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THE IMPACTS OF CHANGING AFFLUENCE ON DIETS AND DEMAND PATTERNS FOR AGRICULTURAL COMMODITIES

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As a lad, he had grown up in a poor family of Italian origin. He was raised on blood sausage, pizza, spaghetti, and red wine. After completing high school, he went to Minnesota and began working in logging camps where -- anxious to be accepted -- he soon learned to prefer beef, beer and beans, and he shunned all Italian food. Later he went to a Detroit industrial plant, and eventually became a promising young executive. This was in the days when it was still fairly easy for a noncollege man to rise in industry. In his executive role he found himself cultivating the favorite foods and beverages of other young executives: steak, whiskey and seafood. Ultimately he gained acceptance in the city's upper classes. Now he began winning admiration from people in his elite social set by going back to his knowledge of Italian food and serving them, with the aid of a man servant, authentic Italian treats such as blood sausage, pizza, spaghetti and red wine.

--Vance Packard, The Status Seekers, p. 146

INTRODUCTION

It might seem quite apparent, on the basis of casual empiricism alone, that human behavior diverges widely across nations because of 'social-cultural' reasons. In fact this may be more true for food consumption patterns than for other items of expenditure. What then, is the justification for cross country studies of food habits?

Ernst Engel established well over a century ago that expenditures for such basic human needs as food, clothing and housing followed patterns that were closely related to income. The most famous of these patterns, that the share of food expenditures in the total household budget falls as income rises, is now well established as Engel's Law. The remarkable aspect of Engel's Law is its seeming universality. Although Engel himself based the first formulation of the food expenditure on his observation of several dozen Saxony families who shared a common geographical and cultural setting, subsequent research has confirmed the pattern for households in every other country in which it has been studied. Even more remarkably, comparisons of households across countries with different per capita income levels show the same tendency.

This alone is sufficient to establish a prima facie case for further investigation along cross country lines. But there is more.

The real issue is not whether behavior, 'interculturally', is similar or not, but whether similar determinants of behavior patterns help explain the diversity. More specifically, the pertinant questions are whether these determinants have similar functional relationships with behavior patterns across nations, and what the limits of these similarities are. These questions can be satisfactorily answered only after conducting the international empirical analysis, not before.

It is also clear to us that we need to get a more precise handle on what is meant by 'tastes' or 'preferences'. These terms have been used rather loosely in the literature as catch-all expressions subsuming all the eccentricities that economics finds difficult to explain. Quite obviously, it would be useful to define, measure and isolate the impact of tastes on behavior patterns. Chapter I, entitled "International Food Consumption Comparisons", which examines expenditure patterns is an effort in that direction.

While Chapter I looks at the relationship between income and broad expenditure categories, Chapter II bears on the implications of this relationship for nutritional status. The focus is on intakes of calories and proteins rather than food expenditures and on how these are determined by incomes and prices. Again cross-country data is analyzed, so that what we see emerging are the long-run relationships.

The first two chapters constitute Part 1 of this essay. Their distinctiveness lies in the fact that a highly aggregative methodology is adopted. Aggregation is implied both in the use of national average indices and in the extremely broad definition of consumption categories. A balance is obviously required, and this is provided in Part 2 which examines the disaggregated picture.

Instead of international comparisons, domestic data is analyzed. Instead of gross categories like expenditure on food or total caloric intake, the dependent variables now are the different categories of food expenditure, like cereals, vegetables, meat, milk products, etc. The primary focus is on the less-developed countries.

Five major independent variables are identified for this purpose -- household incomes, prices, household size and composition, urbanization, and 'social factors'. The impact of each of these is discussed in successive chapters. Not only is it sought to establish relationships between these factors and specific food categories, but an attempt is also made to isolate the consequent impact on nutritional status and the issues that arise for policy makers.

The last chapter in Part 2 deals with social factors and points out that there is an international dimension to food consumption patterns. The diets in the low- and middle-income countries have increasingly followed the trends established in the developed nations. A study of consumption trends in the United States would therefore provide important insights into where the rest of the world is headed. This is the subject of Part 3.

Part 3 looks at two other related issues. The first is the implications for nutritional status of affluent food consumption patterns. The second is the implications for the world food system of the derived demand for grain arising from increased meat consumption in the rapidly growing middle-income countries.

In Part 4 we present our substantive conclusions. The focus is entirely on domestic policy in the less developed countries. The conclusion emphasizes the need for an approach to food policy that, on the one hand, balances both the consumption and production aspects of the food sector, and, on the other, integrates the various policy instruments available in an internally consistent fashion to achieve that balance.

Part 1

I. INTERNATIONAL FOOD CONSUMPTION COMPARISONS

This chapter is devoted to the study of food consumption as measured in terms of expenditures on that category. Schematically, the first part reviews the results of the three major studies of international food consumption patterns that have been conducted in the last twenty-five years. The reference is to the works of Houthakker (1957), Weisskoff (1971), and Kravis, et al. (1982). The second section bears on the legitimacy of international comparisons. In the process the issue of 'tastes' and 'preferences' is discussed, with emphasis on how such influences can be empirically isolated.

At the outset it must be pointed out that the three studies are not similar either in the data sets used, or the methodology adopted, or even in the objectives that guided the research. However, several lessons can be drawn from them and these have implications for the discussion in the second section.

Houthakker's primary concern was to estimate expenditure elasticities for 30 countries for the broad consumption categories of food, housing, clothing, and miscellaneous items, using household budget survey data.[1] Secondarily he was interested in seeing if enough similarity could be found in the elasticity values as to make them 'transferable' for use in countries where own budget data were not available. The latter would be accomplished by using the rough principle that if the individual country elasticity values had a narrow range, and the standard errors were small, then an average of all elasticities could be calculated. This could then be treated as an estimate of the 'true' elasticity for people round the world. Using the double-log functional form and specifying a household size variable (to control for the strong correlation between income and

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[1] Strictly speaking, expenditure elasticities are higher than income elasticities by roughly the share of savings in total income. We have, however, used the two terms interchangeably throughout.

family size in household surveys), Houthakker came upon the following results.

In all cases, food expenditure elasticities were less than unity, strongly confirming Engel's Law. The range of values was 0.34 to 0.73. Not much support was found for the hypothesis that elasticity for food would decrease with an increase in the general level of income. This could conceivably be because relative prices were not considered. Higher prices of food (relative to nonfood) in a high-income country could lead to higher food expenditure elasticities compared to a low-income country which had much lower relative prices of food.

The elasticities for clothing with respect to expenditure were found to be greater than 1.0 and generally less than 1.5. Clothing may therefore be termed a moderate luxury. No particular pattern was apparent across countries with different per capita income levels, and here again prices may have been an important additional determinant. Housing elasticities were found to be mostly less than 1.0. In sum, Houthakker could conclude that:

> What has been shown is mainly that the elasticities of the four main items of expenditure with respect to total expenditure are similar but not equal... if no data on the expenditure patterns of a country are available at all, one would not be very far astray by putting the partial elasticity with respect total expenditure at 0.6 for food, 1.2 for clothing, 0.8 for housing, and 1.6 for all other items.....

Weisskoff's objectives were to estimate long-run and short-run expenditure elasticities as well as to investigate the structuralists' contention that in the developing country context, price elasticities are insignificant. Houthakker's sample had included both developed and underdeveloped countries; Weisskoff restricted himself to LDCs.

According to Weisskoff, long-run elasticities are those derived from cross sectional studies (whether domestic or cross-country), while short-run elasticities are estimated from time series data. The underlying reasoning is that a cross-sectional study works with data that has a wider dispersion of income than a time series study which only considers averages over periods of time. The former is therefore able to capture

the changes in consumption associated with substantial changes in income. It is also true that cross-sectional differences in income have been around for a much longer time than differences in average income which occur from year to year because of economic growth. An elasticity measure which captures the impact of substantial income differences that have existed for a considerable period of time may be justifiably called a long-run elasticity.

Back to Weisskoff. Since cross-country data were used for the long-run model, all expenditure and price data were converted into 'rates of change' form to overcome currency conversion problems. This also necessitated using the double-log functional form.

In Table 1, 'within countries' models estimate short-run elasticities, while the 'between countries' models estimate long-run elasticities. Models 1 and 2 represent Weisskoff's estimates, while 3 and 4 represent Houthakker's estimates (made in a later study in 1965) for 13 OECD countries using essentially the same methodology.

It is interesting to observe that in LDCs short-run expenditure elasticities are higher than in the long-run, while for developed countries the reverse is true. An explanation for this is not easily forthcoming. What is very clear however, and in line with intuitive expectations, is that the LDCs' expenditure elasticities are higher than those for developed countries.

The price elasticities are also higher for the less-developed countries compared with the developed countries, as would be expected at low income levels. On the other hand, the short-run (within countries) price elasticities would be expected to be smaller than long-run (between countries) elasticities, but this expectation is belied for LDCs. Perhaps this is due to the difficulty of making international price comparisons with Weisskoff's data set. Differences in <u>levels</u> between countries are not captured in his methodology, only differential rates of change, and this limitation may account for the relatively smaller long-run elasticities in his analysis. Houthakker's analysis would have significantly fewer problems in this regard

Table 1

Expenditure and Price Elasticities for Pooled Countries

Model	Food Expenditures	
	Expenditure	Price
1) Within Countries (W)	1.1095	-0.8743
2) Between Countries (W)	0.8258	-0.4612
3) Within Countries (H)	0.351	-0.161
4) Between Countries (H)	0.744	-0.234

Note: W = Weisskoff's estimates
H = Houthakker's estimates

Source: Weisskoff (1971), p. 330

because the OECD countries are much more similar in income levels.

Weisskoff next stratified his sample between LDCs where European influence has been higher, and those that were 'typical' developing nations. The former included such countries as South Africa, Greece, and Israel. The latter included countries such as Nigeria, Peru, and Jamaica. It was found, after regressing the data for each group separately, that the 'European-type' LDCs exhibited elasticity patterns similar to Houthakker's results for Europe in Table 1, that is, the short-run elasticities were found to be lower.

How can this be explained? Is this difference in elasticities for the two sets of LDCs a difference attributable to 'lifestyles' or tastes? Or is it a reflection of different income levels in the two sets? This issue is taken up later.

It is well known that official exchange rates do not adequately reflect the purchasing power of currencies in their domestic setting. More specifically, the exchange rates of most LDCs are grossly 'undervalued'. The reason why a laborer in India can survive on 70 cents a day is because that can buy as much as 3 or 4 dollars worth of goods.

The upshot of this 'undervaluation' has been that until recently any international comparison (which necessarily requires conversion of all monetary aggregates to a single currency) had to be done using first differences rather than the absolute figures. Otherwise econometric analyses would yield spurious results. Fortunately, the publication of successive reports of the "International Comparison Project" (the third report is titled "World Product and Income: International Comparisons of Real Gross Product", by Kravis, Heston, and Summers, 1982) has changed all that.

Data is now available for 151 final expenditure categories for 34 countries all expressed in one base currency with real income and price data (for all consumption categories) also expressed in the same currency.

Kravis, et al., regressed category-wise expenditure data against incomes and prices across the 34 countries. This demand analysis was carried out at the summary-category and the detailed-category levels of

aggregation. The former considered 25 summary categories of consumption. The latter covered 103 detailed consumption categories. The summary-category specification had identified nine categories of food consumption. Thus, bread and cereals constituted one category. Meat was another, and fish still another. And so on.

Relative prices and income were found to explain the variations in quantities consumed among the 34 countries very well. For 17 of the 25 categories the R^2 (i.e., the coefficient of determination) exceeded 0.75, and only in three cases was the R^2 less than 0.50.

When the detailed-category specification (which identified 36 categories of food consumption) was used, the proportion of variance in quantities explained tended to be smaller than for the summary categories. Although over 70 percent of the R^2s were 0.50 or higher, only about one-third exceeded 0.75.

Having laid out the evidence, it is now possible to discuss the question of international differences in 'tastes'. One way of tackling the issue is to start with the assumption of no differences. The question then is what kind of empirical evidence is required to validate or refute that hypothesis. This in turn depends on the meaning given to the word 'similarity'.

Similarity of tastes can be defined in several ways. For example, it could be interpreted to mean the same magnitude of expenditure on any particular consumption category, or the same budget share, or the same marginal propensity to consume, or the same income elasticity, or the same price elasticity, or finally, the same functional relationship between quantity consumed, income and prices.

No one would argue that similarity of tastes should be reflected in similar quantities consumed or similar budget shares for the various consumption categories regardless of other factors like incomes and prices. Consequently, the focus here will be on whether similar income and price elasticities should be expected from people with similar tastes.

Income elasticities are considered first. Mathematically, the sum of expenditure elasticities for all consumption categories (including savings), weighted by their budget shares, has to be equal to 1.0. If the expenditure elasticity of a category is greater than 1.0, its budget share will increase and that of other categories will decline. To maintain the identity, all elasticities have to change sympathetically. This logic can be carried further to assert that over a wide range of income, any elasticity that starts much higher than 1.0 has to decline. Thus similar income elasticities should not be expected from countries with similar tastes if their incomes differ. In fact the elasticities will differ.

Pure substitution elasticities associated with price changes can also be expected to be different for different income levels. The reason for this is as follows. At low levels of income, most of it is consumed, very little saved. Thus, when the price of a commodity goes up, the only way of approximating to previous living standards is to substitute away from that commodity.

At higher levels of income, a significant portion is saved. These savings act as a 'buffer' that helps absorb price shocks thereby enabling the effort to maintain consumption standards. In such situations maintaining consumption levels would be an end in itself. Ofcourse, this would tend to be more true for neccessities than for luxuries. Thus the tendency to substitute away from commodities whose prices are rising will be less.

Given the above, it does seem that operational significance may be given to the concept of 'same tastes' only by asserting that this requires that the same functional relationship should exist between quantity consumed, incomes and prices, across all countries. Kravis, et al., express the idea in the following way.

> If in two situations a market choice is made on the basis of the same tastes about what to consume and in what quantities, the actual choices will be determined by the available consumption opportunities defined by prevailing prices and the consuming unit's income. The degree to which it is useful to speak of tastes being the same in different countries turns on the extent to which prices and incomes explain differences in consumption patterns in the countries.

Thus the focus shifts from elasticity estimates themselves to the amount of variation that is explained by the regression equation, that is, to the coefficient of determination, R^2. If the R^2 value is 'high', then it is possible to be confident about an international similarity of tastes (always assuming that the estimates are significant). Harking back to Kravis' own calculations, it may be recalled that for his 'summary-category' specification, the R^2 exceeded 0.75 for 17 out of 25 categories. This result is not insignificant.

The natural next question is whether these high values of R^2 hold up when consumption categories are defined at a more disaggregated level. In Kravis' 'detailed-category specification' 103 consumption categories were identified. It was then found that only about one-third of the R^2s exceeded 0.75. This result is not surprising. In fact it squares with casual empiricism. For example, it is common observation that while there may not be many people who prefer say, French fries of a particular brand, there will be more who like French fries in general, still more who relish potato products, and nearly everyone consumes a starchy staple of some sort.

Thus, the value of R^2, and hence the similarity of taste patterns is a function of the degree of aggregation at which consumption categories are defined. The more specifically a product is defined, the more restricted the preferences for it will be, and this will be reflected in lower values of R^2.

In a later chapter the influence of 'social class' as a determinant ofconsumption patterns will be discussed. It will be shown then how some factors that seem to be non-economic at first glance are really rooted in economics, and that an analysis in sociological terms is, in many instances, only the flip side of a study in economic terms. This ofcourse underscores our earlier point that conceptual clarity in defining and giving operational content to the variables used is imperative.

For now it is sufficient to state that while non-economic factors are important, sufficient grounds exist to pursue an analysis in largely economic terms. While diversity of behavior exists, it is not so random

as to overwhelm the analyst. Regularities exist and can be discovered. This makes knowledge obtained in one setting transferable, with appropriate modifications, to other settings. The part is a window to the whole.

II. AN INTERNATIONAL COMPARISON OF NUTRITIONAL PATTERNS

The relationship between expenditures on food and income per capita gives only broad hints about the impact on nutritional status. Expenditure elasticities include the effects of changes in the quantity of food consumed as well as changes in its price. An increase in either one of these does not necessarily imply an improving nutritional status with increasing incomes.

The 'quantity' of food consumed (whether measured by weight or by volume) may increase, but if there is a simultaneous shift between food categories from low bulk-high nutrition foods to high bulk-low nutrition foods, then total caloric intake may not increase. Similarly, increases in the average price paid for food commodities (with higher incomes) may or may not reflect better nutritive quality. Higher prices may be paid for greater values added through processing and other services built into the food. Such processing may actually detract from the nutritional quality.

It is clear, therefore, that in looking at the relationship between nutritional status and incomes, a more direct measure than food expenditures is required. The direct measures of greatest interest from a nutritional standpoint are caloric intake and protein intake. Adequate protein-calorie intakes are required for growth, activity, and general health.

A relationship between incomes and nutritional indicators is obvious from Table 2, which is based on food balance sheet data for 1977. But more than just income levels separate the developed and developing countries, and a more complete specification of the relationship is necessary. Apart from providing greater insight, an improved empirical understanding of nutrient-income elasticities is needed because they are central to quantifying the magnitude of the calorie deficit in the developing countries.

Table 2

Per Capita Daily Food Supplies, 1977

	Total Calories	Proteins (grams)	Starchy Staple Ratio	Animal Protein-Total Protein Ratio
World	2571	69	56%	35%
All Developed Countries	3395	99	35	56
All Developing Countries	2260	57	68	21

Source: FAO, Food Balance Sheets, 1975-1977

Recent attempts to estimate these elasticities include Thomson's (1974), which was based on a time series of food balance sheet data for 35 countries, and Reutlinger and Selowsky (1976) and Knudsen and Scandizzo (1982), who used within country household budget data. This paper uses an approach similar to the one used by Thomson, and it would be appropriate at this stage to outline the differences and improvements that distinguish the present approach.

Thomson's basic model was:

$$C_{jt} = aE_{jt}^{b} \text{ , where}$$

C = caloric intake, and
E = total per capita consumption expenditure while 'j' refers to country and 't' to time period.

First differences (D) were taken over time series for individual countries after converting to double-log form, giving:

$$D(\log C_{jt}) = b.D(\log E_{jt})$$

The mean value for each country over the total time period was calculated, and these values then served as the basis of regression analysis.

$$\overline{D(\log C_j)} = b.\overline{D(\log E_j)}$$

There were several problems with this approach. The relative price of food items is likely to be an important determinant of nutrient intake, but lack of data prevented their inclusion in Thomson's analysis. Another problem was the comparability of data on income per capita which were denominated in national currencies. Converting income to dollars at the official exchange rates is a poor procedure since such exchange rates do not adequately reflect the internal purchasing power of these currencies. Thomson used the rates of change of income rather than income itself, which required the use of the double-log functional form for regression. Even so, only relative rates of change could be examined, not absolute differences in starting levels of income.

The "International Comparison Project" referred to earlier has made a major contribution to overcoming the above two problems. The task of calculating the real GDP of countries on a comparable basis -- that is, correcting for systematic differences in domestic prices between countries -- requires the calculation of purchasing power parities for commodities at a fine level of disaggregation. The purchasing power parity is the number of domestic currency units required to buy goods equivalent to those that can be bought with one unit of the currency of the base country (in this case, the United States). It is the price in national currency of an amount of a commodity that can be bought for a dollar in the United States.

With exchange rates based on purchasing power parity, the two problems faced by Thomson can be overcome because the prices of different commodities across nations are available, while the real quantities of goods and services produced by each country are valued at 'international prices' to produce comparable GDP figures for each country. Note, however, that systematic differences in food prices, for example, will be reflected in the purchasing power exchange rates and in 'real' GDP purchasing power rather than by the raw prices themselves. Consequently, the food price variable used in this analysis will tend to reflect a pure substitution effect only, rather than the combined income and substitution effect normally estimated in demand analysis.

The treatment of caloric requirements also needs explanation. Even for a given income and price environment, caloric intake should be related to caloric requirements. Peoples of colder climes and of larger body size need more calories for a given level of activity. Similarly, if the composition of the population is biased toward adults and males, the average population requirement will be higher. To take this into account, the analysis here uses the population average calorie requirements for individual countries published by the FAO in its Fourth World Food Survey (1977). These requirements are introduced directly into the regression analysis to serve as a 'shifter' of the overall estimated structural regression or, alternatively, are used to convert calorie intake into a 'proportion of requirements' variable.

Apart from estimating calorie-income and protein-income elasticities it is also useful to estimate income elasticities for the starchy staple ratio and the animal protein-total protein (AP-TPR). These two ratios may be considered measures of the quality of the diet. Since the quality of diet improves with income, the income elasticity of the starchy staple ratio should be negative and that for AP-TPR should be positive. These elasticities are also estimated here.

The Model

With comparable data available for direct comparison of different countries' levels as well as rates of growth, the choice of functional forms was relatively open. Two were tested -- the double-log and the semi-log. The former offers the advantage that the regression coefficients are themselves the elasticities, whereas the latter provides the advantage that it gives an income elasticity that declines as incomes rise, a likely outcome in view of earlier empirical work. In fact, the semi-log form added nothing to the explanatory power after slope and intercept modifiers were introduced into the double-log specification, and no semi-log results are presented here.

Other notable points about the model are:

i) several combinations of the independent variables were tested;

ii) relative food prices were used only in the caloric intake specifications; for others the general food price variable was not the appropriate specification for inclusion.

iii) differences in the elasticities between developed (DC) and less developed countries (LDC) were examined with two techniques. One used variables to modify slopes and/or intercepts where appropriate. The other was simply to split the sample into data for DCs and LDCs, and do the regression analysis separately. The dummy variable method was used by creating a variable with value equal to one if the per capita income of the particular observation was less than the mean for the entire sample, a value of 28.5 percent of the United States per capita income. The DC-LDC approach simply segregated the sample countries into 17 DCs and 17 LDCs on the basis of the World Bank's classification. It is important to realize that the two divisions will

produce similar but not identical samples. The zero-one low income dummy variable was sometimes used by itself to serve as an intercept shifter and sometimes was multiplied by the log of income or price to provide an elasticity shifter.

iv) The food price variable measures movement in food prices relative to nonfood prices after correcting differences in observed prices across countries for the real purchasing power of foreign exchange. Consequently, most of the income effect of different food prices has been captured directly in the income coefficient, and the price coefficient will reflect primarily 'pure' substitution elasticities. The prices of 'caloric commodities'(i.e., food) relative to 'noncaloric commodities' (i.e., nonfood), are measured from a base where this price ratio was set at 1.00 for the United States for 1975. The ratio varies over time if the prices of food grow faster or slower than nonfood within a country. And it varies across countries depending on how food and nonfood prices behave in those countries. Any country and year could have been chosen as a base without affecting the results.
An example illustrates the calculations. Suppose a country's purchasing power parity for food for 1975 is 3 units of national currency and for nonfood it is 4. Then the relative price of food to nonfood in this country is 0.75 compared to 1.00 for the United States. If the price of food now goes up 10 percent in 1976, while the price of nonfood goes up only 5 percent, then the relative price in 1976 would be 0.79 for the country in question. The United States could also have differential price movements, and so the price ratios are linked only for the year 1975, the base year for Kravis' comparative work.

At this stage a compromise had to be made with data availability. While food price indices are published by most countries, nonfood price indices are rare. The ratios actually used related to food prices and general prices, that is, all nonfood and food categories. This has important implications for the price ratios, especially for those of the developing countries since it has led to significant understatement of the true change in relative prices. The understatement is directly proportional to the magnitude of food expenditure in the total consumption expenditure. This is higher than 50 percent for many LDCs. The corollary is that it is likely that the elasticities estimated here will understate their true values.

One last note on the price data is important. It is well recognised

that food prices in poor countries, and especially basic food prices (e.g., for the starchy staples), are significantly lower than in rich countries when prices are converted at market exchange rates. Both because of exchange rate biases and official government policies, developing countries tend to have their staple grain prices below international market levels, and rich countries tend in the opposite direction. These tendencies are actually reversed by the Kravis purchasing power parity adjustment; the relative food to nonfood price index used here shows a noticeable downward trend as per capita income levels rise.[1] That is, nonfood items ('luxuries') are relatively cheap in poor countries and become more dear in the process of development. This is probably a reflection of the limited trading opportunities available to LDCs for their nonfood products.

The sources of data as well as the list of countries included in the sample is given in an appendix to this chapter.

The Results

The results, estimated by ordinary least squares regression are presented in Tables 3 and 4. The first nine equations have log of caloric intake as the dependent variable. For the total sample per capita income has a very high explanatory power with the income elasticity equal to 0.20 when income is entered alone in Equation C1, and it remains as high as 0.15 in Equation C5 when variables for calorie requirements and for low-income price responsiveness are included.

When the price variable is added (Equation C2), the income elasticity drops only slightly, while the price elasticity is -0.1 and significant only at the 10% level. It has been pointed out that prices and income are significantly (and negatively) correlated, and so the income variable has already captured some of the price effect. With just a price coefficient alone in the equation, the estimated elasticity rises in absolute

[1] For the 34 countries in the sample analyzed here, a double log regression with the relative food to nonfood price index as the dependent variable and per capita GDP as the independent variable showed the following negative relationship:

Log Relative Food Price = 0.38 − 0.08 Log Per Capita GDP (R^2 = 0.21, N = 117)
(5.64)

Table 3

Elasticity Coefficients from Calorie Intake Regression Analysis
Using Double Logarithmic Functions
(t-statistics in parentheses)

Equation			Per Capita Income		Food Prices		Calorie	Constant Terms	
Number	R^2	Sample	Overall	Low Income	Overall	Low Income	Requirement	Overall	Low Income
CALORIE INTAKE									
C1	0.75	Total	0.20 (18.77)					7.24	
C2	0.76	Total	0.19 (16.04)		-0.10 (1.37)				
C3	0.77	Total	0.18 (13.77)			-0.20 (2.44)		7.32	
C4	0.78	Total	0.15 (9.07)				0.81 (3.58)	1.08	
C5	0.78	Total	0.15 (8.58)			-0.12 (1.46)	0.70 (2.96)	1.96	
C6	0.04	DC	0.06 (1.30)		-0.05 (0.30)			7.84	
C7		DC							
C8	0.60	LDC	0.15 (8.67)		-0.10 (1.48)			7.38	
C9		LDC							
CALORIE INTAKE RELATIVE TO CALORIE REQUIREMENT									
C10	0.63	Total	0.14 (13.91)					-0.36	

value from -0.10 to -0.66. Due to the manner in which the price ratio is defined, it is entirely possible that higher price coefficients than those reported in Table 3 would be observed if nonfood rather than general price indices were to be used. Again, it must also be recalled that these price coefficients include little of the income effect that makes up a normal response to changes in food prices.

A priori the elasticity figures for LDCs are expected to be higher than those for DCs. The income elasticity should be higher because caloric intake has limits, and the price elasticity (the pure substitution effect) should be higher for reasons outlined in Chapter I. Further, if the "Timmer effect" holds, then the pure substitution elasticity would decline in absolute size as incomes increase at about half the rate of decline in income elasticities.(Timmer, 1982).

These hypotheses are tested in Equations C6 and C8, which report separate equations for sub-samples of the developed and less-developed nations. The income and price elasticities for developed countries are much lower than those for LDCs and were not significant at the 5% level. Interestingly enough, the "Timmer effect" was confirmed. The decline in income elasticity from 0.15 for low-income countries to 0.06 for the high-income countries represents a 0.09 percent decline. One would therefore expect the decline in substitution elasticity to be of the order of 0.045 percent. The actual decline is 0.05 percent.

Confirmation of the significance of the price effect is seen in Equation C3 where it takes the robust value of -0.20 and is very highly significant. In this equation a dummy variable was used to set prices at zero for countries with greater than average GDP per capita. Thus the estimated coefficient represents the price elasticity for countries with less than average GDP per capita, while the (implicit) price elasticity for upper-income countries is zero.

The inclusion of the calorie requirement variable considerably alters the picture (Equations C4 and C5). Looking at Equation C4, it is obvious that the income variable was picking up some of the effect

of variation in calorie requirements. Historically, higher incomes and higher caloric requirements have been found to go together (due to colder climates and larger body size in the DCs). Allowing for this collinearity causes the estimated income-calorie elasticity to drop by one-sixth, from 0.18 to 0.15. Calorie requirements are also correlated with food prices, even after allowance is made for the food price-income correlation. In Equation C5, the low-income sample price elasticity drops to -0.12, with lowered significance.

The 'calorie requirement elasticity' estimates have little operational meaning other than the obvious: a 1 percent increase in 'requirements' does not automatically lead to a 1 percent increase in caloric intake. Per capita incomes and food prices obviously play a critical role in determining whether requirements can actually be satisfied. Equation C10 reports a regression with calorie intake as a proportion of requirements as the dependent variable. The income elasticity of 'satisfying requirements' is 0.14, more or less in line with calorie elasticities estimated directly. However, this approach unnecessarily constrains the value of the calorie requirements elasticity to be exactly one, which empirically it is not.

Table 4 presents results for various measures of dietary quality. The regressions with the starchy staple ratio as the dependent variable are shown in Equations Q1 to Q6. Equation Q1 shows the starchy staple ratio regressed against income. The elasticity of -0.39 is highly significant and has substantial predictive power, as the simple equation has an R^2 of 0.74. Even the introduction of low-income slope and constant shifters, along with a price term, raises the R^2 only to 0.80. Per capita incomes are clearly the dominant factor explaining this measure of dietary quality. To the extent a difference is likely to exist in income elasticities for the starchy staple ratio, the DC elasticity should be larger in absolute terms. This would happen partly because the peoples of poor countries would exhibit a certain stickiness in behavior, having been accustomed to a starchy diet for so long (for example, many wealthy individuals in Asia do not feel they have 'eaten a full meal' unless they also eat rice). In addition, significant scope exists for upgrading

Table 4

Elasticity Coefficients for Various Aspects of Diet Quality
Using Double Logarithmic Regression Functions
(t-statistics in parentheses)

Equation Number	R^2	Sample	Per Capita Income: Overall	Per Capita Income: Low Income	Constant Terms: Overall	Constant Terms: Low Income	Miscellaneous Variables	
STARCHY STAPLE RATIO								
Q1	0.74	Total	-0.39 (18.25)		5.07			
Q2	0.75	Total	-0.35 (11.50)	0.03 (1.57)	4.92			
Q3	0.80	Total	-0.67 (10.13)	0.45 (5.57)	6.22	-1.56 (5.31)		
Q4	0.80	Total	-0.67 (10.19)	0.45 (5.58)	6.22	-1.60 (5.46)	0.245 (1.50)	Food Prices: Low Income
Q5	o.56	DC	-0.64 (8.25)		6.09			
Q6	0.41	LDC	-0.23 (6.39)		4.69			
PROTEIN								
Q7	0.64	Total	0.25 (14.32)		3.46			
Q8	0.01	DC	0.04 (0.85)		4.36			
Q9	0.22	LDC	0.15 (4.11)		3.69			
ANIMAL PROTEIN								
Q10	0.81	Total	0.77 (22.39)		0.72			
Q11	o.41	DC	0.47 (6/19)		2.00			
Q12	0.52	LDC	0.65 (8.03)		0.97			

the diets of low-income people within the context of starchy staples. Thus wheat can substitute for sorghum, or maize for cassava, and rice for maize. Only when diets begin to diversify dramatically in significant quantities to meat, sugar, fish, milk, and other 'high quality' (and expensive) calories does the starchy staple ratio decline rapidly.

This hypothesis is borne out in Equations Q5 and Q6. Separate equations for DCs and LDCs show that the starchy staple ratio elasticity is -0.64 in DCs and only -0.23 for LDCs. Both coefficients are highly significant. A different formulation in Equation Q3 using dummy variables for low incomes found virtually identical results.

Equation Q4 introduces the relative food price variable used in the calorie regressions into the starcy staple ratio analysis with low income coefficients separate from the overall ceofficients. The price coefficient reveals a fairly high price elasticity of 0.25, and it is significant at around 7 percent. The positive sign of the elasticity indicates that the starchy staple ratio increases when relative food prices increase. Since the earlier calorie analysis showed caloric intake responsive to this same food price variable, the explanation for its impact on the starchy staple ratio is probably through caloric intake (the denominator of the ratio) rather than by changing starchy starchy staple intake for a given level of calories. In other words, an increase in relative food prices leads to a substitution from non-starchy staple foods to nonfood categories. Thus the positive sign is logical and expected. What would be interesting, of course, would be to test the impact of starchy staple prices relative to other calorie prices. No comparable data are available to do this,unfortunately.

Equations Q7 to Q9 report the relationship between protein intake and incomes. The protein-income elasticity is 0.25 for all countries, 0.15 for LDCs and 0.04 for DCs. This is to be expected. Once a diet has reached saturation levels as far as calorie levels are concerned, very little addition to the total protein intake will take place. Why would this happen?

It seems that a diet that is 'balanced' from the perspective of the human palate can only take a certain percentage of nourishment as proteins.

Table 5

Relationship between income and percent of proteins in caloric intake

Country	GDP/capita in International dollars, 1973	Calories from proteins as % of total calories
Kenya	379	12.86
India	394	11.13
Philippines	755	10.74
South Korea	904	11.79
Iran	1809	11.97
Hungary	2793	11.44
Italy	2913	12.64
United Kingdom	3750	12.20
Netherlands	4234	11.65
Belgium	4663	12.22
West Germany	4761	11.36
United States of America	6192	13.43

Sources: Kravis, Heston and Summers, International Comparisons of Real Product and Purchasing Power
FAO, Food Balance Sheets, 1975-1977

Table 5 presents the evidence. As can be seen,protein intake as a proportion of total calories is very close to being the same in all the countries, rich or poor. Thus, increments in protein intake closely follow increments in calories. This would provide an additional justification for the thesis that protein deficiencies can best be alleviated by increasing overall caloric consumption.

Back to Table 4. The three protein equations show particularly clearly a characteristic of this particular sample and a behavioral relationship of some significance. Equation Q7 shows a protein-income elasticity of 0.25 when th total sample is considered. When the sample is split, the DC elasticity is 0.04, and the LDC elasticity is 0.15. Neither elasticity from the split sample is as high as from the combined sample. Normally, the elasticity for the total sample should be a weighted average of the two sub-samples. That is not happening here for two reasons. First, the DC sample represents a different population than the LDC sample due to different calorie requirements as well as to a host of other 'modern' traits that do not come immediately with higher income. Second, patterns of behavior take considerable time to adjust to changed income levels. The elasticities for each sample separately can be thought of as representing short-run adjustments to income change, while the elasticity for the combined sample represents a long-run adjustment.

Equations Q10 to Q12 examine the relationship between animal protein and incomes. The animal protein-income elasticity is 0.77 for all countries, 0.65 for LDCs and 0.47 for DCs. The animal protein-protein ratio-income elasticity can be read off by subtracting the protein elasticity from the animal protein elasticity. The elasticity figures in this case are 0.52 for all countries, 0.43 for DCs and 0.50 for LDCs. The animal protein-protein ratio-income elasticity for DCs is lower than for LDCs, a pattern laterally inverse to that for the starchy staple ratio.

The conclusions that seem to be emerging from the above analysis

are rather disturbing. On the one hand, calorie-income elasticities even for LDCs are very low. On the other, protein intake is directly related to caloric intake. Further, the low calorie-income elasticity of around 0.15 is to be contrasted with the income elasticity of food expenditure of over 0.6. This suggests that a 10 percent increase in income will increase food expenditures by 6 percent but caloric intake by only 1.5 percent. What this means is that if the average calorie deficit is around 15 percent, a doubling of per capita income will be required before the deficit can be closed. Given the low historical rates of growth in many LDCs, this possibility can be safely ruled out for the rest of this century.

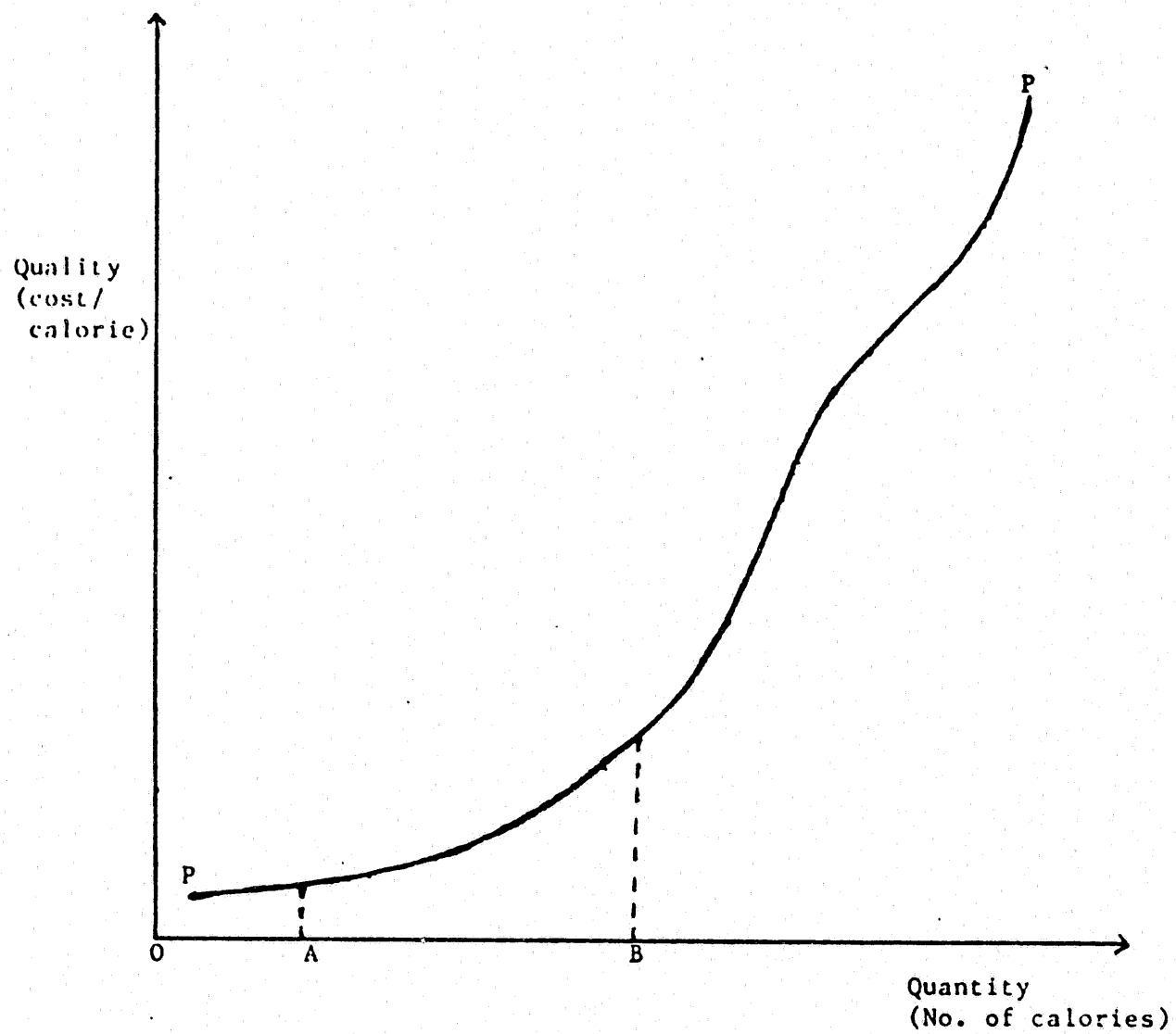
At the same time, one should be cautious about such prognostigations. This is because estimates of the total calorie deficit, the number malnourished and the effort required to reduce the deficit are highly sensitive to estimates of calorie-income elasticities. In the above scenario, for example, if this elasticity was 0.30 instead of 0.15, then 'only' a 50 percent increase in per capita income would be required -- a much more manageable problem.

In fact, in a recent paper, Knudsen and Scandizzo (1982) estimate the calorie income elasticity to cluster around 0.6 for poor consumers in the 6 low income countries they studied. This of course makes the problem of calorie deficits even more manageable. Can both the estimates be 'correct'?

A reconciliation of these conflicting points of view is attempted in Figure 1 which shows the income expansion path for the 'consumption' of two attributes of food -- quality and quantity. The income expansion path PP is the locus of all points where the budget lines are in equilibrium with the individual's indifference map. As income increases, the consumer on the basis of his preferences, selects bundles of quality and quantity as outlined by PP.

It is quite likely that this study, which has national averages as its unit of measurement, is estimating elasticities in the region to the

Figure 1. The Income Expansion Path for Caloric Intake



right of point B. Knudsen and Scandizzo had used intra country household expenditure surveys as their data set and their estimates probably refer to the region around point A. This would be true because the average income in any country would obviously be higher than the incomes of its lowest strata.

Thus the two estimates are potentially consistent and their usefulness depends on the income levels of the population under consideration.

From the viewpoint of nutritional policy the important point is that several points of inflexion exist on the expansion curve PP. A population at point B might be subsisting on an inadequate diet in the sense that they would consume more calories if their budget allowed them. However an intervention policy that seeks to transfer income to them will have only a marginal impact on their caloric intake. At the same time the quality of their diet will be substantially improved. Most price subsidy programs that are targetted at the urban middle class and even the organised labor class probably fall in this category.

The greater payoff from nutrition interventions is to be found in the region of point A. It is here that significant increases in caloric intake can be achieved. Also, given the low intake level, additional calories probably have a greater impact on the physical and mental well-being of the individual.

Thus the problem is manageable. Or is it?

The tragic fact of political economy is that it is precisely the people whose share of the national pie is only a few crumbs who are also unorganised geographically and politically. But that is another story.

Appendix to Chapter II. The Sources of Data and Country List

The Sources of Data

The sources of data are:

i) World Product and Income (1982) for real gross domestic income per capita for 34 countries for the years 1965, 1970, 1975, and 1977 as well as for purchasing power parities for 1975.
ii) FAO, Food Balance Sheets, 1972-1974 and 1975-1977 for data on nutrient availability.
iii) FAO, Fourth World Food Survey, 1977, for data on calorie requirements.
iv) U.N., Yearbook of National Accounts Statistics, Volume II, 1979, for real GDP per capita growth rates.
v) ILO, Yearbook of Labor Statistics, 1979, for general and food price indices.
vi) The 34 countries in the sample, with the number of observations for each, are as follows:

Developed Countries

Austria (3)	Belgium (4)	Denmark (4)	France (4)
Hungary (2)	Ireland (4)	Italy (4)	Japan (4)
Luxembourg (4)	Netherlands (4)	Poland (1)	Romania (1)
Spain (4)	United Kingdom (4)	United States (4)	Yugoslavia (1)
Germany (4)			

17 countries; 56 cases

Less-Developed Countries

Brazil (3)	Colombia (4)	India (3)	Iran (4)
Jamaica (3)	Kenya (4)	Korea (4)	Malawi (3)
Malaysia (4)	Mexico (4)	Pakistan (4)	Philippines (3)
Sri Lanka (4)	Syria (3)	Thailand (4)	Uruguay (4)
Zambia (3)			

17 countries; 61 cases

Total Sample: 34 countries; 117 cases

Part 2

III. AN EXAMINATION OF HOUSEHOLD INCOME AND EXPENDITURE DATA

Household budget surveys show food consumption for different income groups at particular points in time. Cross-section analyses based on such surveys have the advantage of showing the influence of incomes on food consumption without major disturbing effects from changes in prices. However, even in cross-section surveys, different consumers face different prices for the same commodity depending on where they live and what their quality preferences are.

With appropriate concern for such differential price effects, household surveys give a clear sense of the eventual directions that consumption patterns are likely to take as incomes grow because the population under study is narrowly defined both in terms of space (within a country or a region) and time (inter-generational taste consistency not required). Thus the population may be expected to behave consistently within its context. Thus, if it is sought to determine, for example, the rate at which meat consumption is likely to increase in India, household survey data would be a good point to start.

Before the evidence is presented, it would be appropriate to discuss what kind of patterns should be expected.

It would seem axiomatic to assert that more 'preferred foods' would be consumed as incomes rise since, by definition, preferred foods cost more.[1] After all, if a preferred food were cheap enough for satiety to be reached at the lowest income levels, it would not remain preferred. Thus it should be expected that the budget share of preferred (i.e., costlier) foods would rise with increasing incomes.

This also means that a 'heirarchy' of food categories can be drawn up on the basis of costs per calorie. As incomes increase, people would

[1] Cost here is being measured in terms of cost per calorie.

move down the heirarchy, their food budget increasingly composed of more expensive calories. Bennett (1954) expresses the idea this way:

> There are strong reasons to believe that there has for long existed a scale or heirarchy in the prices of different foods paid by consumers such that the prices of first-processed grain products (flour and meals of various sorts) and of starchy roots and tubers (such as white and sweet potatoes, yams, manioc, taro and plantains) tend to be the lowest per 1000 calories of all food prices. If this is so, then the poorest people of the world may be expected to lean much more heavily on these foods to satisfy hunger or energy requirements than would the wealthier; economic pressure would create such an outcome. One would expect, on comparing the food intake of national populations, or of any large population groups, to find the poorest deriving a relatively large fraction of their caloric intake from these starchy staples.

Bennett further asserts that the calorie-price heirarchy would take the following general form internationally, since costs of production would not differ much from country to country.

i) milled grain products and starchy roots;
ii) vegetable fats and oils;
iii) dried pulses (beans, peas, lentils);
iv) sugar;
v) milk and its products; possibly fish;
vi) pork;
vii) beef, mutton, lamb, buffalo meat, poultry and eggs; and
viii) vegetables and fruits.

On this basis, if household expenditure data for different countries were examined, with increasing income the following patterns would emerge:

i) the share (in the food budget) of starchy staples would decline;
ii) the share of fats and oils would increase initially, then decline;
iii) the share of dried pulses would increase until middle-income levels and then decline;
iv) the shares of sugar, milk and milk products would increase;
v) the shares of meats of all kinds, poultry, eggs and fish would increase; and
vi) the shares of vegetables and fruits would increase, very slowly at first and rapidly later.

To test this out, a 'representative' sample of seven countries was selected -- Mexico and Brazil in Latin America; Ghana and Kenya in Africa; and Japan, S. Korea, and India in Asia (Tables 6-9).

As can be seen, unfortunately, the food categories are not exactly the ones that were discussed earlier. "Bread and cereals" replace starchy

Table 6 -- Distribution of Expenditure on Food and Drink by Income or Expenditure Classes by Geographical Area

Country	Average total expenditure on food and drink		Percentage of food and drink expenditure on									
	Currency and amount	Period	Bread and cereals	Meat and fish	Fats and oils	Milk, milk products, eggs	Fruit and vegetables	Sugar, jams, confectioneries	Meals outside the home	non-alcoholic beverages	Alcoholic beverages	Food n.e.c
1	2	3	4	5	6	7	8	9	10	11	12	13
MEXICO, 1968 (All households, non-agricultural and agricultural sectors, whole country)	Peso											
Household income per month (Pesos)												
Whole country:												
Over-all	778.34	month	19.6	22.7	5.6	17.6	15.1	2.7	6.5	6.2	2.0	2.0
Less than 301	196.12	"	37.3	7.7	7.7	9.2	23.9	4.1	1.8	4.4	2.6	1.3
301- 600	317.73	"	32.5	11.5	7.9	13.1	20.1	3.9	2.4	5.4	8.0	1.2
601- 1 000	510.16	"	25.8	17.8	7.0	16.0	16.8	3.4	3.9	6.2	1.7	1.4
1 001- 3 000	854.81	"	19.6	22.9	5.7	18.1	14.9	2.7	6.1	6.6	1.5	1.9
3 001- 6 000	1 394.49	"	15.3	26.2	4.9	19.2	13.7	2.3	7.4	6.3	2.4	2.3
6 001-10 000	1 936.01	"	13.3	29.5	4.0	17.7	12.3	2.1	10.1	5.5	2.5	2.6
10 001 and +	2 572.87	"	10.8	27.7	3.9	18.2	13.0	2.1	15.5	4.7	3.3	2.8
Non-agricultural sectors:												
Over-all	938.08	"	17.6	24.4	5.2	18.3	14.6	2.5	7.1	6.2	1.9	2.2
Less than 301	221.12	"	34.9	7.8	8.3	10.3	23.3	4.2	1.8	5.0	3.0	1.4
301- 600	315.82	"	29.3	12.7	7.3	14.9	19.5	3.5	4.4	5.6	1.5	1.3
601- 1 000	500.90	"	24.1	18.8	6.9	17.2	17.2	3.1	5.5	6.5	1.3	1.6
1 001- 3 000	865.68	"	19.0	23.4	5.5	18.5	14.8	2.5	6.2	6.6	1.4	2.1
3 001- 6 000	1 405.50	"	15.2	26.7	4.7	19.0	14.0	2.2	7.3	6.2	2.2	2.5
6 001-10 000	1 912.56	"	12.9	28.9	3.9	18.0	12.2	2.2	11.0	5.5	2.7	2.7
10 001 and +	2 597.75	"	10.9	28.8	3.7	18.6	13.0	2.1	12.4	4.8	3.4	2.3
Agricultural sectors:												
Over-all	548.58	"	24.6	18.6	6.8	15.7	16.3	3.3	5.2	6.1	2.0	1.4
Less than 301	189.38	"	38.1	7.7	7.5	8.9	24.0	4.1	1.7	4.2	2.4	1.4
301- 600	318.41	"	33.6	11.1	8.1	12.4	20.3	4.0	1.7	5.3	2.2	1.3
601- 1 000	518.77	"	27.4	16.9	7.1	14.9	16.5	3.7	4.4	5.9	2.0	1.2
1 001- 3 000	760.24	"	21.5	21.4	6.4	17.0	15.4	3.0	5.8	6.8	1.6	1.3
3 001- 6 000	1 325.06	"	16.4	22.4	6.4	21.2	16.8	2.4	7.9	7.2	3.8	1.5
6 001-10 000	2 103.44	"	15.4	33.5	4.5	15.8	12.8	1.7	4.7	5.5	4.4	1.7
10 001 and +	2 446.49	"	10.0	21.5	4.5	16.1	13.3	2.1	19.7	4.4	2.6	5.8
BRAZIL, 1962 (All types of households, rural, Federal States of R.G. do Sul and Pernambuco)	Cruzeiro											
Household income per year (Cruzeiros)												
Rio Grande do Sul:												
Over-all	254.5	year	20.0	31.7	7.5	11.1	13.8	3.9	2.1	0.7	2.4	6.8
Up to 99	103.3	"	28.9	25.6	5.8	8.9	14.1	6.6	0.4	1.0	0.4	8.3
100- 249	165.3	"	22.5	25.2	9.1	12.9	13.8	4.7	1.4	0.9	1.6	7.9
250- 499	251.7	"	20.1	31.0	7.0	10.8	15.8	3.9	1.1	0.7	2.5	6.3
500- 799	305.9	"	18.2	31.2	6.3	13.2	13.4	3.9	3.2	0.5	3.8	6.4
800-1 199	458.0	"	16.8	37.3	5.2	9.3	14.2	3.1	3.4	0.6	0.9	9.2
1 200 and +	501.2	"	20.2	37.0	8.7	9.0	10.6	3.6	2.7	0.9	2.9	4.4

129 - sugar only 130-Excluding tea and cocoa 131 - Including jam and confectionaries, tea, and cocoa

Source: U.N. Household Income and Expenditure Statistics, no. 2, 1972

staples with roots and tubers being subsumed under "fruit and vegetables". Pulses presumably have been included with "bread and cereals". The category "meals outside the home" has not been split up into the food groups. Instead it is presented as a category of food itself. On the positive side, for some countries data are available separately for rural and urban households.

This means that some of the expectations need to be modified. Specifically,

i) the category "bread and cereals" would decline slowly at first rather than sharply. This is because some substitution will take place between inferior and high quality cereals on the one hand, between cereals and pulses on the other.

ii) the category "fruits and vegetables" would have a sizable share at low-income levels also (because of the inclusion of roots and tubers) and hence increases in consumption of fruits and vegetables proper would not show up so dramatically.

iii) it would be expected that the category "meals outside the home" would show increases in share with higher incomes. Because of their convenience and higher cost they have the character of a preferred good or even a luxury.

iv) in comparing urban and rural patterns, there might be systematic differences (keeping incomes constant) because of factors like different prices and different age, sex, and size structures of the households.

Table 6 shows the budget data for Mexico and Brazil. In Mexico the shares of "bread and cereals" and "meat and fish" follow expected patterns. So do shares for every other category except sugar which declined in both rural and urban areas. That rural and urban shares follow the same pattern is a striking aspect of these data although there is a difference of a few percentage points.

An important feature of the Brazilian data is the very high share of meat in the food budget -- 32 percent. This should be compared with meat's budget share in Mexico where it is 9 percent less even while the latter's per capita GDP is 25 percent higher. Fats and oils show an increase, which is contrary to expectations unless it is due to the nature of Brazilian cooking. Other anomalous trends are the inconsistency of the share of "milk, etc." and the decline in the shares of sugar, fruits and

Table 7 -- Distribution of Expenditure on Food and Drink by Inocme or Expenditure Classes by Geographical Area

Country	Average total expenditure on food and drink		Percentage of food and drink expenditure on									
	Currency and amount	Period	Bread and cereals	Meat and fish	Fats and oils	Milk, milk products, eggs	Fruit and vegetables	Sugar, jams, confectioneries	Meals outside the home	non-alcoholic beverages	Alcoholic beverages	Food n e c.
1	2	3	4	5	6	7	8	9	10	11	12	13
GHANA, 1967-68 (All types of households, urban and rural, eastern region)	New Cedi											
Household expenditure per month (N.¢)												
Urban areas:												
Over-all	19.65	month	12.7	27.2	2.2		35.4		4.9	7.6		10.0
Less than 15.00	8.44	"	15.1	24.3	2.1		30.1		14.1	7.5		7.0
15.00-24.99	15.01	"	14.2	27.0	2.3		34.3		8.5	6.4		7.3
25.00-34.99	19.54	"	13.4	26.6	2.1	40	37.2	41	4.4	6.2	42	10.1 43
35.00-44.99	22.17	"	12.6	27.4	2.3		36.3		3.2	7.1		11.1
45.00-54.99	27.16	"	12.0	27.8	2.4		35.6		2.4	8.8		11.0
55.00 and +	33.74	"	10.9	28.7	1.7		32.4		3.4	10.8		12.1
Rural areas:												
Over-all	17.44	"	13.5	27.1	1.7		38.6		2.9	8.6		7.6
Less than 15.00	8.46	"	15.5	29.5	2.2		38.1		3.4	7.5		3.8
15.00-24.99	14.42	"	13.2	27.2	1.9		36.9		5.9	9.1		5.8
25.00-34.99	19.19	"	14.3	26.7	1.8	40	40.3	41	1.3	8.7	42	6.9 43
35.00-44.99	22.11	"	14.1	25.5	1.4		39.6		2.6	8.2		8.6
45.00-54.99	23.44	"	14.5	26.5	1.8		36.2		2.2	8.8		10.0
55.00 and +	27.98	"	10.5	27.9	1.8		36.5		1.7	9.8		11.8
KENYA, 1968-69 (All African and Arab households, urban: Nairobi, Mombasa, Kisumu)	Shilling											
Household income per month (Shilling)												
Nairobi (African households):												
Over-all	220.8	month	21.5	20.6	6.3	14.9	12.7	6.1	5.4	3.9	6.9	1.7
0- 199	103.3	"	27.1	18.7	5.2	15.5	15.3	7.0	2.4	4.3	2.4	2.1
200- 299	339.4	"	25.6	19.5	5.9	13.0	16.2	8.1	2.4	3.2	3.4	1.9
300- 399	153.7	"	23.0	20.4	6.5	13.5	14.4	7.3	4.6	4.0	4.5	1.8
400- 499	171.9	"	26.1	21.5	6.5	15.8	12.4	6.9	3.8	4.1	2.0	0.9
500- 699	191.1	"	23.6	21.9	6.4	13.8	11.8	6.2	5.0	3.5	6.6	1.2
700- 999	240.5	"	21.2	19.0	6.5	14.1	12.2	6.1	8.3	4.6	6.9	3.1
1 000-1 399	288.7	"	20.6	22.5	7.0	16.0	14.2	4.8	3.9	4.3	5.1	1.6
1 400-1 999	356.0	"	19.6	19.9	6.3	15.0	11.8	5.8	4.2	3.5	12.8	1.2
2 000 and +	425.5	"	15.9	20.6	5.6	16.4	10.3	4.5	8.9	4.0	10.5	3.3

40 - included with food n.e.c.
41 - probably included with food n.e.c.
42 - tabacco and drinks
43 - including milk and probably sugar
Source: ILO, Household Income and Expenditure Statistics, No. 2, 1974

vegetables. It seems that other foods are being 'sacrificed' so that more meat and fat can be consumed.

In Africa (Table 7), the familiar declining trend is found for bread and cereals. While the share of meat increases in both urban Ghana and Kenya, the increase is quite marginal -- 4 percent in Ghana and 2 percent in Kenya from the poorest to the richest households. The rural pattern in Ghana for meat shows stagnation if not decline. It is noteworthy that in Ghana fruits and vegetables make up a high and stable share -- more than one-third -- of the total food budget. In Kenya the share of fruits and vegetables is the more usual 10 to 15 percent; it increases marginally then declines. Sugar shows a declining share, while milk and milk products retain a constant share.

Japanese consumption patterns (Table 8) are quite remarkable in that the shares are about the same for all income classes for fats, milk products, eggs, fruits, vegetables, and alcoholic beverages. There is a 9 percentage point decline in the share of bread and cereals between the lowest and the highest income households, and this is absorbed by a 4 point increase in meat share and a 6 point increase in meals eaten outside the home.

In the Republic of Korea (Table 8), the meat share doubles from 11 to 22 percent between the poorest and richest households. The share of bread and cereals remains very high -- the highest for any country (except rural India) in this survey -- almost 30 percent for the highest income class. Milk products, sugar products, and meals away from home show significant increases, doubling or even tripling their budget shares. Fruits and vegetables also show an increase, though a more modest one.

In India (Table 9), the income classes are stated in terms of fractiles rather than monetary income. The highest fractile in the rural areas spent 48 percent of its food budget on cereals, while the lowest spent 74 percent, the highest in this sample. While this is partly due to India's having the lowest per capita income among these countries, it does not fully explain this large share. Kenya has nearly the same per capita income, and the cereals share of the highest income class in that

Table 8 -- Distribution of Expenditure on Food and Drink by Income or Expenditure Classes by Geographical Area

Country	Average total expenditure on food and drink		Percentage of food and drink expenditure on									
	Currency and amount	Period	Bread and cereals	Meat and fish	Fats and oils	Milk, milk products, eggs	Fruit and vegetables	Sugar, jams, confectioneries	Meals outside the home	non-alcoholic beverages	Alcoholic beverages	Food n. e. c.
1	2	3	4	5	6	7	8	9	10	11	12	13
JAPAN, 1969 (Japanese households of two or more persons except farmers and fishermen, whole country)	Yen											
Household money income per month (Yen)												
Over-all	28 531	month	19.2	22.1	0.8	7.6	19.2	1.6	9.8	2.2	5.7	11.8
Less than 20 000	13 797	"	24.4	21.1	0.8	6.8	21.2	1.7	5.7	1.8	5.1	11.4
20 000-29 999	16 743	"	22.6	22.2	0.9	7.3	21.2	1.7	6.3	1.8	5.4	10.6
30 000-39 999	19 277	"	21.6	21.3	0.8	7.8	20.4	1.7	6.7	1.9	6.1	11.7
40 000-49 999	20 567	"	20.6	21.4	0.8	8.3	19.9	1.8	7.7	1.9	5.8	11.8
50 000-59 999	22 694	"	20.0	21.3	0.8	8.2	19.7	1.8	8.3	2.0	6.0	11.9
60 000-69 999	24 915	"	20.0	21.2	0.8	8.3	19.3	1.8	9.0	2.0	6.1	11.5
70 000-79 999	27 059	"	19.9	21.2	0.8	8.0	19.1	1.9	9.3	2.0	5.9	11.9
80 000-89 999	28 990	"	19.3	21.9	0.8	7.7	19.2	1.8	9.8	2.2	5.7	11.6
90 000-99 999	30 334	"	19.1	21.8	0.8	7.7	18.8	1.8	10.3	2.2	5.8	11.7
100 000-119 999	32 313	month	19.2	22.3	0.8	7.3	18.8	1.7	10.4	2.2	5.6	11.7
120 000-139 999	34 711	"	18.8	22.8	0.8	7.1	18.8	1.8	10.2	2.4	5.3	12.0
140 000-159 999	36 460	"	18.1	22.8	0.8	7.3	18.8	1.6	10.8	2.4	5.7	11.7
160 000-179 999	39 054	"	17.7	23.3	0.8	6.8	18.9	1.4	11.2	2.6	5.0	12.3
180 000-199 999	38 351	"	17.5	23.5	0.9	7.2	18.7	1.5	11.0	3.1	4.8	11.8
200 000-249 999	41 867	"	17.4	23.6	0.8	6.6	19.1	1.6	11.3	2.7	5.3	11.6
250 000 and +	45 154	"	15.8	24.8	0.8	6.3	18.7	1.4	12.3	2.7	4.9	12.3
KOREA (Rep. of), 1971 (Korean households of two or more persons, urban, whole country)	Won											
Household income per month (Wons)												
Salary and wage earners:												
Over-all	13 460	month	45.4	16.9		5.5	16.4	4.1	2.2		1.7	11.8
Less than 20 000	8 380	"	56.2	11.1		2.4	14.7	3.2	1.5		2.0	9.1
20 000-27 999	11 180	"	49.2	14.0		3.0	15.7	3.6	1.5		1.3	11.7
28 000-35 999	13 760	"	44.4	16.7		3.2	16.2	3.7	2.0		1.3	12.3
36 000-43 999	15 760	"	40.7	18.6	99	3.7	17.2	3.8	2.2	100	1.5	12.1
44 000-51 999	17 400	"	36.3	20.2		4.8	17.1	4.6	2.2		1.7	12.2
52 000-59 999	18 360	"	37.9	21.3		3.4	17.3	4.2	2.3		1.6	11.5
60 000 and +	24 020	"	29.9	22.3		5.0	17.8	6.1	4.1		2.2	12.6

99 - Included with "Food n.e.c." Butter included with "milk, milk products, eggs."
100 - Including soft drinks
101 - Soft drinks included with "sugar, jam and confectionaries
102 - Including fats and oils
Food n.e.c. - Food items not elsewhere classified

Source: U.N., Yearbook of Income and Expenditure Statistics, No. 2, 1974

Table 9 -- Distribution of Expenditure on Food and Drink by Income or Expenditure Classes by Geographical Area

Country	Average total expenditure on food and drink		Percentage of food and drink expenditure on									
	Currency and amount	Period	Bread and cereals	Meat and fish	Fats and oils	Milk, milk products, eggs	Fruit and vegetables	Sugar, jams, confectioneries	Meals outside the home	non-alcoholic beverages	Alcoholic beverages	Food n.e.c
1	2	3	4	5	6	7	8	9	10	11	12	13
INDIA, 1965-66 (All households, urban and rural, whole country)	Rupee											
Fractile groups of households [104]												
Urban areas:												
Over-all	22.63	30 days	44.0	5.0	6.6	13.3	11.3	4.4	5.0	6.5	...	3.9
0- 5	8.30	"	64.2	3.4	4.8	3.5	11.7	4.6	0.7	2.6	...	4.5
5- 10	11.63	"	57.6	3.4	6.1	6.4	13.2	5.0	0.4	3.0	...	4.9
10- 20	13.92	"	56.9	3.7	5.7	6.5	13.2	5.0	1.0	3.4	...	4.6
20- 30	16.35	"	52.1	4.3	6.5	9.4	14.2	4.8	0.8	3.5	...	4.4
30- 40	18.60	"	50.3	4.1	6.4	10.0	14.7	4.7	1.2	4.1	...	4.5
40- 50	20.89	"	46.3	4.4	7.2	11.4	15.8	5.0	1.2	4.6	...	4.1
50- 60	23.98	30 days	41.7	5.0	7.7	13.6	16.6	4.7	1.1	5.2	...	4.4
60- 70	27.44	"	36.6	6.2	7.5	14.9	17.0	4.7	2.5	6.5	...	4.1
70- 80	32.51	"	32.0	5.1	6.7	17.5	16.0	4.1	7.4	7.7	...	5.5
80- 90	39.71	"	24.8	5.5	6.1	16.8	15.9	3.5	15.3	9.1	...	3.0
90- 95	45.35	"	21.6	5.5	5.8	19.0	17.8	3.7	12.9	10.8	...	2.9
95-100	66.74	"	15.7	6.7	6.7	19.0	18.3	2.8	13.5	15.0	...	3.1
Cities combined *:												
Over-all	30.83	"	20.2	8.3	7.6	15.7	19.4	4.0	9.5	11.8	...	3.5
0- 5	10.93	"	49.3	5.4	6.9	5.7	16.6	6.3	-	4.0	...	5.8
5- 10	14.79	"	37.1	8.3	9.1	8.0	19.2	6.5	0.4	6.1	...	5.3
10- 20	18.24	"	35.0	8.6	7.8	10.6	19.5	5.3	1.3	7.1	...	4.8
20- 30	21.45	"	28.1	8.2	10.1	13.6	20.6	5.9	0.8	8.1	...	4.6
30- 40	25.55	"	25.7	10.8	10.0	12.3	19.8	5.3	2.9	9.0	...	4.2
40- 50	33.09	"	20.1	8.7	6.3	18.3	17.5	4.5	8.2	10.4	...	6.0
50- 60	34.64	"	16.8	8.0	8.5	14.6	18.7	3.6	13.5	13.3	...	3.0
60- 70	42.18	"	15.2	7.4	7.5	17.1	19.9	3.5	13.6	12.4	...	3.4
70- 80	43.91	"	12.2	6.9	6.3	20.2	16.9	2.9	18.6	13.3	...	2.7
80- 90	51.92	"	13.5	6.3	6.5	17.6	20.3	3.2	14.0	16.2	...	2.4
90- 95	61.04	"	13.0	6.9	5.2	22.9	22.4	2.5	8.8	14.8	...	3.5
95-100	79.02	"	7.9	12.9	7.1	14.1	18.6	1.5	18.6	17.3	...	2.0
Rural areas:												
Over-all	19.34	"	63.6	2.8	4.3	8.5	11.2	3.4	0.8	1.9	...	3.5
0- 5	7.06	"	73.9	2.1	3.5	2.0	9.1	1.8	1.3	1.7	...	4.6
5- 10	9.93	"	74.9	2.2	3.6	2.0	8.7	2.3	1.0	1.5	...	3.8
10- 20	12.01	"	71.9	2.1	3.9	3.5	9.5	2.5	1.2	1.5	...	3.9
20- 30	13.96	"	70.3	2.6	4.2	4.2	10.2	2.7	0.4	1.5	...	3.9
30- 40	15.80	"	69.4	2.7	4.2	4.8	10.6	2.5	0.5	1.5	...	3.8
40- 50	17.51	"	67.7	2.5	4.4	6.4	10.5	3.0	0.4	1.6	...	3.5
50- 60	19.60	"	65.9	2.7	4.4	7.1	11.1	3.0	0.7	1.7	...	3.4
60- 70	21.79	"	64.1	3.2	4.3	8.4	11.2	3.2	0.5	1.7	...	3.4
70- 80	24.83	"	61.6	2.9	4.3	10.4	11.5	3.6	0.5	1.8	...	3.4
80- 90	28.86	"	58.3	3.2	4.5	11.7	12.1	4.0	0.9	2.1	...	3.2
90- 95	34.66	"	54.3	3.1	4.6	13.7	13.2	4.3	1.2	2.3	...	3.3
95-100	46.07	"	48.3	3.3	5.0	17.0	12.7	5.7	2.2	2.3	...	3.5

* Cities combined includes only Bombay, Calcutta, Delhi, and Madras

1 - per capita

63 - including laundry soap

104 - estimated percentage of households based on the results of ranking the households by ascending order of consumption per person

Source : ILO, Household Income and Expenditure Statistic, P 2, 1974

country was 16 percent. The equivalent income class in urban India spent around 15 percent of its budget for cereals. A more probable explanation lies in the fact that the survey was conducted in the drought year of 1965-1966. Rural areas might have been harder hit than urban areas where government distribution efforts were better organised. If so, cereals would be significantly cheaper in the cities, permitting the budget share to be lower for a given quantity consumed. Also fractile for fractile rural incomes must have been much lower than urban incomes.

Meat consumption in India starts from a very low base of 2 to 3 percent of poor household' budgets, the lowest among countries in the sample, and does not increase to very significant levels -- 6.7 percent in the richest urban households and 3.3 percent in the richest rural households. These numbers suggest that if urban per household food expenditures trebled, from Rs. 22 to Rs. 66, the share of the budget allocated to meat would increase from the current average of 5 percent to only 6.7 percent. This suggests the severe limits to growth in per capita meat consumption in India. In contrast, milk and milk products show very dramatic increases. From a low of 2-3 percent, expenditures rise to 13 percent in rural areas and 18 percent in the urban centers. Sugar's share declines in richer households in the urban areas, while it rises in the rural areas.

This survey makes obvious the importance of income as the driving force causing basic changes in food consumption patterns -- witness the substantial difference in budget shares of food categories between the highest and lowest income categories within countries. At the same time it also reveals significant differences in behavior patterns across countries -- only three of the a'priori expectations were confirmed with any degree of universality. These related to budget shares of bread and cereals, meat and fish, and meals away from home.

In other areas major differences were observed both in terms of trends and levels of consumption. These findings suggest that either the general cost heirarchy is not as universal as Bennett thought it was or that there might be a universal heirarchy, but for a variety of social

or cultural reasons, people in specific countries do not behave according to it. As the next chapter shows, there are elements of truth in both these views.

The final point to note is that at very low income levels, changes in prices of staples automatically imply significant changes in real incomes. Therefore, income growth may be a laudable long-run objective; but in the short-run, it is prices that determine the nutritional status of the poor.

IV. THE PRICE FACTOR

In 1957, an article in the FAO publication, The State of Food and Agriculture could claim that

> In the United States the general trend of opinion among economists at the present time seems to be that the influence of price levels on food consumption is relatively minor and that more attention should be paid to the effect of changes in income...(FAO, 1957, p.95)

This view has roots in the structural model of the development process. According to the structuralists, food prices are irrelevant to the development process since both producers and consumers are insensitive to changes in prices. Such a 'trend of opinion' was surprising even in 1957 when estimates of price and income elasticities clearly showed that the former were as high as, and sometimes higher than the latter, as shown in Table 10.

It is now generally accepted that prices play a very important role in the production sector. Their role in the consumption sector is less well documented although Geissler and Miller (1982) have argued in a recent article that the principal reason for differential occurrence of malnutrition in Thailand and the Philippines -- two countries that are very similar in GNP per capita, population size, industrialization, and adequacy of food supply -- is lower food prices in Thailand. Philippines has three times as many doctors per head, twice as many people enjoying safe drinking water, and literacy rates 23 percent higher. Yet according to one estimate (Reutlinger and Alderman, 1980), 71 percent of the Philippine population suffered from some calorie deficit while the corresponding figure for Thailand was 53 percent.

Price changes have two distinct and separable impacts -- the substitution and income effects. The substitution effect causes consumers to substitute away from the costlier product and is always negative in direction. The income effect generally causes consumption of all goods to fall (if prices increase) although exceptions are made for 'inferior'

Table 10

Elasticity Estimates, United States, 1922-1941

Category	Price Elasticity	Income Elasticity
All Food	-0.34	0.27
All Meat	-0.64	0.56
Beef	-0.79	0.73

Source: FAO, 1957, (p. 95)

goods. This is expressed algebraically in the "Slutsky equation",

$e_{ij} = \epsilon_{ij} - E_i \alpha_j$, where

e_{ij} = total price elasticity of good i when good j's price changes,

ϵ_{ij} = the Slutsky 'pure' substitution elasticity for the same price change,

E_i = the income elasticity for good i,

α_j = the budget share for good j.

The income effect, represented by $E_i \alpha_j$, is itself quite substantial for poor households. If the income elasticity for food for the poor is 0.8 and the budget proportion is about the same, the observed Cournot elasticity (e_{ii}) would be -0.64 even if the substitution effect were zero. Moreover, work by Timmer (1981) suggests that not only is the substitution effect considerable, but it is also higher for the poor than for the richer households. In other words, were a third dimension reflecting household incomes to be added to the Slutsky matrix, the terms of the matrix for a given commodity would 'curve' smoothly from poor to rich households.

A sample of results for substitution between rice and cassava in Indonesia is shown in Table 11. The data base was the 1976 Socio-economic Survey (SUSENAS V) which collected detailed commodity expenditure and quantity data for the entire cross-section of households, making it possible to calculate implicit prices.

As Table 11 shows, all the substitution terms are significant for all income classes except the rice-cassava cross-substitution terms, which are not significantly different from zero at normal confidence levels.

This has important policy implications insofar as consumers, especially poor consumers are concerned. Not only are prices the substantial determinant of nutritional status in the short run (simply because income growth takes time) but they can be much more easily manipulated

Table 11

Compensated Price Responses by Income Class, Indonesia, 1976

		Slutsky Elasticities (ϵ_{ij})[a]	
Income Class		Rice	Cassava
Low	Rice	-1.318	-0.043[ns]
	Cassava	1.364	-1.251
		Rice	Cassava
Low-Middle	Rice	-1.002	0.007[ns]
	Cassava	0.950	-0.807
		Rice	Cassava
High-Middle	Rice	-0.856	-0.078[ns]
	Cassava	0.897	-0.939
		Rice	Cassava
High	Rice	-0.669	-0.006[ns]
	Cassava	0.648	-0.801

Note: ns = not significant

[a] Rows refer to the commodity whose quantity changes and columns refer to the commodity whose price changes. Also, cassava refers to fresh cassava.

Source: Timmer (1981, p. 400)

by government policies.

Therefore, a rational food policy would be based on the matrix of consumption parameters disaggregated by income class. While estimating these parameters is a daunting and expensive process, the results in terms of better policy make it worthwhile.

The gains to public policy accrue in two forms. Firstly, a consumption parameters matrix enables a systemic approach to food policy since it accounts for all the linkages between food prices and their overall impact on nutritional status. Questions like, e.g., the impact on rice consumption of changing cassava prices and the net impact of this on the caloric intake of the lowest income class, can be answered. Secondly, it becomes possible to target subsidy type interventions better and to minimize leakages, thus reducing the burden on the exchequer.

Apart from elasticity estimates, many useful insights can be gained by examining the cost per calorie of the various food categories.

In the last chapter the point was made that either the cost-heirarchy is not universal or that consumers exercise preferences based on non-cost considerations. It is now time to test these ideas.

Table 12 shows the heirarchy of calorie costs for 13 food categories for 7 countries for 1975. The prices are expressed in index form with the cheapest commodity in each country being the base (=100).

The prices were calculated using data from Kravis, et al., (1982) and the FAO's Food Balance Sheets, 1975-1977. The former provides expenditure data in national currencies for each food category, while the latter gives the calories derived from them. For some categories where a country's consumption is very low (e.g., meat in India or pork in Kenya), expenditure and calorie data had a high margin of error. In such instances, the caloric costs were calculated using purchasing power parities, also given by Kravis, et al. The actual prices in national currencies are shown in Table 13 along with the amounts of calories provided by each source. As can be seen, an unfortunate weakness is that the category 'other cereals and pulses' (which accounts for a large share of calories) could not be disaggregated further because of data unavailability.

Table 12

The Hierarchy of Calorie Costs for 7 Countries, 1975

Food Category	USA	India	Kenya	Korea	Brazil	Mexico	Japan
1) Roots & Tubers	100	163	100	208	114	400	163
2) Sugars & Honey	114	170	286	213	100	100	100
3) Rice	136	147	790	148	253	200	191
4) Other Cereals & Pulses	186	100	190	100	210	200	303
5) Pork	186	151	438	298	834	1200	1122
6) Milk & Milk Products	236	626	1029	556	639	700	1084
7) Egg & Egg Products	255	653	1019	494	1858	3300	388
8) Lamb & Mutton	273	312	648	287	1566	5500	413
9) Beef	314	163	605	1735	1502	3200	3209
10) Poultry	464	1328	3000	640	2902	4500	1428
11) Fruits	545	595	2905	1015	380	900	1434
12) Vegetables	1632	895	2471	377	8468	6000	2216
13) Fish	1705	100	4794	525	2249	2600	1741

Note: The cheapest commodity in each country is set as base = 100.

Sources: Kravis et al. (1982).
FAO, Food Balance Sheets, 1975-77.

Despite Bennett's assertion on the cost-heirarchy for food categories, the cost per calorie is not likely to be the same for all commodities in all countries. Casual observation of Table 12 shows that the relative prices across countries tend to differ both in terms of 'spacing' (between contiguous commodities in the heirarchy) and in the ordering of the heirarchy itself. Of course there are broad similarities; for example, sugar and cereals are generally cheaper and fruits and vegetables are generally more expensive. But it is difficult to be confident about a common international heirarchy of prices. Clearly, there are limits to international trade.

How can 'taste effects' be isolated from all the other supply and demand factors that are acting simultaneously to determine prices? Conceptually, a positive taste effect implies a propensity toward a commodity so that for a given price and income setting, demand is greater than in other societies. A negative taste effect works in the opposite direction. These simple categorizations can be illustrated in a surprisingly clear fashion with the comparative calorie cost data in Table 13. In the cases of India and Kenya, the Indians seem to exercise a 'negative preference' for tubers, pork, beef, and fish. On the other hand, they have a positive preference for milk. The Kenyans seem to have a negative preference for tuber, pork, and eggs.

It must be emphasized here that the term 'negative preferences' is not being used as a synonym for 'taboos'. In fact to label all negative preferences as taboos is to miss an important analytical point and make policy options seem narrower than they actually are.

To return to the India example, the reasons why people consume less beef are quite different from the reasons why they consume fewer tubers. The origins of the negative preferences are different in the two instances.

The negative preference for beef has historical and religious associations, and taboo is an apprpriate term. However, there is no taboo against potatoes or sweet potatoes. The potato is a fairly recent entry in the food habits of the Sub-continent, and has been slow to

Table 13

Price of 1000 Calories in National Currencies for 7 Countries with Calories/Capita/Day from each Source, 1975

Food Category	USA (cents)		India (paise)		Kenya (cents)		Korea (won)		Brazil (cruzeiros /100)		Mexico (pesos)		Japan (yen)	
	Price	Daily Calories	Price	Daily Calories	Price	Daily Calories	Price	Daily Calories	Price	Daily Calories	Price	Daily Calories	Price	Daily Calories
1) Roots & tubers, including potatoes	22	112	70	41	21	201	108	98	67	250	4	25	52	61
2) Sugars, honey, syrup, jam	25	541	73	173	60	172	111	55	59	449	1	444	32	247
3) Rice	30	34	63	544	166	15	77	1219	149	386	2	58	61	890
4) All other cereals & pulses	41	606	43	741	40	1308	52	694	124	657	2	1431	97	424
5) Fresh pork & all pork products (processed)	41	279	65	1	92	2	155	30	492	39	12	61	359	100
6) Milk, milk products, excluding butter	52	368	269	55	216	112	289	8	377	130	7	132	347	79
7) Eggs, egg products	56	63	281	-	214	3	257	18	1096	13	33	23	124	62
8) Fresh, frozen & salted lamb & mutton	60	6	134	3	136	12	149	1	924	3	55	2	132	8
9) Fresh, frozen & salted beef	69	340	70	1	127	56	902	12	886	116	32	56	1027	20
10) Fresh, frozen & salted poultry	102	89	571	1	630	7	333	5	1712	24	45	20	457	24
11) Fresh & processed fruits	120	116	256	28	610	49	528	21	224	24	9	99	459	64
12) Fresh & processed vegetables	359	67	385	31	519	15	196	76	4996	17	60	17	709	67
13) Fresh, frozen & canned fish	375	19	43	5	1007	4	273	56	1327	15	26	9	557	175

Sources: Kravis, et al. (1982)
FAO, Food Balance Sheets, 1975-77.

spread because it has never been actively propagated. If people have traditionally eaten rice, wheat or maize and have not discovered (or needed to discover) that potatoes are also a cheap source of calories, then it is not taboos but habit, inertia, and ignorance that prevent more flexible dietary patterns. Household decision-making is made on the basis of incomes and prices to be sure. But the manner in which the consumption possibility set is defined is largely a function of the 'received experience' from the family and the larger society.

This perspective on food preferences makes it possible to distinguish among different categories of 'cheap' calories and the policy options that are best suited to each.

The first category includes those foods already consumed to a fair degree by most people, especially the poor. Since in most countries these grains, roots, or tubers tend to be 'inferior' goods for at least the middle- and upper-income households, they are an ideal vehicle for income redistribution and overcoming malnutrition through price subsidies. Examples of such foods are cassava and maize in Indonesia, and coarse wheat in India.

The second category is comprised of foods that may be even less expensive than the first. They are likely to have a short history as edible or available food in the region, for example, tubers, or pulses, or soybeans. Although such foods are highly nutritious sources of calories and proteins, their consumption is restricted because of people's habits and lack of knowledge. Since their prices are already quite low, what is needed is not a subsidy policy but a dissemination of their palate-pleasing and nutritive properties. In fact, further lowering of their prices runs the risk that such foods might be perceived as useless since apparently nobody wants to eat them. Naturally, this type of nutrition education has to be done in the context of how they are to be cooked and eaten with other traditional foods. The message has to mesh with the foodways of society.

In some countries another category of foods, generally meats, has the lowest caloric price of all, mainly because the foods are taboo. These foods have strong negative associations either because of religion,

as beef among Hindus or pork among Muslims, or cultural attitudes. Policies designed to increase consumption of such foods face ridicule and loss of credibility for the policy makers. There is little point in investing policy efforts in such directions.

It bears repitition, however, that some foods are available in every society whose prices are already low and which are not regarded as taboo or culturally inferior. They are not consumed in substantial quantities because of the inertia of eating habits. Active propagation of their palatability is what is required, not a further subsidy on their costs.

The list of economic forces shaping consumption patterns encompasses not only incomes and prices but also demographic factors. There are two reasons for this. On the one hand, intra-household behavior is determined by aspects of the structure of households -- their size, male/female-child/adult composition, number of working members, and so on. On the other, certain demographic trends like urbanisation imply changing life-styles and consumption patterns. Changes in these structural variables and lifesyles and their impact on food habits cannot be fully captured by income and price elasticities. Accordingly, they are the subjects of the next two chapters.

V. THE INFLUENCE OF DEMOGRAPHIC VARIABLES

The object of this chapter is to investigate the effects of household size and composition on consumption patterns. By 'household composition' is here meant the age and sex of the members of the household.

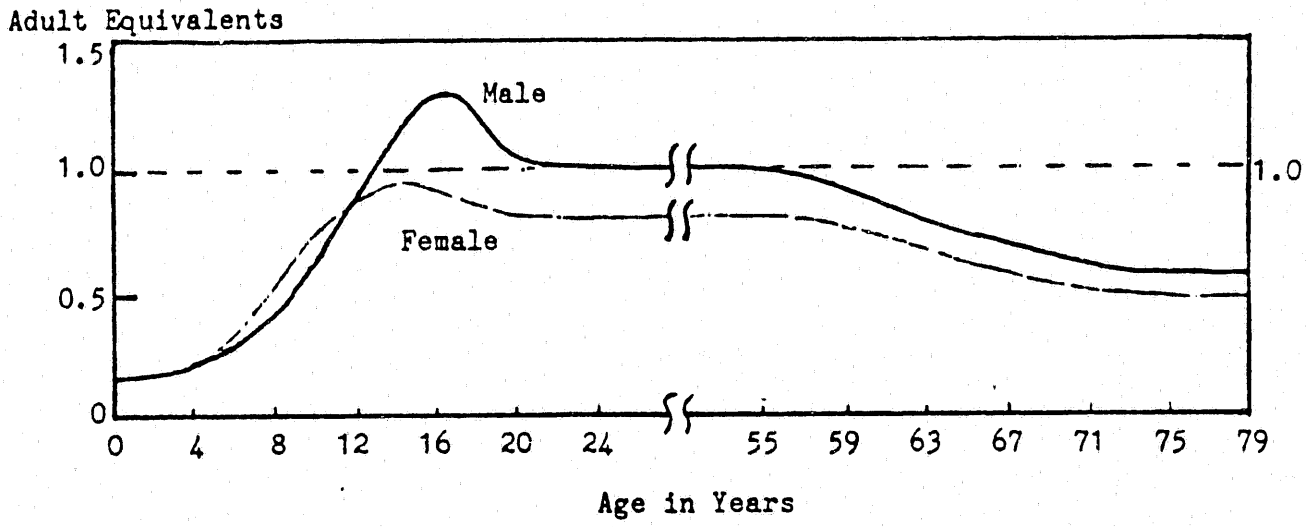
In analyzing the differential effect of adding a person of a particular type to the household it is necessary to distinguish two stages in the calculation. There is, first, the question of how an increase merely in the number of persons in the household would affect consumption, all persons being of the same standard type. Once this has been determined, it is possible to go to the second stage and ask how the addition of the person of the particular type would compare with that of a person of the standard type.

One simple hypothesis that may be used to start of with is the 'homogeneity hypothesis'. According to this, a proportionate increase in household size leads to a percentage decline in income per capita of the same magnitude, and hence the change in consumption will be given by the income elasticity applicable to that expenditure category. This is equivalent to asserting that, holding income per capita constant, the 'elasticity of per capita demand with respect to household size' is zero.

This hypothesis is not very realistic. Indeed, it would not have been mentioned here but for its widespread usage, mostly implicitly. Economies of scale accrue to large households in both purchase and production of food. Savings in value of consumption per person may be made in large households for certain foods simply by buying in large quantities at lower unit prices. Also leftover wastage as a proportion of food cooked is lower. Thus it should be expected that the household size elasticity, which is defined as the rate of change in consumption per capita relative to the rate of change in the size of households, should have a non-zero value. Estimates for the United States show that

Figure 2

A Hypothetical Scale for a Food Commodity



Source: Salathe and Buse, "Household Food Consumption Patterns in the United States", USDA/ESCS Technical Bulletin No. 1587, January, 1979.

the elasticity varies from -0.2 to -0.4. For example, consider a family whose size goes up from 4 to 5 members. To remove any 'income effect', their income is adjusted so that the per capita income remains the same as before. For this 25 percent increase in household size, per capita food expenditures will decline to 95 percent of their former level, assuming a household size elasticity of -0.2. Stated differently, a 25 percent increase in household size leads to a 19 percent increase in total food expenditures.

The influence of age and sex on food requirements may now be considered. For comparison, the standard is defined as the consumption of an adult male of 'average' body size who engages in the 'average' amount of physical activity for that population. The consumption of people of other ages and sex can then be expressed as a percentage of the standard. Such scales are called 'adult equivalent scales', and have been constructed in the United States. Figure 2 shows what a typical scale might look like.

As can be seen, for any given age group, women would consume less than men. Also consumption levels are likely to be higher in youth (16-22 years) than in later years, and they drop substantially after the age of 55.

It is now possible, having isolated the separate effects of household size, age and sex composition, to see how they interact with each other and with income per capita. It should be expected that for given levels of income per capita, consumption effects will be different for large households vs. small households, younger households vs. older households, and so on. Our primary interest here is on the characteristics of household structures that are associated with low per capita incomes. Below we present our hypotheses and the evidence.

It should be expected that households with low per capita incomes would tend to be younger on average as compared to higher income households.

happen
This would/partly for normal life-cycle reasons -- in most

Table 14

Sao Paulo: Income and Age Distribution

Income	Percentage of Family in Age Group		
	Less than 5 Years	Less than 15 Years	15-35 Years
0 - 0.5*	29.3%	63.1%	30.3%
0.5 - 1.0	30.8	50.0	39.5
1.0 - 1.5	32.4	46.3	46.0

*Income measured in units of minimum income per month with one minimum unit = US$80 - $100.

Source: Escola Paulista, p. 15, cited in J. Austin, et al.

occupations a person's earnings grow with age. It would also happen because households with low per capita incomes are less able to afford the cost of adequate nutrition and health facilities, and are therefore liable to greater mortality risk. In other words they have a greater chance of dying young. Table 14 shows how the age distribution differs among income groups in a study done in Sao Paulo.

In Sao Paulo the lowest per capita income households have 63 percent of their members younger than 15 years, while those households with incomes in the highest category have only 46 percent of their members that young.

The other relationship of interest is that between incomes and household size. The a'priori expectation would be that low per capita income households would tend to be larger. They would have more children because even a child has a marginal product in sundry occupations. Also, given the high mortality risk, having more children is simply insurance for old age. Table 15 shows how the mean family size varies with income in Sao Paulo. The size of the average family tends to decline from 6-7 members to about 4-5 as income grows.

No data could be availed on the relationship between household income and sex composition. It is very possible, however, that low-income families have a greater percentage of males than the high-income families. This is based on the common observation that in poor countries infant mortality among females is higher than that for males. This has been attributed to a poverty that necessitates tough choices between alternate ways of spending the family health budget. It is also attributable to a deliberated neglect of female infants arising from the attitude that female children are less desirable or productive than males.

To summarize, if our hypotheses are correct and the Sao Paulo data has any claim to universality, low-income households would tend to be characterized by lower than average age, larger family size and higher male proportion than the upper-income households.

The combination of low per capita income and large family size means

Table 15

Sao Paulo: Mean Family Size

Nutritional Status	Income*			
	0-0.5	0.5-1.0	1.5-2.5	2.5 plus
Malnourished**	7.1	5.9	4.2	4.6
Well Nourished	6.2	5.3	4.6	4.5

*In minimum income units
**Malnourished defined as 2nd and 3rd degree malnutrition according to the standards of Gomez, weight for age.
(Sample size approximately 1,300)
Source: Escola Paulista, p. 42, cited in J. Austin, et al.

that poorer households are in a better position to exploit economies of scale in the purchase and production of food. This does not mean very much since the net output of this -- nutritional status -- is already captured in data that relates to their caloric intake. To the extent nutritional deficiencies exist, they are after accounting for the beneficient influence of economies of scale.

What it does suggest is that the emergence of nuclear families without significant changes in income places additional pressure on these families. This is specially pertinent in the context of rapit urbanisation in many low- and middle-income countries.

The net impact of more male members in low income households (which leads to demand for more calories) and lower average age (which may reduce demand for calories or increase it depending on proportions of children and youths) is likely to be higher need for calories than in richer households. This is without taking into account the manual nature of low income occupations. Also, demand for the various food groups would be effected. Among younger populations the demand (or at least the need) for milk would be higher as would demand for other low-bulk, high protein foods.

It is difficult to arrive at more specific conclusions regarding the impact of household structures on consumption patterns since data in this area is woefully lacking. In fact an important aspect which was totally ignored here relates to the decision-making process that allocates resources within the household. What should be clear however, is that the factors considered here do have an impact that is not captured by aggregate econometric estimates of parameters like elasticities, and secondly, that the extent to which these factors change (trends towards nuclear and single-parent families, longer life-spans, etc.) introduces elements of instability in the underlying consumption parameters themselves.

This completes our study of the 'economic factors' -- incomes, prices, and household size and composition. The next two chapters will examine the impact of the 'non-economic factors' -- urbanisation and social class.

VI. THE IMPACT OF URBANIZATION ON DIET PATTERNS

The world has been undergoing a rapid change in its settlement patterns. Urban centers have grown through internal population growth and because of migration from the rural areas. This trend is likely to continue. In 1980, 77 percent of the population of the industrial market economies were living in urban settlements. In contrast, only 27 percent of the low-income countries were similarly settled. Obviously, the scope for further urbanisation in LDCs is considerable -- with or without economic growth.

In evaluating the impact of urbanisation on dietary patterns, it is important to distinguish between the 'total effect', and its 'separate effect'. The total effect would merely compare differences in consumption between urban and rural areas. Thus it would ignore urban-rural differences in income and prices. The 'separate effect' analysis would eliminate the 'noise' emanating from different incomes and prices. It would isolate the impact that is uniquely attributable to urbanisation. In the context of this paper, this would refer to all factors associated with urbanisation other than incomes and prices -- new life-styles, social relationships, marriage patterns, family structures, availability of new packaged and processed foods, and advertising and the media.

DeGarine (cited in J. Austin, p.70), looking for the total effect, found certain common patterns in the differences between the diets of urban and rural peoples. He based the following observations on studies conducted in Brazil, the Philippines, Cuba, and Chile.

a) The food of city dwellers is more varied; many different kinds of foods are available, albeit for a price;

b) city dwellers generally consume more animal proteins, fats milk;

c) urban consumers are more responsive to innovations in the field of food, especially those foods easy to prepare quickly and cheaply;

d) the diets of city dwellers are less subject to seasonal variations, but more subject to fluctuations in wages, etc.;

e) the caloric value of the urban consumer's diet may be less than that of rural consumers;

f) more fresh vegetables and fruit are eaten on a yearly basis by urban dwellers; and

g) finally, given that a more diverse diet is likely to supply the essential nutrients better than one that is less diverse, he concluded that the urban consumer is, on the whole, better off than his rural counterpart.

Thus, according to DeGarine, the total effect of urbanisation is a positive one. Does an examination of the separate effect reveal a similar picture? The little evidence that exists is not very assuring.

Most of the food eaten by the urban poor is prepared in their homes. Even so, snack foods have become increasingly popular, and some of them are cheap enough to be purchased by low-income peopls -- sweets, ice-creams, fried foods, fruit preparations, and, of course, soft drinks.

The magnitude of snack food consumption has not been adequately documented in the literature. Even if snack foods constitute only 5 percent of the total food budget, this is a fairly sizable amount given the size of the protein or calorie deficit which has been found in their diets. These snacks are, compared to home-cooked food, very expensive sources of calories, and their protein content is often negligible.

Meals consumed away from home can be a significant component of an urban dweller's diet, particularly those wage earners whose jobs are far from their homes. During the 'lunch hour' the sidewalks of the big cities come alive with a plethora of eating places offering both traditional and and nontraditional meals. It is difficult to comment on the nutritional value of such meals except to say that the fat content is frequently very high.

As far as consumption of starchy staples, the 'backbone' of the diet, are concerned, two kinds of shifts have been noticed. First, in the cities there is a trend away from the consumption of 'inferior grains' such as maize and sorghum. Second, there is a tendency toward the consumption of highly milled and polished rice and wheat as compared with home-pounded

grain eaten in the countryside.

These trends have two implications. The shift toward superior grains results in a higher percentage of the food budget being spent on staples (since these are costlier) leaving less money for other foods. The shift toward polished, attractive looking grain often contributes to reduced vitamin intake.

> Surveys carried out among the Bantu in the Union of South Africa showed that their normal rural diet of whole grain cereals and milk is often replaced by one based on refined maize meal, white bread and mineral water and that efforts to spread nutrition education among the urbanized Bantu are necessary to counteract that tendency. Another example is the increasing incidence of beri-beri, a serious deficiency disease, in some countries in South and East Asia as a result of the spread of small rice mills producing highly milled and polished but vitamin-deficient white rice. (FAO, 1957)

Much more than the rural populace, the urban poor encounter a wide variety of advertised, processed, and packaged products. In a sense, the emergence of product differentiation based on brand identification and the decline of commodity-based selling are natural concomitants of the process of industrialization. (After all, a country can consider itself developed if the tomatoes in its grocery markets carry brand names. Import of bottled water from France would be a symptom of the post-industrial society.)

But, the assurance of quality that brand names carry, and the marketing efforts required to build brand loyalty, carry a price tag that is ultimately borne by consumers. To the extent that these products are consumed by the poor -- instant coffee, Western-style white bread, milk powder, snack foods, etc., -- they crowd out more essential items of consumption.

Nutritional status is a function not only of the volume and composition of food intake but also of the physical characteristics of urban life, which for the poor frequently means overcrowding, poor sanitation, disease, ignorance, insalubrity, lack of drinking water, etc. The undernourished individual is always living in an inadequate environment, and

the damage produced by undernutrition is aggravated by an urban slum environment. Thus, it has been observed that children with an acceptable food intake but living in an inadequate socioeconomic environment show low efficiency in psychomotor development tests.

One particularly vulnerable urban group is that of the recently arrived migrants. Rural people just arriving in the cities are quite unfamiliar with the norms and modes of urban life. Their education and skill levels are generally low, and their ignorance about the job market makes them easy prey for exploitation. Those migrants who stubbornly stick to their traditional rural diets, perhaps as a form of psychological security, would not be at greater nutritional risk. But if they cannot afford to buy all of what they used to eat in the countryside and if all those foods are not available in the city, an imbalance in the diets of these people would occur.

The family structure is also disrupted when men migrate to the city alone. Without female partners such men mey be deprived of emotional as well as logistical support. This may lead to less complex food habits, 'quick-fix' meals, a greater propensity to eat out, and, perhaps even alcoholism.

The thesis that emerges is that nutritional status of the urban poor is not likely to be comparable to that of their rural brethren, and that there are good reasons to expect it to be inferior for any given income level. Where the city offers significantly greater income-earning potential, of course, average nutritional status may well be better than in the countryside.

Two public policy issues arise from this discussion. First is the need to make available cheap, nutritious, packaged food with built-in maid service to the urban poor. At present such foods simply do not exist. The packaged foods currently available are either nutritionally negligible or too expensive or both. The second point is that urban centers act as channels by which the habits, customs, fads, and fashions of the developed world get communicated to the semi-urban and rural areas. Policy that aims at popularizing new food habits in the countryside where the bulk of the population still lives -- the use of soybeans for example -- must necessarily aim at achieving success in the urban areas first.

VII. THE SOCIAL FACTORS

Consider the following observation which relates to the eating habits of the poor:

> Long experience with poverty results inevitably in adjustment to the realities of inadequate income. Attitudes about food as well as food choice become adapted to the existing situation in ways that seem suitable. One adjustment that must invariably be made concerns the relative importance of food -- how does food rank in priority when compared to other needs. Hunger, of course, gives food an overriding importance but the kind of food with which one assuages the accompanying discomforts matters relatively little. Except to prevent hunger, food is pushed downward in the scale of priorities by other wants that are considered more pressing; in fact a deliberate choice is occasionally made to undergo periodic and temporary mild hunger in order to acquire some object deemed eminently desirable. Middle-class persons are prone to criticize such a practice as being foolish and short-sighted, not recognising that a vitally needed lift to the spirit can result from a new possession, for example, a pair of stylish shoes or some article of personal adornment. The poor are just like everyone else in deriving great personal satisfaction from the acquisition of some longed-for object which is not exactly utilitarian; for them as for everyone else, an occasional luxury is an emotional necessity. (Gifft, et al., 1972, p.103)

From the viewpoint of this paper, such seemingly perverse behavior raises two questions of interest. Firstly, what implications do such behavior patterns have for policy analysis. And secondly, what are the implications for economic theory in general and parameters like income elasticity in particular.

With respect to policy analysis, the most important implication that suggests itself is that there might be limits to the kind of useful impact that education can have on the nutritional status of the poor.

An appeal to 'rationality' based on nutritional science may not result in a higher expenditure on food simply because, as long as hunger is assuaged, food is pushed down in the order of priorities. However this still leaves considerable scope for improving the mix of food eaten so that the 'bang for the buck' is maximised. This may therefore be a more productive plank for launching nutritional interventions.

In discussing the implications for economic theory, the view adopted here is essentially that expressed by Prais and Houthakker (1971) in "The Analysis of Family Budgets". According to them, apart from current income, past and expected income, and the amount of capital possessed have to be brought in as independent variables to explain expenditure patterns.

> Consider... the typical working-class household, the economic charactersistics of which are that it has a negligible amount of capital at its disposal and the prospect of an uncertain and irregular income stream...The problem which such a household has to solve is that of establishing habits of expenditure which will allow it to survive in the future as far as it can foresee it. Habits, however, are difficult to establish and even more difficult to change; in particular, it is easier to become accustomed to an increase than to a decrease in the consumption of a particular commodity... In these circumstances a working-class household will be acting in a perfectly rational manner if it discounts very heavily its expected future income stream and establishes habits of expenditure, at any rate as far as the staple items are concerned, which are appropriate to a lower income level than it may in fact be [currently] enjoying; that is, habits which on the whole are similar to those of a household expecting a lower but regular income stream. The excess income is then spent as quickly as possible in some non-habit-forming direction...(Prais and Houthakker, 1971, p.155)

The implication of this is that the concept of income elasticity has to be elaborated so that a distinction may be drawn between the effects of long-term and short-term changes in income.

Thus a short-term increase in the income of a worker may merely lead to an increase in his expenditure on entertainment; but a long-term increase may lead to a change of social class, an increase in education, and even a change of occupation.

It should be noted that there is a difference between the impact of short term changes in income and the short run impact of a long term change in income. The former would result merely in an increase in non-essential expenditure. The latter would initiate a process of change in behavior more in line with the social class to which the household aspires. Non-essential expenditure may actually be cut down as the household tries to build up its capital stock quickly.

At the same time changes in expected long-term income will effect food habits -- as is succintly and only half-humorously described in the quote at the beginning of this essay.

The perspective that has been developed so far suggests that consumption patterns associated with different social classes may, in economic terms, be described as behavior attributable to expected long-term income. Thus, the different approaches -- sociological and economic -- should be regarded as potentially consistent.

The dynamics of economic and social change does not end here. There is an international dimension to it and this will be explored next.

The origins of the international connection are quite clear. The twentieth century revolution in transportation and communications has brought the world together like never before. This has allowed -- through commerce, tourism, and television -- an interaction, unprecedented in scale, of peoples, cultures, and consumption patterns.

Previously 'status-seeking' behavior had only a national (or even sub-national) character as the lower social classes imitated the consumption patterns of the upper classes to bootstrap themselves socially. The dimension that has now been added is that the elite of the poor countries is imitating the consumption patterns of their middle- and upper-class counterparts in the richer countries. This phenomenon has been termed 'international demonstration effect'.

Instances are available from India where it used to be that low castes gave up eating beef and other meats after they had gained the economic clout to be accepted in the middle-castes. With the 'internationalization' of social classes, food habits are increasingly following the Western pattern. This is especially noticeable in the big cities. Not only are meats like chicken, lamb and pork being consumed by a wider number of sub-castes (and by implication , a larger number of people), but Western preparations like burgers, pizzas and pies are very popular in the metros. Ofcourse accepatability of beef is still a long while away.

What all this means is that in attempting to foresee the long-term changes in consumption in the low- and middle-income countries one necessarily has to look at the patterns that are currently prevailing (and evolving) in the richer nations. This is the subject of Part 3.

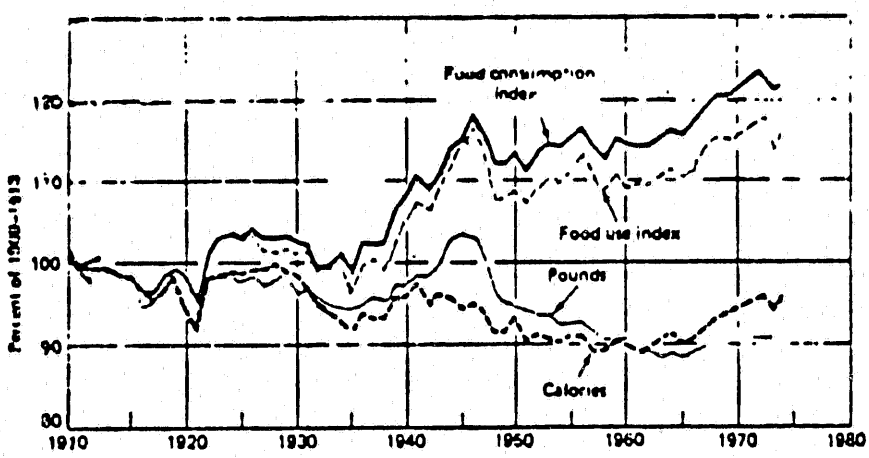
Part 3

VIII. CONSUMPTION PATTERNS IN THE UNITED STATES, 1909-1980

The United States seems to set the pattern for the rest of the world in food consumption behavior. A study of its dietary patterns is not only necessary to predict short-run trends within the country, but is also very revealing of the directions in which consumption patterns are headed in other parts of the globe. In examining the trends it should be borne in mind that by today's standards the United States was already a 'middle-income' nation in 1909. To that extent the following analysis is more relevant to the rapidly growing middle-income countries in East Asia and Latin America than the low income countries of Africa and the Indian sub-continent.

Figure 3 shows the trends in tota' per capita caloric intake. There was a long-term decline between 1909 and 1966 from around 3400 calories per capita per day to 3175, a reduction which reflects a tendency toward sedentary lifestyles. This has also been found in other industrialised nations. After 1966, caloric intake started rising. The rise may be attributable partly to government food assistance programs for the poor, partly to greater consciousness of physical fitness and exercise, and partly to some increase in food waste at the household and institutional level. It may be noted in passing that caloric 'intake' actually refers to the total disappearance of foods at the retail level. The share of this total that is ingested by the American people depends on a number of factors, including economic and social pressures to avoid waste as well as the technology of food preservation and marketing. Thus the gap between caloric disappearance at the retail level and actual calories ingested is likely to be much higher (and fluctuating) in the U.S. and other DCs than in LDCs. The important point to be noted here is the almost complete absence of incomes as a factor in explaining caloric intakes. Currently the intake is around 3500 calories.

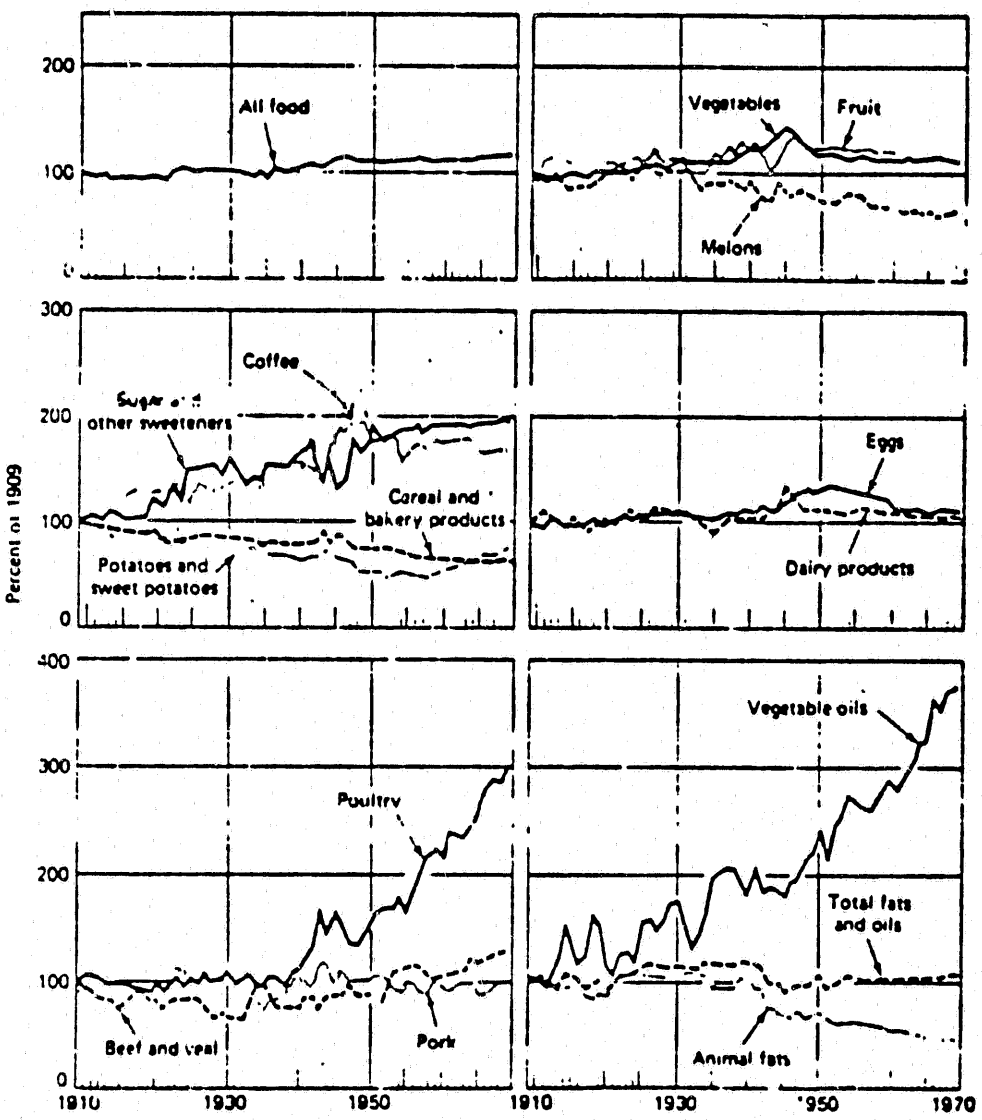
Figure 3. -- Four Measures of Per Capita Food Consumption



Four measures of per capita food consumption. Food consumption index is the retail weight equivalent, weighted by constant retail prices. Food use index is the farm-weight equivalent, weighted by prices received by farmers; the index is adjusted to the level of the food consumption index in 1924 (1924 = 103.8). Calories are those available for consumption at the retail level, and pounds are the retail-weight equivalent. Figures for 1974 are preliminary. *Source:* Economic Research Service, U.S. Department of Agriculture. Neg. ERS 5520-75 (11).

Figure 4

Trends in Per Capita Food Consumption



Trends in per capita food consumption. Items are combined in terms of constant retail prices. Butter is included with both dairy products and fats and oils. *Source*: Economic Research Service, U.S. Department of Agriculture. Neg. ERS 4017-69 (10)

Table 16

Share of Major Food Groups in Nutrient Intake

	Calories			
	1909-13	1947-49	1970	1980
Food Group				
1) Meat, Fish & Poultry	15.8	17.3	20.9	21.0
2) Fats, Oils, Butter, Dairy Products & Eggs	23.1	30.3	31.0	29.9
3) Fruits & Vegetables	4.4	6.0	5.8	6.0
4) Starchy Staples	42.5	27.0	22.0	22.6
5) Sugars & Other Sweeteners	11.7	15.7	16.8	17.0

	Proteins			
	1909-13	1947-49	1970	1980
1) Animal Products	51.8	63.7	69.8	68.9
2) Crop Products	48.2	36.3	30.2	31.1

Source: ESCS, U.S. Department of Agriculture, Statistical Bulletin 364, U.S. Food Consumption, Sources of Data and Trends, and various supplements.

Figure 5 -- Diet Sources of Protein

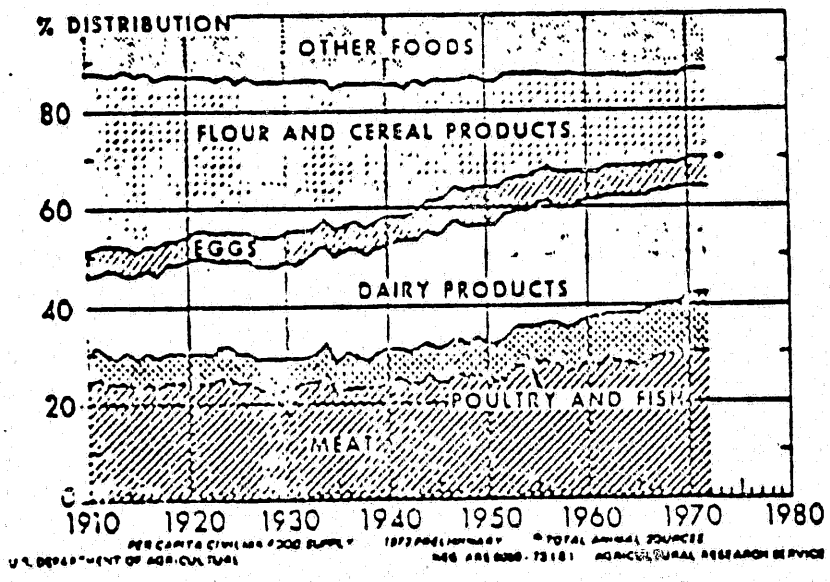


Figure 4 summarizes the trends for the major food categories. Table 16 quantifies the changes that have taken place in calorie-sourcing. As can be seen, Starchy staples declined from 42.5 percent of total calories in 1909-1913 to only 22.6 percent in 1980. Most of this decline had occurred by 1947-1949. Consumption of meat, fish and poultry increased by 26 percent to bring their calorie share to 21 percent. Fats, oils, dairy products and eggs increased their share by 7 points to provide almost 30 percent of all calories in 1980. The consumption of sugar and and other sweeteners increased by 130 percent so that they now provide fully one-sixth of all calories.

Because of these trends, the source of proteins in the diet has shifted towards animal products (Table 16 and Figure 5). While in 1909 the shares of vegetable and animal proteins were almost equal, by 1980 vegetable sources provided less than one-third of protein intake.

The meat, fish and poultry category has seen substantial growth in its calorie share as well as major changes in its composition (Table 17). Pork consumption has increased only marginally over the last 70 years, while beef consumption has grown by 50 percent and poultry (mainly chicken) consumption has increased 2.6 times. Interestingly, beef consumption has declined by 18 pounds (almost 20 percent) between 1976 and 1980. It may be too early to call this a trend but it clearly reflects a consciousness of the harmful consequences of fatty meat.

Despite the increase in meat consumption, the share of animal products has actually declined in the total food budget (Table 18). The share of the budget spent on meat, fish and poultry has remained around 34 percent, while the shares of eggs and animal fats have declined. Even as the share of crop products increased, starchy staples declined 4.2 percentage points. The slack was taken up by sugar and other sweeteners whose share of the budget increased dramatically from 4.3 to 7.6 percent. This was largely because of increasing consumption of soft drinks. Between 1960 and 1980, the consumption of these drinks increased threefold from 13.6 gallons per capita per annum to 37.8 gallons. With the emergence of 'diet' soft drinks, there might be a significant change in this trend.

Table 17

Per Capita Consumption of Beef, Pork and Poultry, 1970-80 (Pounds)

Commodity	1910-19	1970-74	1975	1976	1977	1978	1979	1980
1) Beef	50.5	83.8	87.9	94.4	91.8	87.2	78.1	76.5
2) Pork	60.4	62.3	50.6	53.7	55.8	55.9	63.8	68.3
3) Poultry	16.8	49.6	49.0	52.2	53.6	56.2	60.9	60.9
4) Total (1+2+3)	127.7	195.7	187.5	200.3	201.2	199.3	202.8	205.7

Source: See Table 16.

Table 18

Relative Importance of Major Food Groups in Food Budget

Commodity	1909-13	1947-49	1976
1) Animal Products	59.4	58.0	53.8
2) Crop Products	40.6	42.0	46.2
3) Meat, Fish & Poultry	34.3	31.5	34.2
4) Fruits & Vegetables	16.1	17.2	18.1
5) Starchy Staples	14.7	9.6	10.5
6) Sugars & Other Sweeteners	4.3	6.3	7.6

Source: See Table 16.

Advances in technology have produced new and improved methods of preserving and processing, freezing, and drying. These techniques have had their greatest impact on fruits and vegetables (Table 19). More than half of all fruits and vegetables bought in the supermarket are processed, and the trend is rising. Innovations on the supply side have been matched by the popularity of processed foods on the demand side. Not only are they well suited to current life-styles, they are also in line with the emerging demographic trends -- more women taking up careers, single parent households, and indeed single person households.

Another aspect of processing is the extent to which it has influenced the consumption of a starchy staple -- the potato. By 1960, potato consumption had declined to about 55 percent of the 1909 level. Then came potato chips and frozen French fries and other potato snacks. Not only was the decline arrested, but overall potato consumption has actually been increasing in the '70s(though this is not reflected in Fig.6).

Over time there has been an increasing tendency to eat away from home. In 1980, 27 percent of all food expenditures were made outside the home as compared with 20 percent in 1960-61. And there is scope for further increases -- the top income-quintile spent as much as 37 percent of the food budget on 'away meals' in 1972-73. Apart from rising incomes, other factors that explain this trend are greater the greater proportion of working mothers and single person households.

Disaggregating the separate influence of changing incomes and prices, changing household size, composition and age of the population on these consumption patterns is a major task and will not be attempted here. The interested reader is referred to Burk (1951 and 1961), George and King (1971), Houthakker and Taylor (1970), and Nino-Gajardo (1977), for an authoritative review of the subject.

However, another important issue will be probed here: Is it reasonable to expect that price and income changes will have very little effect on food consumption patterns in the U.S. After all, the budget share share of food has reached such low levels -- 16 percent of

Table 19

Trends in Processed Foods

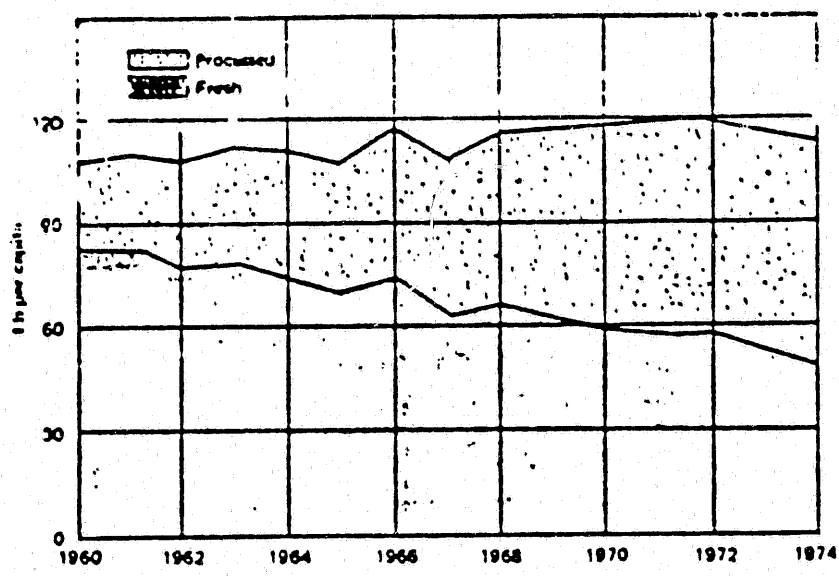
Commodity	1910-19	1930-39	(Percent) 1950-59	1970-74
1) Processed Fruits share in total fruits	17	24	48	61
2) Processed Vegetables share in total vegetables	33*	34	50	56

*Refers to 1920-29. Figure for 1910-19 was not available.

Source: See TAble 16.

Figure 6

Fresh and Processed Potato Consumption



Fresh and processed (fresh weight equivalent) potato consumption. Fresh potatoes include small quantities used for flour. Figures for 1974 are preliminary. *Source:* Economic Research Service U S Department of Agriculture.

disposable income on food, and 1.7 percent on starchy staples -- that income and price elasticities should be expected to be very low.

The underlying logic of this argument would liken food to a commodity like common salt. Salt can be consumed only up to a limit, and since it is cheap, saturation levels are reached at fairly low levels of income. Thus neither income nor price changes significantly affect the quantity of salt consumed. Similarly, food consumption has reached its limits, whether measured in volume, weight or calories. In a rich society, by definition the food price is low compared with income. Since saturation levels have already been reached at much lower levels of income, changes in price and income will not affect the quantity of food consumed. Therefore, the argument would conclude, calorie levels should be independent of price and income changes.

The evidence certainly seems to back this up -- caloric levels in the U.S. seem to be impervious to changes in income or prices.

The next question to ask is whether this 'income and price rigidity' extends to food categories. In other words,is it possible that own-price, cross-price, and income elasticities for food categories are also negligible or close to zero? The qualitative evidence available suggests that it is so. The following examples are drawn from the sharp economic dislocations of 1972-74.

i) when prices of cereals rose, consumers did not reduce the quantities that they consumed, they merely switched to buying items that had a good deal less value-added.

ii) and, the restaurant industry's performance was a classic illustration of

> ...the extent to which consumers were willing to trade down but not give up the conveniences they had come to expect in food consumption. Fast food restaurant chains continued to achieve record sales levels in 1973-74, when meat prices were going up rapidly, and also in 1974-75, when incomes were declining. A medium-priced, high-quality restaurant chain experienced the same thing. Its sales increased rapidly in 1974-75, as consumers traded down from the higher-priced French restaurants. (Paarlberg, ed., 1977, p.143)

This suggests that prices and incomes do have an impact, but that

impact is primarily on the quality (or price paid) of the food purchased, not on the quantity. In other words, the 'substitution effect' on quantity is negligible, and the 'income effect' operates primarily through changes in the quality of food. Thus there is little change in the quantity consumed of each food category.

It must be pointed out that the validity of this hypothesis depends pivotally on how broadly or narrowly food categories are defined. If categories are defined as broadly as, e.g., meat, dairy products and foodgrains, then own- and cross-price elasticities would both be very low -- that is, quantities would be rigid.

On the other hand, if the meat category is broken up into beef, pork, and poultry, and dairy products into eggs, butter, cheese, etc., then own-price elasticities can be pretty substantial. This can be seen in Table 20 which presents George and King's (1971) estimates. At the same time, cross-elasticities among categories as well as income elasticities are quite small. This suggests that the 'rigidity hypothesis' tends to lose validity as the level of disaggregation becomes finer, and it seems to have greater validity for income-elasticities than for own-price elasticities.

Thus the general assertion can be made that as incomes rise, own price and income elasticities will tend to decline with the latter declining faster than the former. This is, of course, another way of stating that with increasing incomes, the level of category disaggregation at which high elasticities will be observed will go up. To take a specific example, as incomes rise, (assuming tastes remain the same), the price and income elasticity for beef will tend to decrease, and significant elasticities will be observable only at the level of steaks and hamburgers. At still higher levels of income, the substitutions will take place between 'A' grade steak and 'B' grade steak. And so on.

As a matter of fact, the most important changes taking place in the American diet today have little to do with incomes or prices. They are

Table 20 —Retail Demand Elasticities for Selected Farm Products

Percentage quantity change in:	1 percent change in the price of:															
	Beef	Veal	Pork	Lamb and mutton	Chicken	Eggs	Butter	Margarine	Fresh milk	Cheese	Sugar	Oranges	Bread	All foods	Nonfood	Income
Beef	-0.6438	0.0280	0.0826	0.0454	0.0876	0.0013	0.0003	0.0002	0.0028	0.0008	0.0009	0.0004	0.0036	-0.3896	0.0998	0.2899
Veal	0.3593	-1.7177	0.1977	0.0660	0.1736	0.0074	0.0018	0.0011	0.0153	0.0042	0.0050	0.0022	0.0196	0.7943	0.2032	0.5911
Pork	0.0763	0.0141	0.4130	0.0602	0.0355	0.0026	0.0006	0.0004	0.0053	0.0015	0.0017	0.0008	0.0069	0.1793	0.0459	0.1335
Lamb and mutton	0.5895	0.0661	0.8914	-2.6255	0.2338	0.0040	0.0010	0.0006	0.0083	0.0022	0.0027	0.0012	0.0107	0.7875	0.1941	0.5712
Chicken	0.1971	0.0436	0.1208	0.0546	-0.7773	0.0023	0.0006	0.0001	0.0047	0.0013	0.0015	0.0007	0.0061	0.2398	0.0[illegible]	0.1[illegible]
Eggs	0.0102	0.0027	0.0111	0.0019	0.0033	-0.3183	0.0036	0.0022	0.0307	0.0085	0.0101	0.0043	0.0096	0.0737	0.0189	0.0549
Butter	0.0019	0.0017	0.0003	0.0011	0.0003	0.0078	-0.6524	0.1605	0.0072	0.0020	0.0024	0.0010	0.0093	0.4274	0.1033	0.3181
Margarine	0.0115	0.0030	0.0133	0.0021	0.0039	0.0162	0.4245	-0.8465	0.0000	0.0025	0.0030	0.0014	0.0117	0.0000	0.0000	0.0000
Fresh milk	0.0064	0.0021	0.0050	0.0015	0.0016	0.0107	0.0014	0.0002	-0.3455	0.0007	0.0008	0.0004	0.0031	-0.2736	0.0700	0.2056
Cheese	0.0047	0.0020	0.0032	0.0013	0.0011	0.0095	0.0011	0.0002	0.0013	-0.4601	0.0035	0.0026	0.0215	-0.3344	0.0855	0.2489
Sugar	0.0109	0.0028	0.0120	0.0020	0.0038	0.0154	0.0022	0.0005	0.0069	0.0077	-0.2419	0.0018	0.0154	0.6432	0.0110	0.3321
Oranges	0.0035	0.0018	0.0021	0.0012	0.0008	0.0083	0.0011	0.0001	0.0000	0.0044	0.0015	0.6832	0.0325	0.1530	0.0895	0.2405
Bread	0.0116	0.0030	0.0133	0.0021	0.0039	0.0182	0.0024	0.0006	0.0078	0.0081	0.0042	0.0065	0.1500	0.0000	0.0000	0.0000
All foods	-0.0420	-0.0162	0.0250	-0.0060	0.0091	-0.0039	-0.0056	0.0003	-0.0247	-0.0093	-0.0020	0.0055	0.0039	0.2368	0.0606	0.1763
Nonfood	-0.0217	-0.0008	0.0317	-0.0008	0.0086	0.0103	-0.0025	-0.0015	-0.0214	-0.0059	-0.0070	-0.0033	0.0276	-0.2253	1.0179	1.2432

Source P. S. George and G. A. King, *Consumer Demand for Food Commodities in the United States with Projections for 1980*, Giannini Foundation Monograph 26, California Agricultural Experiment Station, Mar. 1971, pp. 46–51.

Taken from: D.C. Dahl and J.W. Hammond, Market and Price Analysis: The Agricultural Industries, New York: McGraw Hill, 1977, p. 80

the result of a combination of fads and fashions, as well as growing awareness of the link between foods and diseases. The 'rediscovery' of the potato, the proliferation of 'all natural' foods, the recent reduction in the consumption of beef, and the movement away from excessive salt and sugar, are some examples of this.

This raises an interesting, and important, question: Will the middle- and low-income countries follow the American experience *in toto* or will they learn from it and reject outright some of the medically harmful aspects of the American diet. As the next chapter shows, the evidence seems to be stacked in favor of the former.

IX. IMPLICATIONS OF AFFLUENT CONSUMPTION PATTERNS

The spread of affluence and the accompanying shifts in dietary patterns, most acutely represented in the United States but now well established in most of the developing world, have two important implications. First, considerable alarm has been expressed over the long-run health consequences of the American diet, with its high concentration of refined sugar, saturated fats, and cholesterol, and relative lack of dietary fiber, fresh fruits and vegetables. The alarm has sometimes spilled over to hysteria, and innocent visitors from the developing world are often shocked to find that many of the foods to which their people aspire are treated as poisons by friends and the press in the United States.

It cannot be denied that the relationship between diet and disease is complicated and insufficiently understood scientifically, for government policy to play an active role in the promotion or discouragement of different foods or dietary patterns. At the same time, many well-informed and health-conscious citizens are making private judgements about the evidence and are altering their entire life-styles with the expectation of significant benefits to health and well-being. As evidence accumulates that validates such decisions, and that is certainly the trend of scientific results over the past thirty years, an important dilemma will be faced by policy makers in developed countries.

> ...society's interest in this decision extends beyond humanitarian concern. Even if sufficient information were available to indicate the probable benefits of the 'good' life-style, many in society will continue to choose the 'poor' life-style for a variety of personal reasons. Although the individual who chooses the 'poor' lifestyle pays part of the costs through more chronic disease and higher medical costs, not all of such costs are private. Society pays an important share of such costs through losses in productivity of workers and through partial public financing of medical

> costs. That is, there is a strong social investment in the individual's 'lifestyle' decision, and some mechanism is needed to reconcile the difference between private and public costs and benefits to alternative dietary/lifestyle decisions. (Timmer and Nesheim, p.168)

Such concerns seem a far cry from the hunger and calorie deficits so prevalent in the developing countries. But many countries, especially those which have emerged recently into middle-income status, seem intent on achieving American-style diets as soon as possible. Thus, the second implication of affluent diets is their possible international economic repercussions if extended widely to the rapidly emerging middle-class households of the third world. Apart from any potential health concerns, the grain resources needed to provide such diets are an issue of considerable importance.

The earlier econometric estimates of animal protein income elasticities (chapter II) showed how vigorous the desire is for meat products in developing countries. For particular meats, especially beef, that desire remains strong even in the richer countries, as is shown in Table 21. The income elasticity for beef is more than 0.6 in the European community, is 0.7 in Mexico and Central America, and is 1.2 in Japan, where extremely high prices make beef a luxury good even at present levels of per capita incomes.

The implication of these large income elasticities for meat can be seen in Table 22, which reports both direct grain consumption per capita and indirect grain consumed by feeding livestock, for a variety of countries from the United States to India. Despite direct grain intake in the United States of about half the Indian level, <u>total</u> grain consumed is 4.5 times as large as India's total grain consumption per capita -- 646 kg per year versus 143.

The ramifications on world grain markets of 'follower' countries adopting American-style diets and the indirect grain demand implicit in them are staggering. If all the countries from Japan and below in Table 22 were to reach the average level of grain consumed in the

Table 21

Demand Elasticities for Meat

Item	Elasticity with respect to price of			Income Elasticity
	Beef	Pork	Poultry	
United States:				
Beef	-.7	.1	.1	.4
Pork	.4	-.8	.1	.1
Poultry	.3	.2	-1.0	.8
Canada:				
Beef	-.6	.3	.15	.7
Pork	.4	-.7	.15	.15
Poultry	.3	.2	-.8	.9
EC-6:				
Beef	-.7	.3	.1	.6
Pork	.5	-.8	.12	.5
Poultry	.38	.5	-1.07	1.0
EC-3:				
Beef	-.6	.2	.08	.7
Pork	.18	-.8	.2	.45
Poultry	.3	.3	-.6	1.0
Other Western Europe:				
Beef	-.6	.2	.1	.7
Pork	.2	-.7	.2	.6
Poultry	.1	.2	-.8	.9
Japan:				
Beef	-1.2	.26	.35	1.2
Pork	.20	-.90	.11	.9
Poultry	.50	.17	-1.10	.6
Mexico and Central America:				
Beef	-.4	.1		.7
Pork	.1	-.3		.6
Brazil:				
Beef	-.6	.3		.4
Pork	.2	-.6		.4

Source: ESCS, USDA, FAER No. 146, Washington, D.C., April 1978, p. 88.

Table 22

Annual Per Capita Grain Consumption in Selected Countries
1975-1977 Average

	Grain Consumed Directly (kgs)	Grain Consumed Indirectly (kgs)	Total Grain Consumed (kgs)	Total Grain Consumed as multiple of India's Consumption
USA	63	583	646	4.5
USSR	141	444	585	4.1
Argentina	100	275	375	2.6
Germany	67	288	355	2.5
U.K.	71	254	325	2.3
Japan	132	144	276	1.9
Korea	199	54	253	1.8
Brazil	91	124	215	1.5
China	156	52	208	1.5
Philippines	131	35	166	1.2
Indonesia	142	10	152	1.1
India	128	15	143	1.0

Note: Grain Consumed Indirectly is not corrected for imports and exports of meat and poultry.
Source: FAO, Food Balance Sheets, 1975-1977.

United Kingdom and Germany (340 kg per capita per year, a figure only slightly more than half the United States level), more than 300 million metric tons of additional grain would be needed, a figure equal to one-fifth of global grain production. Even excluding both India and the People's Republic of China from the calculation leaves an added grain demand of more than 60 million metric tons, more than one-quarter of world grain trade in recent years.

If income growth proceeds rapidly in these countries, and they are fast growers in historical terms, the derived demand for grain through increased meat consumption will be the major force determining the balance of supply and demand in world grain markets. Failure of income to grow rapidly will depress demand and could lead to significant grain surpluses in years of good harvests. But a combination of vigorous economic growth around the world with a poor harvest in the United States would see the supply-demand balance tighten and prices rise to allocate supplies to those most willing to pay.

Here then is the dilemma of affluent diets for the direct grain consumers of the poorest countries. The demand for meat in the middle- and upper-income countries determines the international market price not only for feedgrains (which many poor people consume directly as well) but also for wheat and rice. Through the feedgrain-livestock-meat connection, the diets of the poor and the rich are linked.

Part 4

X. CONCLUSIONS

The ultimate goal of food consumption analysis is to improve the potential for and efficiency of government interventions in increasing staple food intake among the very poor. Food consumption interventions can be targeted in a variety of ways, but they all require significant knowledge about food consumption patterns of the poor, both descriptively (including who the poor are and where they are located) and analytically (how they change their food consumption patterns when their incomes or prices change).

The analytic knowledge required includes answers to such questions as, when average GNP per capita rises, how much is market demand for rice likely to increase? Market demand for wheat? For cassava, corn, and meat? How much meat is grain-fed, and what will growing meat demand do to grain demand? How sensitive is market demand to absolute and relative food prices? If all foodgrain prices rise relative to nonfood prices, how much does demand drop? When prices rise, does wheat consumption rise while rice consumption falls, and by how much?

In other words, knowing what the poor eat and why and how those patterns will change when the external environment changes is essential to designing targeted food interventions. Since most food interventions take the form of an implicit or explicit subsidy, altering either the price facing the consumer or transferring real income, the necessity to have disaggregated price and income elasticities for important food staples is obvious.

To the extent that it was possible, this is what this paper has attempted. Despite the many gaps that currently exist in our knowledge, one fact emerges quite clearly -- the poor are significantly more responsive to economic signals. Both income and price elasticities are higher for the low-income classes as compared to the richer classes

whether behavior is measured in expenditures, quantities or amount of nutrient intake.

This has two implications. Firstly it suggests that perceived undernutrition is not felt in the middle- and upper-income classes even in the poor countries -- otherwise their expenditure elasticities would be higher. This apparently trivial point leads to the important policy conclusion that generalized food subsidies which enable the entire population to access cheap food are a wasteful use of public funds in as much as this food is consumed by those who are going to use this 'income transfer' to finance nonfood or better quality food consumption.

Secondly, it suggests that small increases in income can make substantial differences to the caloric intake, and hence nutritional status, of the extremely poor. The number of under-nourished people in the world has been variously placed between 300 and 1300 million. Whatever the actual figure, it is clear that if their calorie-income elasticities are as high as 0.6, then small increases in their income would lead to significant increases in the market demand for foodgrains and exert an upward pressure on grain prices.

The fact that this does not happen and the world is periodically deluged by grain surpluses is testimony to the extreme softness of demand from the undernourished. Thus grain surpluses exist not because world production is too much but because many of those who need the grain do not have the resources to buy them. Also, it is clear to us that the only way the poor will obtain these resources (in the long-run) is through increases in their income from agriculture -- on which the bulk of them currently depend for their livelihood.

It is therefore tragically ironic to see such grain surpluses cited as evidence and rationale for following a development strategy that deliberately neglects agriculture. It is quite true that government investment decisions should be guided by prospects of long-term payoff. But one important aspect of a planner's intuition is the ability to

foresee that even if certain sectors are going to decline in future, some investments in those sectors are needed to generated the economic growth that ultimately powers their decline. In other words, it is important to get the causation right. It is not a declining agricultural sector that leads to economic development, hence justifying a neglect of government investment in agriculture, but the other way round. It is economic development that results in a declining agricultural sector, and, more often than not this economic development has itself been powered by a dynamic agricultural sector.

This brings us to the heart of the food policy dilemma. For the farmer food prices are the major factor determining his income. The output price signals the incentives to the farmer to use purchased inputs, new technology, and household labor and managerial skills. Food prices communicate the need to maintain adequate food supplies. Thus the need to induce dynamism in the agricultural sector translates into a need to maintain attractive output prices for the producers.

On the other hand, for consumers, higher food prices restrict the range of purchases available of both foods and other goods and services, while lower food prices offer scope for greater food intake, a wider variety of foodstuffs and a higher quality diet, as well as an occasional new shirt or a radio. For the very poor, survival itself may hinge on low food prices.

Most governments use a variety of policy instruments to influence the rural-urban terms of trade in general, and food prices in particular. Frequently these prices are set to protect urban interests, to keep wages low, or even to increase staple food intake among the poor. While the short-run effects of these price policies might be viable and satisfactory to government officials, their long-run and dynamic consequences are frequently negative and worse, poorly understood.

Although food price policy in particular is seldom considered as part of macroeconomic policy, in many poor countries with large rural sectors, or simply a large fraction of personal income spent on basic

food commodities, the macroeconomic consequences of food price changes are quite significant. The obvious impact is through the size of the government budget devoted to price subsidies, but the foreign exchange impact may also be quite important when food price changes alter the volume of imports or exports. Countries with significant industrial sectors producing behind tariff barriers for domestic consumption can also experience Keynesian fluctuations in employment when food prices change. Higher food prices, for example, force consumers to increase the budget share devoted to food and reduce purchases of other goods and services supplied by domestic industry and workers. If the reduced domestic demand cannot be compensated by increasing exports, significant unemployment and reduced national income can result.

At the same time, the impact of the macro-economy on the food system is so powerful that it frequently dooms all efforts of policy makers within the agricultural sector to make any headway in 'getting agriculture moving' when the macro sector is sending contrary signals. A distorted set of macro policies -- which typically includes rapid inflation, an overvalued exchange rate, subsidized interest rates for preferred creditors, minimum wages for an urban working class elite, and depressed rural incentives -- makes rapid agricultural growth extremely difficult while it serves simultaneously to skew the distribution of income.

Since much of the environment for rural decision-making is dictated by macro policy and the macro prices, rapid rural growth over long periods of time can occur only when this macro environment encourages the efficient allocation of rewources. Short bursts of growth are possible from any of the other elements in the decision-making environment -- a new seed technology, subsidized fertilizer, or a more effective extension service. But for the long haul rural growth will falter in the absence of an overall economic environment that encourages, and ultimately forces the allocation of land, labor and capital into their most productive uses.

Macro policy reforms requires that the distortions usually found -- overvalued exchange rates, subsidized interest rates, depressed agricultural incentives, and low food prices -- be corrected. The devaluation that brings foreign exchange rates into equilibrium usually will pump new purchasing power into rural areas, with positive effects on rural employment and improved income distribution. Price increases will help reduce budget subsidies and cut inflationary pressures. Eventually, scarcity values for labor and capital will induce a new efficiency in resource use.

At the same time, the incentives needed to generate much of this rural dynamism can seriously affect the food consumption of poor people. By designing short-run targetted food consumption subsidies to help poor people across the bridge to long-run dynamic economic growth, it can be made easier for macro policy makers to implement the needed reforms in the first place. To design such policy interventions, disaggregated consumption parameters need to be used in order to identify how different income classes adjust their consumption. The major concern, of course, is to measure the extent to which consumer groups with marginal or inadequate caloric intake may be pushed significantly below the margin if food prices rise.

In conclusion, we wish to emphasize the paramount importance of "getting prices right" in sending the right signals to the decision-makers -- consumers and producers -- to ensure long term growth. The overwhelming lesson of development experience over the past few decades is that the efficiency with which resources are allocated determines how dynamic and rapid the growth path will be. This notion is contrary to early expectations of many economists and planners, who noted that static economic losses due to allocative inefficiencies tend to be very small, typically less than 2 percent of national income even for severe distortions, and hence could easily be dominated by more rapid growth.

Just the opposite has happened.

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