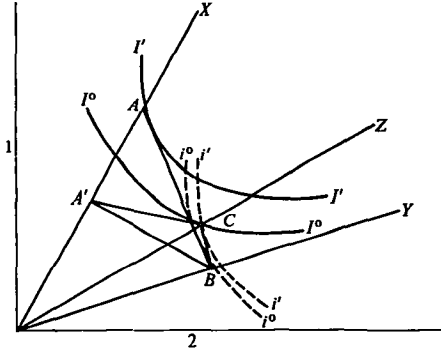


FIG. 2

Thirdly, where markets are dominated by a few very large firms, these firms may withdraw their old products (and/or raise their price) when they introduce new products. They may do so because costs have risen, for one or other of the reasons just mentioned, or because their marketing strategy requires it. The latter is probably the most usual reason with firms withdrawing old models so as to ensure that demand is switched to the new products. Changes in fashion with respect to clothing and automobiles are obvious examples here.<sup>7</sup>

If, for any of these reasons—competing use of scarce resources, indivisibilities or marketing strategy—the relative costs of old products rise, or they become non-available, then the introduction of the new products may lead to a deterioration in welfare, for some groups in society, or even for whole societies.

In Fig. 2, the initial efficiency frontier was represented by  $AB$ . The introduction of a new product,  $Z$ , leads to a rise in the cost of production of  $X$ , such that the new frontier is represented by  $A'CB$ . Whether consumers are made better or worse off by the change will depend on whether their indifference map is represented by the set of  $II$ , or by  $ii$ . Consumers with indifference curves  $ii$  will be better off; those with the  $II$  map worse off. Any situation in which the price of existing products is increased, or their production withdrawn, may make some consumers worse off, if the new products involve a changed bundle of characteristics (for a given cost).

If all consumers had identical indifference maps, then they would either all be of a  $II$  type, or all of a  $ii$  type. If they were all of a  $ii$  type then they

<sup>7</sup> 'Apart from the few weeks at the end of the year when next year's models are already available but dealers also sell out their remaining stock of the old year's models, the consumer must buy his new car with its new design and new features whether he wants them or not.' Scitovsky (1976) p. 256.

would all be better off. If all were of a  $II$  map, then presumably the new product would not be introduced. Hence, for new products to involve a deterioration in welfare, consumer preferences must differ, and while the welfare of some consumers may go down, that of others goes up. As one would expect, the group of consumers whose preferences are most directed towards the characteristics combined in the old product, whose price has risen (or which has been withdrawn), are most likely to suffer a deterioration in welfare, while those whose preferences are most directed at characteristics embodied in the new goods are most likely to gain. In a commonsense way we can say something about the likely causes for people to be in one group or the other:

A. People with 'conservative tastes' who dislike change are likely to be among those with preferences weighted towards the old product characteristics, and are therefore more likely to be losers.

B. In so far as economies of scale are of significance in determining the change in costs, then those with the tastes of the majority are likely to be among those who gain, those with minority tastes among those who lose. One should add that 'minority'/'majority' is here defined with reference to total effective *monetary* demand, not with respect to felt needs. With an unequal income distribution, the majority of the people may represent the minority of the purchasing power.

C. One of the most significant sources of differences in tastes is that of differing income levels. As consumers get richer, the product characteristics of the goods they consume change towards more high income types—i.e. better quality, more uniform standards, more luxurious etc. (See Stewart, (1977)). In so far as new products are directed to satisfy the needs of those with rising incomes, then each new set of products will embody more high-income characteristics and less low-income characteristics. Hence the higher income consumers will tend to be among those who gain, the low income among those who lose.<sup>8</sup>

Suppose characteristic 1 represents low income characteristics, characteristic 2, high income. Then a new product,  $Z$ , is likely to be to the South East of  $Y$  representing more high-income characteristics. Where the new product leaves existing products unaffected, no group of consumers will lose, but the gains from the new product will be concentrated among high income consumers. Suppose high income consumers have indifference map  $II$  in the diagram below (Fig. 3). With the introduction of new product  $Z$ , they will move from  $I^oI^o$  to the higher indifference curve  $I'I'$ . But the poor consumers with indifference map  $ii$  will remain on the same indifference curve,  $i'i'$ . Thus while no-one will lose, the relative gains will be concentrated on the rich

<sup>8</sup> Research and development on new products is directed at the biggest markets (in monetary terms) as indicated by these figures for the pharmaceutical industry:

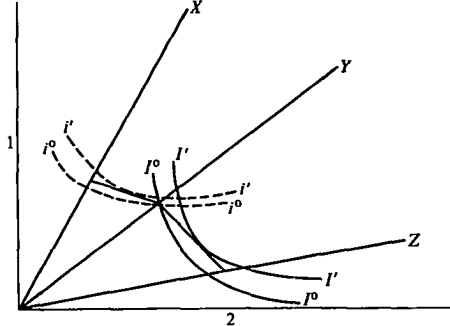


FIG. 3

consumers. If as a result of the new product, one of the old products, X, is withdrawn from production, then poor consumers (indifference map  $i^0$ ) will suffer a loss of welfare moving to a lower indifference curve  $i^0 i^0$ . A similar consequence would follow for an increase in cost of the old products. If the new product represented a more *efficient* product (i.e. involving at least as many of each characteristic as some existing product, at lower cost) the old product would be eliminated as inefficient. All groups of consumers would

*New products introduced by revenue size of therapeutic market, 1969*

Therapeutic class revenue parameter \$ million	France		Italy		Germany		UK	
	No. of C	No. of P	No. of C	No. of P	No. of C	No. of P	No. of C	No. of P
0.0-0.5	18	3	17	1	23	2	23	5
0.5-1.5	30	13	34	17	36	19	20	5
1.5-2.5	18	13	19	10	13	14	9	10
2.5-5.0	23	23	29	22	28	47	20	44
5.0-10.0	31	45	27	68	21	41	10	39
10.0+	26	75	22	98	25	112	11	34
Totals	146	172	148	216	146	235	93	137
	Spain		Belgium		Holland		Austria	
0.0-0.5	55	19	37	3	94	23	116	23
0.5-1.5	43	62	38	21	30	18	28	45
1.5-2.5	19	44	21	8	7	8	4	16
2.5-5.0	27	146	29	21	6	12	—	—
5.0-10.0	7	54	19	24	2	1	—	—
10.0+	6	156	9	21	—	—	—	—
Totals	157	481	153	98	139	62	148	84

C = Classes, P = Products

Source: D. Reekie, *The Economics of the Pharmaceutical Industry*, Macmillan, 1975, p. 68. Even what relatively little R and D exists in and for poor countries appears to be directed largely to the high income minorities in these countries. In Berg's survey of Indian firms more than half stated that new products were aimed at middle and upper income levels. Another study notes that in the case of processed foodstuffs very little interest has so far been shown in the lower income segments of poor countries.

gain. However, unless each characteristic was reduced in cost by the same proportion, relative gains would be concentrated among the consumers who most prefer the characteristic most reduced in cost.

Over time, as incomes rise there is a systematic shift in consumer preferences towards higher income characteristics, so that 'average' preferences shift as shown in the diagram below (Fig. 4):

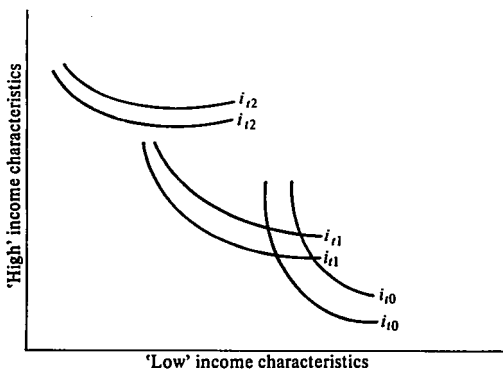


FIG. 4

New products are designed—and old products withdrawn—in accordance with this shift in tastes. When new products are introduced into an economy for which they are designed (i.e. when technological change is endogenous) negative effects on consumers' welfare, of the type described above, are likely to be confined to certain groups within society, because if *all* consumers were made worse off, then it would be unlikely that the new products would be developed and introduced. This is generally the situation in advanced countries. Minority groups and poorer consumers may suffer welfare deterioration as new products are introduced but majority (in a monetary demand sense) consumers will gain: an obvious example is the way in which poorer consumers lose as private transport replaces public, and large-scale units of consumption replace small. To assess the overall welfare impact of new products in such cases requires weighting the gains and losses of different groups of consumers.

The situation is somewhat different when products from one (richer) society are introduced to another (poorer) society. New 'high-income' products are developed for the high and rising income societies, and consequently have increasingly high-income characteristics. While these new products tend to correspond to the consumer preferences of large groups in



the rich societies—i.e. in terms of Fig. 3 the *ii* map may represent all (or most) consumers in poor societies; the *II* map that of all (or most) consumers in rich societies. If that were so, then the question to be answered is why the new products should be introduced into the poorer societies at all, and why, if they are (e.g. to serve a minority elite with similar consumption-patterns to those of the rich society), the low-income goods should be increased in cost or withdrawn. There are of course goods where this does not happen, and countries where the new products are not introduced. And in most poor countries there is some lag before new goods are introduced from rich societies. But there is some tendency for the new high-income goods to be introduced and old goods to be withdrawn even where the new goods do not correspond to the main consumer demand. This may happen:

(i) where monetary demand in the poor country is heavily concentrated among the rich, so that preferences expressed by monetary demand are similar to those of the rich countries. Some Latin American countries provide well known examples: it has been argued, by Furtado for example, that the maldistribution of monetary income and demand is a deliberate policy-induced strategy in order to create demand for the new products and therefore a market for those companies producing the new products. In this type of situation the negative welfare effects of new products arise from the distribution of income, rather than the introduction of new products as such (although the production technology associated with the new products—see below—may be partly responsible for the skewed income distribution.)

(ii) where production of *all* goods—old and new—takes place in the advanced countries: the rise in price of the old goods/withdrawal of them that arises with switches to the new goods in the advanced countries then also affects consumption possibilities in the poor countries.

(iii) where production of both types of goods (old and new) takes place in the poor countries, using technology from the advanced countries, and the change in the advanced countries towards the new products changes the relative costs of production *in the poor country*: this could happen where products compete for scarce factors, or where there are world wide economies of scale (e.g. in technology development, maintenance, inputs, advertising and so on) which affect the relative costs of production in the poor countries, even though the change in demand and production initially only takes place in the rich country. In many cases, for example, problems (including rising costs and non-availability) in securing parts and inputs persuade entrepreneurs in poor countries to switch to more recent techniques and products.

(iv) where the production of both goods, which takes place in the poor country, is dominated by particular decision makers whose private interest lies in switching to more recent products. For example, a continuous switch

in products may be the most effective way for multinational companies to prevent local competition.

(v) where production of both goods takes place in the poor countries—or where production of the old good takes place in the poor country, and the new good in the rich country—and where some switch in demand away from the existing products raises their costs—because of indivisibilities. Such a situation (ignoring for the moment the impact of advertising) may occur so long as there are some high-income consumers whose tastes are more in line with rich country tastes (i.e. a similar situation to (i) above, but less extreme).

In two of these cases ((i) and (v)), some distributional judgements are involved in assessing the impact of new products, since some consumers gain: however, in both the distributional judgement required is of a different kind from that involved in the rich country case. In case (i) in monetary terms, the majority of consumers gain, but the majority of consumers, in terms of *numbers* of people, may lose. This is unlikely to be the case in the rich country situation. In case (v), the gainers may be confined to a minority among monetary consumers. In the rich country situation, it is likely that new products will only be introduced if a substantial proportion of consumers are likely to gain. In the other cases (ii)–(iv), new products may be introduced even though the *whole* society loses. It should be noted that this will only be the case on certain assumptions about consumer preferences, about the nature of new products, and of indivisibilities associated with production. Whether or not these assumptions apply will vary in different products/countries. But it is possible to generalise a little:

(a) Assuming consumer preferences are unaffected by the existence of alternative products and by promotional efforts (an assumption we relax below) poor country preferences are likely to be towards low-income characteristics compared with rich country products.

(b) If new products are first developed *for* rich societies—as for the most part they are—each new product is likely to embody more high-income and less low-income characteristics than existing products. However, because of technological advances in product design and technology, the cost per unit of each characteristic (including low-income characteristics) *may* be lower than that of old products.

(c) There is abundant evidence of economies of scale in much of modern technology—which is accentuated by even more marked economies of scale in marketing etc.<sup>9</sup> In so far as one ‘modern’ technology product replaces another—as in much of the changes in the modern sector—indivisibilities may be of significance. Indivisibilities are much less marked in traditional techniques/products, so that costs of production of these traditional products

<sup>9</sup> See, for example, Pratten (1971).

may not rise as new modern sector competing products are introduced. But costs of traditional products may rise if the costs of inputs rise as a result of the new products. The established decline in traditional products over time may in part be due to the fact that they do not represent efficient alternatives; in part to policy changes which discriminate against them (e.g. standard setting, making low brewing illegal, etc). But part is likely to be due to rising costs. Traditional/old products may be more likely to survive in large economies, where even declining demand may still represent a sizeable market, than in small.

Taking these considerations together, whether or not new products benefit or harm poor societies is likely to vary according to the products. This is part of the explanation of why there are apparently 'good' and 'bad' products. But there are three other types of reasons, not allowed for in our framework so far: the effects of new products on tastes, learning by consuming effects, and indivisibilities and complementarities in consumption.

*Taste creation*: producer sovereignty type effects, associated with promotional efforts on the part of producers, mean that producers attempt (and often succeed) to change preferences. These attempts are systematically related to new products, so that expenditure to promote new products tends to increase preferences for new products as against old. This is particularly marked where the old products are traditional ones, normally associated with minimal promotion, but is also true where one new modern sector product replaces another. One effect of the tendency for greater promotion of new products will be to accelerate the switch in demand away from old products and therefore to increase the tendency for these to rise in cost/be withdrawn. In a strict consumer preference framework, it is not possible to compare a situation in which consumer preferences have been altered, with the preceding situation. But stepping outside this framework, it is reasonable to argue that promotional expenditure on one type of product is likely to lead to over-consumption of that product compared with the less well promoted products. Consumers subject to such imbalanced promotional efforts will tend to spend a greater amount on the new products than they would in the absence of such expenditure. If we take expenditure patterns in the absence of promotion (or with 'equal' promotion, which may not produce the same results) as the 'balanced' pattern of consumption, then promotional expenditure of new products will tend to lead to an imbalance of consumption expenditure towards new products—which in the case of poor countries is likely to mean towards high-income products. Consumers will then spend too little on low-income characteristic goods. The results are likely to be insufficient expenditure on basic needs. It is plausible to argue that this has been the effect in relation to many goods consumed in poor countries.

It should be noted that the effect on preferences is not just a matter of formal promotional expenditure: all sorts of other influences also operate. For example, cultural dependency and the image of the sophisticated Westerner (which used to be described as 'demonstration effects') may have as much influence in promoting new products, as formal advertisements.

*Learning by consuming:* The formal theory of consumer preferences does not allow for learning by consuming. In practice this is a very significant element in consumption practices. Consumers become more efficient *qua* consumers as they consume—learning how the items consumed endure, how to use them, their effects in terms of the fulfillment of the needs for which they were demanded. These learning effects are a function of experience in consuming particular products: as a new product is introduced consumers tend to be inefficient in choice and in use once selected (i.e. secure less than the maximum possible combination of desired characteristics.) As time proceeds learning effects take place, and consumption efficiency rises. Since learning effects are related to the time for which a product has been available, the gap between efficient and actual consumption patterns is greatest for the most recently introduced products, least for the oldest products. In addition to this, there is a more general society learning process, so that some societies are more efficient consumers than others, particularly in relation to certain types of products. In all societies, therefore, one can expect more efficiency in consumption of old products than new, and the gap in efficiency will be greatest where the difference in characteristics of products is greatest, and where the old products have been consumed for the longest period. One would therefore expect the biggest gap in efficiency between consumption of traditional products—which have been available for a long time and for which consumption efficiency is high—and modern newly introduced products. The observed fall in nutritional standards following the introduction of 'modern' processed goods is partly due to the lack of learning experience with this type of product, as against the traditional products. The baby milk case is an example of this. Rich societies in general put considerable effort into improving consumption efficiency—as a response to the steady introduction of new products, for which learning experience would otherwise be low. Children are educated to be discriminating consumers, consumer groups establish magazines etc. to inform consumers and the government intervenes to protect and inform consumers. The net result is a much higher degree of consumption efficiency in relation to new products than in poor societies. Lacking the learning experience related to many new products, social (including government) protection and information services, there is a systematic tendency for inefficiency of consumption of new products in poor countries.

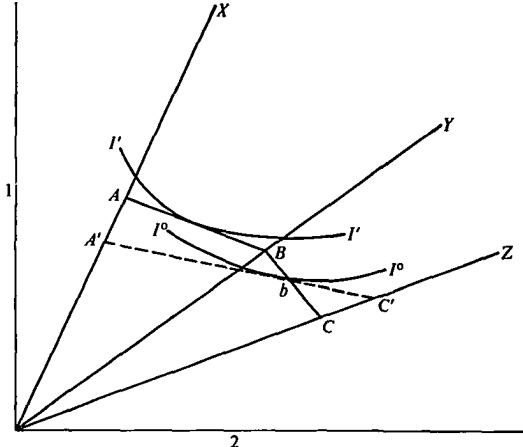


FIG. 5

The combination of imbalanced promotional efforts and consumption inefficiency both concentrated on new products would tend to result, simultaneously, in an undervaluation of old products and an overvaluation of new products in relation to their true characteristics. This is illustrated in Fig. 5.  $X$  and  $Y$  are existing products:  $Z$  is the new product. Because of differential promotional expenditure consumers underestimate the traditional products: whereas the actual combination of characteristics possible with a certain income is represented by  $ABC$ , and therefore the best position is on  $I'I'$ , consuming only  $X$  and  $Y$ , the potential of the traditional products is underestimated, because of lack of information/advertising, while the potential of new product  $Z$  is exaggerated because of promotional efforts plus lack of learning effects. Consumers believe the efficiency frontier is represented by  $A'C'$  and therefore consume at  $b$ , on a lower indifference curve than they might have done in the absence of new product  $Z$ , or with correct information about the alternatives.

**Indivisibilities in consumption:** Many products are more or less indivisible, the extent of indivisibility varying with the product. At one extreme, food grains may be perfectly divisible (although not the packages in which they are purchasable); at the other a modern aircraft or spaceship can only be purchased in very large units. The higher the income of consumers, the larger the unit in which they are prepared, and indeed may wish, to buy characteristics. This fact is reflected in the design of products—which tend

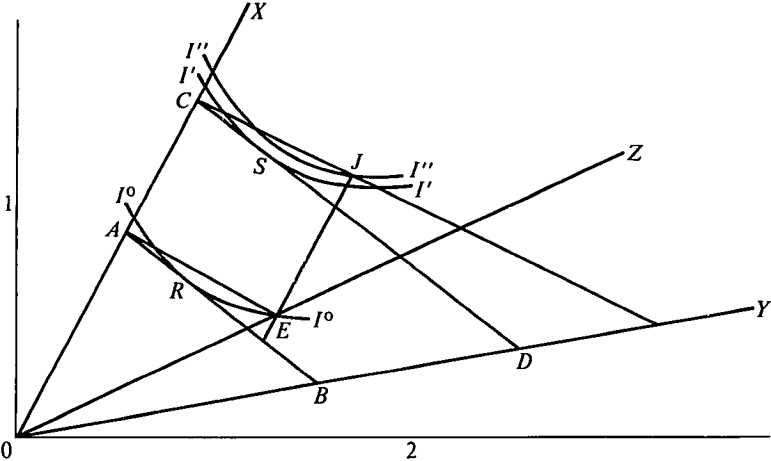


FIG. 6

to be increasingly indivisible<sup>10</sup>—in relation to any desired set of characteristics—the higher the income for which the products are designed. Indivisibility is thus a ‘high income’ characteristic. But it is sufficiently important to merit separate treatment. Products designed for high income consumers tend to be more indivisible than would be appropriate for low income societies. This means that new products will tend to benefit rich individuals more than poor.

Figure 6 shows two individuals with different incomes (represented by  $AB$  and  $CD$  respectively) and identical tastes (represented by the indifference map  $I$ ). Prior to the introduction of new good  $Z$  the two individuals consume at points  $R$  and  $S$ . Good  $Z$  is now introduced but cannot be bought in units less than  $OE$ . The result is that the low-income individual cannot improve his welfare (i.e. he can only move to  $E$  on indifference curve  $I^0$ ) while the second individual is able to combine  $OE$  of good  $Z$  with  $AC$  ( $=EJ$ ) of good  $X$  to reach  $J$  on the higher indifference curve  $I''$ .

If the indivisible item is nonetheless purchased by the poorer consumer because he wants certain of the associated characteristics, then this involves disproportionate expenditure on that item as against other items of consumption. Consumption patterns in some underdeveloped countries illustrate the effects of indivisibilities. Consumer durables are outstanding examples of indivisible consumption items. Wells’ survey of expenditure on

<sup>10</sup> A study in the USA covering food and household goods shows for example a distinct trend towards packaging in larger sizes. See Stanton (1964).

consumer durables in Brazil revealed very widespread ownership of consumer durables, even among relatively low income groups.<sup>11</sup> Increasing consumption of consumer durables was accompanied by a decline in nutritional standards. A survey in Sao Paulo found that between 1959 and 1969/70 "there was a significant rise in the share of household expenditure devoted to domestic appliances... an analysis of (physical) *per capita* food consumption shows that there was a downward trend, indicating that levels of nutrition among the working class deteriorated absolutely".<sup>12</sup> Analysis of two family expenditure surveys in 1968 and 1974 showed that the share of expenditure devoted to food fell from 46.7 to 41.1% between 1961/62 and 1971/72. This shift in expenditure was accompanied by an absolute deterioration in nutrition standards, with 2704 calories being consumed in 1961/62 (73.7 g. proteins, 75.6 g. fats) compared with 2531 calories in 1971/72 (80.2 g. proteins, 70.5 g. fats).<sup>13</sup> These trends in consumption expenditure are of course the outcome of a variety of effects, besides indivisibilities. Others include changing behaviour in response to the availability of new products, to promotional expenditure and to demonstration effects.

*Complementarities of consumption:* for many consumer goods there are interdependencies, such that the enjoyment of one good depends on the consumption of some other good: tennis balls and tennis rackets; cars and roads; chairs and tables; and so on. Interdependencies in consumption may reinforce some of the other effects already discussed because they mean that a new product and/or the withdrawal of an old product not only has direct effects on consumers, but also affects the welfare gained from other items. Thus some existing products may be rendered obsolete by the replacement of a complementary new product. The initial replacement of one good by another might apparently benefit all consumers, leading to more of all characteristics than the replaced product; but the complementarity effect may render obsolete other products which are replaced by goods which make some consumers worse off. (Of course the reverse may also happen.) Alternatively, complementarities may, like indivisibilities in consumption, cause the benefits from new products to be out of the reach of low income consumers, who cannot afford all items in the package. Complementarities may also reinforce the effects of new products in causing imbalance in consumption. Absence of complementary goods and services is a major factor behind the harm done by powdered baby milk. The practice of

<sup>11</sup> See Wells (1977).

<sup>12</sup> *Ibid* pp. 269-70.

<sup>13</sup> A similar phenomenon appears to be taking place in Trinidad and Tobago. One-third of households in the poorest four income classes spend less than 29% of total expenditure on food despite the fact that there is "considerable undernutrition and malnutrition among the population".

feeding powdered milk to babies "is being used by women with no knowledge of hygiene, no ability to read the instructions on the can, and no money with which to buy sufficient powdered milk. Thus, diluted powdered milk from dirty bottles and dirty teats is substituted for breast milk. This leads to malnutrition and dietary disorders such as marasmus, diarrhoea and vomiting".<sup>14</sup>

Cars and roads provide another example of indivisibilities cum complementarities. Modern cars generally (despite the success of the East African Safari) require modern roads for efficient use. If the cars are provided without the roads, then serious inefficiencies result. If the roads are also provided, social expenditure is concentrated on the provision of roads to car-owners, indirectly depriving other consumers of much needed infrastructure.

*Summary of effects:* the analysis suggests that the impact of new products on economic welfare will depend on the particular circumstances and will need to be assessed separately for each product and for each country—since the effects vary according to consumer tastes and income levels, and the product characteristics and production technology of new and existing products. In general we may distinguish the following situations:

A where new products are likely to increase welfare in a Pareto sense. This occurs in two sets of circumstances:

- A<sub>1</sub> where the new products are more efficient than the old—i.e. each characteristic is of lower cost;
- A<sub>2</sub> where the new product does not displace nor add to the costs of existing products, and 'tastes' are not affected.

B where new products are likely to decrease welfare for some or all consumers. This may occur:

- B<sub>1</sub> where a new product displaces an old product or increases its relative cost;
- B<sub>2</sub> where promotional expenditure on the new product leads to over-consumption.

In all of these cases, the new products will have distributional consequences. In general where new products are designed in rich societies and introduced into poorer societies, the distributional consequences can be expected to be inequalitarian. Gains will be relatively concentrated among high income consumers; losses relatively concentrated among low income consumers. Thus we may distinguish two alternative distributional consequences, C.

- C<sub>1</sub> where the new product is egalitarian in its consumption effects;
- C<sub>2</sub> where the new product is inequalitarian in its consumption effects.

In general, data for changes in income distribution over time do not allow

<sup>14</sup> See Hughes and Hunter (1972) p. 90.



for these effects, since they look at shares of incomes received by different percentiles, not at the purchasing power in terms of characteristics. Even estimates (which are rare), which take into account changes in prices of the main product groups consumed by different income groups, do not disaggregate sufficiently to allow for the effects of the introduction of new products.

*Effects on production technology:* The discussion above has been confined to considering the effects of new products on consumers *qua* consumers. In practice, an equally—perhaps more—significant effect on welfare will result from the effects on production technology, and hence on employment and income distribution. New products developed in advanced countries in general involve a later vintage technology than older products: this normally means that the associated techniques of production tend to be more capital intensive, more sophisticated and larger scale.<sup>15</sup> The production of new products in poor countries, and the displacement of old products, will therefore tend to nudge the technology in use towards greater capital-intensity and larger scale. This in turn will tend to reduce employment below what it might have been, increase technological dualism, and increase urban concentration.

Thus to complete our classification, we may distinguish between two types of production technology, D, associated with the new products:

D<sub>1</sub> where the production technology is more appropriate<sup>16</sup> (i.e. labour intensive, small scale etc.) than that of existing products;

D<sub>2</sub> where the production technology is more inappropriate (capital intensive, large scale etc.) than that associated with existing products.

The total effects of new products on economic welfare will thus consist of the combined effects A→D.

*Empirical evidence:* Difficulties in handling changing product characteristics are notorious and this is one reason why the subject has been neglected. Most statistics classify products into such broad categories that many variations in product characteristics go unnoted. Another reason is the general reluctance of economists to incorporate changes in tastes into welfare analysis. It remains true, as Friedman pointed out in 1962 that, “economic theory proceeds largely to take wants as fixed”. Lack of empirical attention reflects this theoretical bias. There is an abundance of evidence concerning production efficiency—almost none on consumption efficiency.

Ideally, what is needed are detailed microstudies into the history of product development/introduction in relation to some specified needs in a

<sup>15</sup> See discussion in Stewart (1977).

<sup>16</sup> There are well known problems about defining ‘appropriate’ and ‘inappropriate’ technology. Despite these it is not difficult to arrive at a working definition (see Stewart (1977) and Morawetz (1974)).

developing country, describing the changing product characteristics, changing costs per characteristic, the way in which different types of product are marketed and promoted, and the extent of reasons for product displacement over time. Some evidence is provided by existing studies of choice of technique, but mainly incidentally, since for the most part the studies aim to exclude product differences. In the next section we summarise the findings of eight studies which throw some light on the question.

### 1. *Sugar-processing*

The study by James highlights some of the important differences between the two major forms of sweetener consumed in India.<sup>17</sup> The traditional and unrefined product (gur) is shown to be more nutritious and cheaper than refined sugar although the keeping qualities of the latter are superior. Refined sugar is produced far more capital-intensively in factories. Production on a large scale, in India, began only in 1932–33 with the grant of protection to the industry. As a result, the number of sugar factories increased rapidly from 31 prior to the grant to 111 in 1933–34.<sup>18</sup> Despite the competition from sugar, the share of gur in total consumption of sweeteners has remained stable since then.

### 2. *The Kenyan soap industry*

Langdon's<sup>19</sup> study of the soap industry in Kenya focuses on the changes brought about by the introduction of multinationals (MNCs) in an industry, which until the Second World War, comprised entirely locally-owned soap factories. The product of the MNCs is more expensive than the hand-processed varieties in addition to being functionally inferior, i.e. it has lower quality ingredients and is less durable in cleaning. These facts notwithstanding, the new products have been highly successful. A major reason for this, in Langdon's view, is the differential promotional expenditures of the MNC subsidiaries and the local firms. The latter devote less than 1% of annual turnover to advertising as opposed to the figure of 6% for the subsidiaries. The shift to the high-income soap products has been at the expense of the growth and profitability of local firms which have been forced on this account to imitate MNC patterns of production. The initial displacement of

<sup>17</sup> James (1977).

<sup>18</sup> Government of India (1965).

<sup>19</sup> Langdon (1975).

local products has thus tended to become cumulative. This in turn has "hurt most consumers in Kenya".

### 3. Bread

"Data from Chile on automatic baking revealed an unexpected but probably not unusual pattern. Sliced wrapped bread produced on automatic lines was displacing 'traditional' bread although its price per unit weight was considerably higher. The main advantages of the automatic bakeries were their capacity to advertise and, no doubt, influence consumer tastes, as well as the convenience of the product because of its longer shelf life. Against this they use very capital-intensive technology embodied in machinery systems which are imported *in toto* from abroad. The smaller bakeries use locally designed and fabricated equipment."<sup>20</sup>

### 4. Maize grinding

A study of maize grinding in Kenya<sup>21</sup> found that the product that resulted from modern methods of milling (first introduced into Kenya in 1935) differed considerably from ordinary posho, the output of older methods. The modern refined product was substantially less nutritious; costs of milling were substantially greater (prices charged were  $3\frac{1}{2}$  times as great) while methods of production were far more capital-intensive (ten times the investment per worker). Nonetheless, the newer refined product has found a large and growing market. This is in part due to various superior qualities—it keeps better and the taste is preferred by many consumers. In part, it is due to heavy promotional expenditure, which is concentrated exclusively on the branded refined product. One enquiry suggested that promotional expenses added as much as one third to production costs. However, the introduction of the refined product has not displaced the old, which continues to be available, nor has it increased its costs.

### 5. Breakfast cereals in Kenya

Kaplinsky<sup>22</sup> finds a 90:1 price differential between the unit cost of the cheapest traditional staple and the most expensive imported cereal: the difference in cost per nutrient is greater because of the superior nutritional

<sup>20</sup> Cooper (1976).

<sup>21</sup> Stewart (1977), Chapter 9.

<sup>22</sup> Kaplinsky (1978).

content of the traditional food. Among locally produced cereals he finds the following differences:

*Differential between unit nutrient costs for 100% extraction maize flour and locally manufactured breakfast cereals.*

	Unit price differential	Carbo-hydrates	Protein	Fat	Ash	Fibre	Calories	Thiamine	Vitamins Ribo-flavine	Niacin
Weetabix/ maize flour	20	18	19	45	55	22	21	9	3	4
Weetaflakes/ maize flour	25	22	30	64	68	29	24	12	3	5
Post Toasties/ maize flour	27	22	36	225	164	100	27	18	3	10

Kaplinsky attributes the consumption of the manufactured breakfast cereals (which are taking an increasing share of the market) to the demonstration effect (consumption which started with European expatriates first occurs among the Kenyan elite and then “moves down”) and to promotional expenditure, which is heavy and concentrated among the brand name products. “Breakfast cereals with high nutrient costs are being aggressively marketed as an alternative to traditional foodstuffs.” The production technology of the advanced country products is far more capital intensive than the traditional products. It is estimated that the same investment would create employment of 600 in maize mills compared with 15 in a Weetabix/Weetaflakes plant.

## 6. Cement blocks

A study of cement blocks<sup>23</sup> in Kenya found that cement blocks were stronger than the traditional clay blocks. If made with mechanised techniques they were of more standard quality. They cost more (at least twice as much) and used more capital-intensive techniques. There was little promotional expenditure associated with cement block sales—but mechanically produced cement blocks had replaced traditional clay blocks for urban use because of their superior qualities.

## 7. Footwear

A study of footwear in Ethiopia<sup>24</sup> found that moulded plastic sandals appear “to offer much better value as simple covers for the soles of feet for peasant families” [than traditional leather shoes]. The price per pair is less than one-seventh of the hand-sewn leather shoe. The production techniques

<sup>23</sup> Stewart (1977), Chapter 10.

<sup>24</sup> N. S. McBain (1977).

associated with plastic sandals are far less appropriate than those associated with the production of leather shoes. Fixed capital per employee is over three times as great; the materials are largely imported, while the scale of plant is much larger and employment is concentrated in the formal sector. In contrast leather shoes are often produced on a very small scale by families and use local materials. A study in Kenya,<sup>25</sup> where in 1975 70 to 80 percent of shoe consumption was met by the Bata shoe company, found that "The advantages of capital-intensive mass shoe production have rendered artisan shoe-production redundant, because of its high production costs".

## 8. *Drugs*

The drug industry provides illustrations of many of the points made in the discussion above.<sup>26</sup>

The development and promotion of new products forms a vital part of the marketing strategy of the large pharmaceutical firms. "About half of the medicines sold on national markets are less than ten years old."<sup>27</sup> Research and development into new drugs is concentrated in a few large companies in the developed countries. "Pharmaceutical firms in developing countries do practically no research, with the possible exception of a few leading producers."<sup>28</sup>

"Foreign firms are not interested in research on drugs for tropical diseases as the global demand for such drugs will not be sufficiently economic."<sup>29</sup> The consequence of the nature of the industry, its competitive strategy, and the fact that research is concentrated in the developed countries, is that new products tend to be directed at diseases of the rich, rather than the poor, new drugs tend to be high cost, and product differentiation abounds. While the new drugs usually fulfill some additional benefit, as compared with the old, they often do so at a considerable increase in cost, as is illustrated in the table below. For poorer countries (consumers) the additional benefits may not be justified in relation to the extra costs.

Heavy promotional expenditure in the industry—in the U.S. for example expenditure on advertising exceeds expenditure on research and development by three to four times—raises the cost of each drug, and often misleads as to the relative efficacy of different drugs: "the flow of essential information about the discovery of drugs, their relative efficiency and their relative cost is submerged in a deluge of glossy and persuasive advertising of

<sup>25</sup> Swainson (1978).

<sup>26</sup> This example is essentially taken from S. Lall, (1975).

<sup>27</sup> DAFSA (p. 19).

<sup>28</sup> Lall, para. 30.

<sup>29</sup> Hathi Committee, p. 93.

<sup>30</sup> Lall, para. 87.

Drug	Standard adult daily dose	Cost per year (US\$)	Cost as % of lowest priced drug
Isoniazid	300 mg	0.90	—
Thiscetazone	150 mg	1.00	111.1
Paraaminosalicylicacid	10 g.	9.25	1,027.8
Streptomycin	1 g.	17.25	1,916.7

Source: H. Friebe, "Therapeutic Needs and Production of Drugs" in UNIDO, *Establishment of Pharmaceutical Industries in Developing Countries: Report and Proceedings of Expert Working Group Meeting, 1970 (ID/35)*, p. 33.

particular products".<sup>30</sup> Lack of official regulation and investigation means that the promotional efforts in LDCs are often potentially more harmful than those permitted in DCs.

Many of the new products do not contain new chemical properties, or therapeutic characteristics, but are differentiated with respect to packaging, presentation etc. Investigations have established huge cost differences between proprietary branded products and the generic equivalent—e.g. 50–60 times for antibiotics. In the U.S. price differences of up to 1,000% have been established.<sup>31</sup> In India it was estimated that 116 drugs represented India's basic drug needs in contrast to the 15,000 drugs currently marketed.<sup>32</sup>

The net result has been drugs which are "inappropriate in terms of price and therapeutic effects".<sup>33</sup> "The high price of modern drugs in developing countries, their heavy promotion and the training received by doctors all conspire with the unequal distribution of income and lack of free health provisions in developing countries to ensure that only a small minority of the population gain access to drugs."<sup>34</sup> In India, it has been estimated that only 20% of the population consume modern drugs.<sup>35</sup>

*Summary of case-studies:* The table below summarises the effects of the introduction of new products in these studies. In only one of the eight—soap—did there appear to be substantial displacement of existing products. For the most part therefore (and this may have been true of the soap case too) the new products extended consumers' choice. Promotional expendi-

<sup>31</sup> Kefauver Committee.

<sup>32</sup> Hathi Committee.

<sup>33</sup> Lall, para (VI).

<sup>34</sup> Lall, para. 74.

<sup>35</sup> Hatli Committee, p.194.

*Effects of new products*

	<i>Benefits some or all consumers</i>		<i>Negative effects on some or all consumers</i>		<i>Distributional consequences</i>		<i>Production technology</i>	
	<i>Reduces costs of characteristics</i>	<i>Increases choice</i>	<i>Displaces old product/ increases cost</i>	<i>Promotion/ over-consumption</i>	<i>Egalitarian</i>	<i>Inegalitarian</i>	<i>Appropriate</i>	<i>Inappropriate</i>
Refined sugar	-	+	-	+	-	+	-	+
Soap	-	-	+	+	-	+	-	+
Sliced, wrapped bread	-	+	-	+	-	+	-	+
Refined maize flour	-	+	-	+	-	+	-	+
Breakfast cereals	-	+	-	+	-	+	-	+
Cement blocks	-	+	-	-	-	+	-	+
Plastic sandals	+	+	-	-	+	-	-	+
Drugs	-	+	-	+	-	+	-	+

- indicates negative or zero effect.

+ indicates positive effect.

ture, however, was probably responsible for over-evaluation of the benefits of the new products and over-consumption in at least six out of the eight cases. This may have had serious negative effects in the food and drug cases. In all the food cases, the nutritional content of the new products was lower than the old. In drugs, the substantial expenditure due to the consumption of expensive new products may have limited expenditure on other drugs. In seven of the eight cases, the new products had high income characteristics compared with the old. In these seven cases the distributional impact was inegalitarian. Plastic sandals were the one case of a new low-income product whose consumption impact was probably egalitarian. Production technology was inappropriate in every case, including sandals, as compared with the technology associated with the older products.

The net effects on welfare depend on the combined effects on consumption and production. In each of the cases considered there were both positive and negative considerations, so that the overall impact depends on how the various considerations are weighted. The chief positive effect lay in the extension of consumer choice and the benefits conferred on those consumers who prefer the new products to the old; the negative effects arose from over-consumption of the new products due to demonstration/ promotion, the inegalitarian consumption effects and the effects on production technology.

It must be emphasised that these products were not selected to be representative of products as a whole. Moreover more detailed and custom designed research is required in each case to be confident about the results. But the direction of effects is broadly in line with what one would expect, given the historical circumstances. New products could, in principle, be designed for low income consumers to be produced with appropriate technology. But the historical (and current) concentration of research and development into products and techniques in the advanced countries makes this a rarity at present.

*Some policy implications:* The introduction of new products that have been developed in and for developed countries into LDCs can have important welfare implications. In many cases, the distributional impact is likely to be inegalitarian, while in some cases, the new products may impose absolute losses on society. Our analysis suggests the need for countries to develop an active product policy. Elements of such a policy include:

1. Product development. There is a systematic tendency for product development in high-income countries to be inappropriate for LDCs, leading to products containing excessive characteristics. The development of appropriate products with low-income characteristics (including divisibility) and appropriate to the environment of poor countries would enable such countries to benefit from the increased efficiency of modern products, without being harmed by their high-income characteristics. The development of appropriate products should contribute to a more egalitarian income distribution. With an initial inegalitarian distribution, such product development might need to correspond to 'felt needs' of poor consumers, rather than monetary demand. Even where modern products from advanced countries do confer benefits on consumers in poor countries—as in Fig. 7—the development of appropriate products would be likely to confer greater benefits.

Suppose  $X$  is the initial product. The new product developed in a developed country,  $Z'$ , enables consumer welfare in the LDC to rise from  $I^{\circ}I^{\circ}$  to  $I'I'$ . But more appropriate product,  $Z''$ , leads to a greater rise in welfare in the LDC. Policies to develop more appropriate products require local research and development related to product (as well as technique) development.

2. Policies towards the import of products: a more selective approach is required towards the import of new products from advanced countries, while a more active search is needed to promote the import of appropriate products from other developing countries. More systematic research is needed to assess the benefits and costs of particular products in particular countries, but it seems likely that there is a strong case for a total ban on some products, and for differential taxation on others.



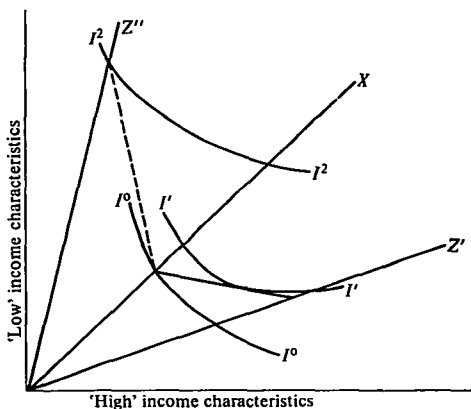


FIG. 7

3. Government standards/specifications for products need revision. At present, in many countries they are either totally absent (e.g. no requirements for health warnings on cigarettes) or imitations of requirements in advanced countries, leading to 'too high' standards and over specified high-income products. Government standards should be designed to see that basic needs-type characteristics are embodied in the relevant goods.

4. Policy towards advertising/promotional expenditure: the disproportionate concentration of promotional efforts devoted to modern advanced country products needs to be corrected. There is a strong case for limitations on promotional expenditure, which wastes resources and creates consumption inefficiency. Paradoxically, while the need for controlled advertising is greater in developing countries than in developed, in most LDCs there are no controls at all. A deliberate effort—of expenditure, organisation, publicity—needs to be made to provide accurate information about all available products. Taxation of private promotional expenditure could finance efforts in this direction. The system of trade-marks, which gives rise to much promotional expenditure, often leads to consumer adherence to well established foreign products. Reform of this system is an important aspect of a products policy, as well as assisting local technological development, and reducing the price of imported technology.<sup>36</sup>

<sup>36</sup>The question of trademarks is explored in much greater depth in UNCTAD (1977) and Stewart (1979).

5. Taxes/subsidies and rationing may be used to encourage the production and consumption of more appropriate goods, and discourage that of inappropriate goods.

**Conclusion:** This paper has attempted to provide a more systematic framework for assessing the benefits and costs of new products. It presents a research agenda rather than well established conclusions. We consider the conditions that are likely to lead to gains/losses in consumer welfare following the introduction of new products. We find, tentatively, that products developed in advanced countries are likely to have inegalitarian effects when introduced to poor countries and may, under certain conditions, cause losses among some or all consumers. These conclusions suggest the need for LDCs to have an active product policy.

We should emphasise that the paper uses a very conventional model of consumer choice and consumer welfare, as its point of departure—viz. it is assumed that consumers are isolated units whose welfare depends on their own behaviour alone and that individual consumer preferences are the ultimate determinant of economic welfare. If we were to introduce interdependencies of behaviour—see Sen—or of consumer welfare (Veblen), or a more sophisticated psychology of consumer welfare (as Scitovsky) we would have to abandon much of the framework presented here.<sup>37</sup> While we have not incorporated any of these approaches in any systematic way, each supports the need to challenge the usual assumption of the unquestioned benefits of new products.

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<sup>37</sup> See Sen (1977), Veblen (1899) and Scitovsky (1976).

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