Static and Dynamic Demand Models
The Pragmatic Versus the Theoretical Approach

by

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INTRODUCTION

The analysis of static and dynamic demand models has been the focus of research in consumer behaviour for two reasons: the strong theoretical basis for the various consumption hypotheses has generated interest in empirical test of the underlying propositions; (2) this type of analysis has proved to be useful for the refinement of structural relations used in economic models. This has important implications for microeconomic policy analysis.

Microeconomic policy in the Caribbean has not been the focus of economic analysis, more emphasis has been placed on macroeconomic policy. As a result not many studies have used the formal approach - analysis heavily couched in theory - as a means to gaining a better understanding of the structure of consumer preferences. Instead, they have relied on the pragmatic approach. A case in point is the use of double logarithmic functions - for their ease in calculating elasticities - as demand specifications. These double logarithmic demand funtions are inconsistent with standard utility assumptions. Only in special cases, where the indifference curves are implausible in form, does the system of double logarithmic functions satisfy the integrability condition and thus cannot generally be deduced from maximization of a utility function (Green, Hassan and Johnson 1984).

SECTION I

THE DEVELOPMENT OF THE STATIC AND DYNAMIC APPROACHES

Static demand models and the associated theory are a product of two important lines of economic enquiry. Demand and utility theory. With the development of computer software with capacity for the manipulation of large data sets and complicated non linear functions, these two lines of enquiry have amalgamated. This has made it possible for analysts to explore these demand models.

Some of the better known static models are the following: the linear expenditure system or LES (Stone 1954); the indirect addilog demand system (Houthakker 1960); Powell's system of additive preferences (Powell 1966).

These static demand models have different separability[1/] assumptions. In particular the linear expenditure system is an additive model. Additivity, groupwise independence and strong separability mean the same thing in the context of the LES. These assumptions impose restrictions on the parameters of the demand equation:

[1/] The concept of separability was introduced independently by Leontief (1974) and Sono (1960). See also Phlips (1983).

This study seeks to explore the formal as opposed to the pragmatic framework as a framework for analysing the demand for imports in the Barbadian economy over the period 1957 to 1978. It draws on previous work done in this field by Wallace Joefield-Napier (1982). This explanation is performed with a transcendental logarithmic utility function. It must be emphasized that no attempt is made to posit the formal approach as an ideal way of organising experiments in demand analysis. Instead it provides one way of investigating demand phenomena, a way which has some advantages over alternatives and some disadvantages. One of the advantages was mentioned previously. Another advantage is the elegance with which expenditure elasticities and price elasticities can be provided without recourse to questionable assumptions. A disadvantage is the increasing complexity of demand specifications as one attempts to manipulate the static approach into a dynamic one and the difficulty of utilising non-traditional arguments in the various utility functions.

The paper begins with an appraisal of static and dynamic demand theory. An application of the static theory is then made to the case of imports in the Barbadian economy. The paper ends with an appraisal of the implications of the study for consumer import demand in the Barbadian economy and a criticism of the transcendental logarithmic utility function.

The restrictive assumptions of some of the static demand models however, make them undesirable in terms of what a functional form should have to offer (C. Clopper Almon) 1985)).

Criticism of the static approach has led to the formulation of dynamic demand models and systems which take savings into account (Powell 1974) where demand systems are specified.

Dynamic Demand

The treatment of dynamic demand is considerably less extensive than that for static systems. Notwithstanding, there is a long history of attempts to model consumer behaviour with dynamic demand models (Mcfall Lamm Jr. 1982). Early studies used distributed lag models in their approach; Houthakker and Taylor (1970) advanced a partial adjustment model permitting consumer stocks to influence the demand for durables and non-durables; while Phlips (1972 and 1983) applied a dynamic demand version of the LES to broad classes of goods. Pollak and Wales (1969) and Pollak (1970) have also made some contribution at the level of incorporating habit formation. More recently, variational principles have been combined with ideas of impatience and time discounting and intertemporal consumption decisions, Phlips (1983)

In summary, static demand models have been found lacking. However, one cannot underscore their usefulness in testing the theory of demand for consistency with the data. The models have shown that the postulates of the theory of demand, except for the homogeneity postulate, are consistent (Brown and Deaton (1972). Moreover, they have demonstrated that further restrictions on the structure of demand are contradicted by the evidence. This is an important result because in many practical situations there are so few effective degrees of freedom that only models embodying very strong restrictions may be estimated at all. Want independence (strong separability) is a favourite way of generating these restrictions and many widely applied models incorporate this hypothesis.

Brown and Deaton (1972) analysed a wide spectrum of models. Some of their findings are mentioned in the previous paragraph. However, before accepting these conclusions, it is still necessary to apply them to Caribbean data and compare findings whereever possible. In essence then, the paper uses Praxeology (Robert Batemarco, 1985).

SECTION 2

IMPORT DEMAND 1957 TO 1978: THE CASE OF BARBADOS

This paper focuses on import demand over the period 1957 to 1978. One of the significant features of the Barbadian economy over the period 1954-1970 has been its reliance on imports, not only as a source of food and raw material inputs to industry but also as a major source of government revenue (Napier 1982).

Napier used the pragmatic approach in his analysis. It was argued that the mathematical form of the demand function could not be specified in an apriori manner. The choice of an appropriate functional form had to be based on consideration as well as intuition.

This analysis was confined to relative price and real income variables. Dummy variables were included because the Barbadian economy had a high sensitivity to political and economic shocks, both externally propagated, and internally generated.

Equations of the following form typified the work being discussed:

$$M_{it} = a_1 + y_t + a_3 \frac{Pm}{p_h}$$

M_{it} = the quantity of the ith commodity imported in year t

Y_t = a measure of real gross national income or some other activity variable in year t.

Pm = price index of the imported commodity

P_h = Some general price index of Barbados.

a_i = i^{th} demand parameter

The trends in imports were analysed by Napier. It was observed that over 25% of total imports over 1954-1970 was food. The bulk of food imports consisted of dairy products, cereals, meat and fish.

Napier's study had several short comings: (1) Dynamic models were not applied to the data; (2) many non economic institutional factors were left out; (3) restrictions imposed by the theory of demand were not utilised. The double logarithmic form - as previously pointed out - does not satisfy the integrability criterion; (4) it is questionable how much information the estimated cross-price elasticities convey for substitution possibilities. The latter is perhaps, the most troublesome. Presumably policy makers would want to know at a higher level of disaggregation the cross price elasticities. This would aid in planning at the micro level.

In order to show how these cross price effects can be isolated within the context of demand theory an explicit static utility function expressing consumer preferences is chosen. Three are examined in the next section. The translog is chosen because of its desirable properties.

SECTION 3

THREE STATIC UTILITY FUNCTIONS

The linear expenditure system has the following form:

$$\bar{p}\, q = \bar{p}\, g + (y - p' g)\, m$$

$m = [m_i]$ is the n-component vector of marginal budget shares and $g = [g_i]$ is the n-component vector of quantities interpreted as minimum consumption levels. This interpretation holds only when g is assumed positive. The parameter vectors m and g are estimated subject to the restriction $0 < m_i < 1$ for any i. $\bar{P}$ is the n x n diagonal matrix with non zero diagonal elements given by the vectors P_i. q is the n x 1 vector of quantities and y is total expenditure on the n-commodities. The other restrictions on m and g are:

$$i' m = 1 \text{ and } (q - g) > 0$$

The individual expenditure equations in the system are represented as:

$$P_i\, q_i = P_i\, g_i + m_i \quad (Y - \Sigma P_j\, q_j)$$

$(i = 1, .. n)$

These models can perhaps claim precedence among demand models (Deaton and Brown (1972)).

Several studies have been performed of the linear expenditure system. With a few exceptions, mainly when supernumerary income has become negative, investigators seem to have been satisfied that these models explain expenditures reasonably well: though occasionally negative estimates of the m's occur the vast majority are positive as are those of g's; multiple R^2 statistics of fit have been satisfactorily high, rarely dropping below 0.95 when estimated in the basic version.

The indirect addilog system proposed by Houthakker (1960) is based on the concepts of duality and on indirect utility function.(2) The particular functional form suggested by Houthakker is:

$$S\,(Y,P) = \sum_{i=1}^{n} \frac{a_i}{b_i} \left({}^{y}/_{p_i} \right)^{b_i} \qquad (b_i > -1)$$

Y is real income and P_i is the price of good i.

Applying Roy's identity (3) to the above indirect utility function, one obtains the demand functions:

$$\text{Log } q_i - \log q_j = \log \frac{a_i}{a_j} + (b_i + 1) \log \left(\frac{y}{p_i} \right) - (b_j + 1) \log \left({}^{y}/_{p_j} \right)$$

(2) See C. Green, Johnson and Hassan

(3) Ibid

For this model, inferiority as well as complimentarity is possible. However, the system is no less restrictive than the LES.

The results of Parks (1969) and others suggest that the LES performs much better. However, cross elasticities of these models are quite different given the different assumptions of direct and indirect additivity.

Deaton and Browne (1972) could find no evidence of any clear advantage of the indirect addilog over the LEA.

Even though the LES functions well in practice the assumption of additivity is still too strong to use in an exploratory study of the demand for imports. It would be better to employ a utility function which does not have such strong restrictions on preferences.

Transcendental logarithmic utility functions have this desired quality - flexibility. These represent one of several flexible forms proposed in the literature. These flexible forms represent consumer preferences without placing any prior restrictions on the full set of price and income elasticities (Christensen, Jorgensen and Caves, 1980).

Some of the other flexible forms include the generalised leontief (GL) the translog (TL), the generalized Cobb Douglas (GCD), the generalized square root quadratic (GSRQ), and the generalized Box - Cox (GBC)

Berndt, Darrough and Diewert (1977) found that the TL performed better than the GL of GCD. Accordingly, this paper employs the TL.

Christensen et al (1975) have analysed the TL. One objective was the development of tests of the theory of demand that did not assume additivity or homotheticity.(4) They represented the utility function by functions that were quadratic in the logarithms of the quantity consumed. The resulting utility functions provide a local second order approximation to any utility function. A second objective was to exploit the duality between prices and quantities in the theory of demand. A complete model of consumer demand implies the existence of an indirect function defined on total expenditure and prices of all commodities.

The indirect utility function is useful in characterizing systems of direct demand functions giving quantities as functions of the ratios of prices to total expenaiture. The direct utility function is useful in characterizing systems of indirect demand functions giving the ratios of prices to total expenditure as functions of the quantities consumed.

Following Christensen, Jorgensen and Lau, the direct utility function is represented as:

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(4) Lau (1970)

$$\text{Ln } U = \text{Ln } U(x_i, x_2, x_3, \ldots\ldots\ldots, x_m)$$

where x_i = Quantity of the i^{th} good.

Using this form for the utility function, the negative of the logarithm of the direct utility function can be represented by a function quadratic in the logarithms of the quantities consumed.

$$- \text{Ln } U = a_o + \sum a_i \text{Ln} x_i + \tfrac{1}{2} \sum \sum B_{ij} \text{ Ln} x_i \text{ Ln} x_j$$

B_{ij} and a_i are parameters.

Let $a_m = \sum a_k$ and $B_{mi} = \sum_k B_{ki}$

so that using Roy's identity - the budget share equations are:

$$P_j x_{i/M} = (a_j + \sum B_{ji} \text{Ln} x_i)/(a_m + \sum B_{mi} \text{ Ln} x_i)$$

$$(j = 1, 2, \ldots\ldots\ldots m)$$

N.B. the budget constraint must be satisfied.

$$\sum P_i X_i = M$$

where P_i is the price of the i^{th} commodity.

Since the equations for the budget shares are homogeneous of degree zero in the parameters a normalization of the paramaters is required for estimation. A convenient normalization for the parameters of the translog is:

$$a_m = \sum a_i = -1$$

The indirect translog utility function can be represented in the form

$$\text{Ln} V = \text{Ln} V (P_{i/M} \quad P_{2/M} \quad \ldots\ldots\ldots \quad P_{m/M})$$

The budget share for the i^{th} commodity using the René Roy identity (Berndt, Darrough and Diewert (1977) is given as:

$$w_j = P_j x_j/M = \frac{-d\text{Ln}V}{d\text{Ln}p_j} \Big/ \frac{d\text{Ln}V}{d\text{Ln}M}$$

$$(j = 1 \ldots\ldots\ldots m)$$

N.B. $\frac{dy}{dx}$ = the partial derivative of Y with respect to x.

Preserving symmetry with the direct utility function, Christensen et al (1975) approximated the logarithms as the ratios of prices to the value of total expenditure:

$$\text{Ln } V = a_o + \sum a_i \text{ Ln } P_i/M + \tfrac{1}{2} \sum \sum B_{ij} \text{ Ln} P_{i/M} \text{ Ln} P_{j/M}$$

$$w_j = P_j X_{j/M} = (a_j + B_{ji} \text{ Ln} P_{i/M}) \quad (a_m + B_{mj} \text{ Ln} P_{j/M})$$

as before:

$$a_m = \sum a_k = -1$$

Only m-1 equations are required for a complete econometric model of demand (Berndt and Savin 1975).

If the equations are generated by utility maximization, the parameters B_{mj} appearing in each equation are equal. CJL referred to these as the "equality restriction."

The logarithm of the direct translog utility function is twice differentiable in the logarithms of the quantities consumed so that the Hessian of this function is symmetric. This imposes another set of ½(m-2) (m-1) restrictions called the "symmetry restrictions" by CJL.

There are of the forms

$$B_{ij} = B_{ji} \quad (i \neq j \; i,j = 2,\ldots\ldots\ldots m)$$

Additivity restrictions are of the form - given the equality and symmetry restrictions - as follows:

$$B_{ij} = t \; a_i \, a_j$$

$$(i \neq j \quad l_j = 1,2,\ldots\ldots\ldots m)$$

where t is a parameter.

The translog approximation to an additive utility function is not necessarily additive. The direct translog utility function is additive if and only if Ln V can be written as the sum of m functions each depending on only one of the quantities demanded. Explicit additivity of the translog utility function implies the additivity restrictions given above, and the additional restriction:

$$t = 0$$

SECTION 4

APPLICATION TO IMPORT DEMAND

Previous study by Napier guided the choice of import category - food - to be studied. Food has also been the object of study by Manser and Christensen (1977). In particular, they analysed consumer preferences for beef, fish, poultry and pork. They found that (beef) and (fish, poultry and pork) can be considered as additively separable sub-groups of meat. The translog utility function has been applied to as few as too demand categories (Terrence J. Wales (1977)) of variables.

The categories of food studied here are: (1) meat and fish; (2) Dairy Products and vegetables (3) Potatoes and meat; (4) Aggregated meat and aggregated dairy products.

The following formulas for the elasticities were utilised.

$$N_{im} = \frac{1 + -\sum B_{ji/w_i} + \sum_i \sum_j B_{ji}}{1 + \sum_i \sum_j B_{ij} \quad LnP_j*}$$

where N_{im} is the expenditure elasticity.

The ownprice elasticity was.

$$N_{ii} = -1 + \frac{dLnw_i}{dLnP_j} = -1 + \frac{B_{ii/w_i} - \sum_j B_{ji}}{1 + \sum_i \sum_j B_{ij} \, LnP_j*}$$

and the cross-price elasticities are

$$N_{ij} = \frac{dLnw_i}{dLnPj} = \frac{B_{ij/w_i} - \sum_i B_{ij}}{1 + \sum_i \sum_j B_{ij} \quad LnP_j*}$$

N.B. $P_j* = P_{j/M}$

N.B. Green et al's version of these formulas were originally used. Further analysis revealed that their calculated elasticity formula was incorrectly printed. The printed formula in their book is

$$\frac{N_{ii} = -1 + B_{ii/w_i} - \sum_i B_{ji}}{1 + \sum_i \sum_j B_{ij} \ lnP_j*}$$

The correct fomula is that used by Mansen and Christensen.

Estimation

The estimation of the equations was performed by nonlinear least squares. With a two commodity system we only need to estimate one equation.

The practice has been to use maximum likelihood estimators (Powell 1974). Since nonlinear least squares estimates of a single equation are consistent and asymptotically normally dis tributed, this estimator was used. Provided the error has zero mean and is independently identically distributed with variances s^2, it can be shown that even if the error distribution is non-normal then on linear least square estimation B_{LS} of B* is consistent and asymptotically normal.

TABLE ONE

STATISTICAL OUTPUT FROM THE ESTIMATION

OF THE INDIRECT TRANSLOG SYSTEM

	Meat and Potatoes		Meat and Fish		Dairy Products vs Meat		Dairy Products vs Vegetables	
Coefficients	T-STATS	VALUE	T-STATS	VALUE	T-STATS	VALUE	T-STATS	VALUE
a_1	6.7753	.3919E9	.0968	.2045E8	1.8069	.1425E10	.1388	2538265
B_{11}	6.2703	.2499E9	.0972	550997	-2.3761	-7674E9	.1428	7707354
$\bar{B}_{12}$	2.9158	.3847E8	.0965	3736601	5.6442	.198E10	.1401	170559.2
B_{22}	-6.9286	-.8986E8	-.0977	-7946611	-3.6546	-.1308E10	.1425	-729031.3
R - Squared		.9270		.8006		.33803		.3375
R - Squared		.9149		.7674		.1603		.2271
Sum of squared residuals								
Standard error		.0278		.0692		.1371		.0239

TABLE TWO

STATISTICAL OUTPUT FROM THE ESTIMATION

OF THE INDIRECT TRANSLOG SYSTEM

	Meat and Potatoes		Meat and Fish		Dairy Products vs Meat		Dairy Products vs Vegetables	
Coefficients	T-STATS	VALUE	T-STATS	VALUE	T-STATS	VALUE	T-STATS	VALUE
2_1	-.4282	-.9197E8	1.3680	.8902E8	-1.3675	-1.0047	1.6300	2185132
B_{11}	.4709	.5597E8	2.0700	.9057E8	.8490	.7982	2.0700	2595500
B_{12}	.4365	3780187	.4249	61919.4	1.2214	.4954	1.8800	91161.25
B_{22}	.3862	.1407E8	2.2035	.77522E8	1.0571	.3648	2.0020	4689E8
R - Squared		.6671		.9680		.9328		.9130
R - Squared		.6117		.9630		.9216		.8985
Sum of squared residuals		.0636		.0136		.0316		.0014
Standard Error		.501		.0274		.0042		.0087

TABLE THREE

ELASTICITIES CALCULATED FOR THE INDIRECT TRANSLOG (1978)

	Meat and Potatoes	Meat and Fish	Dairy Products vs Meat	Dairy Products vs Vegetables
Expenditure	1.1257	1.254	.9669	1.5216
Own	- 1.0210	- .8143	-0.7188	-1.4552
Cross	- .1046	- .4130	- .3273	- .7552

These elasticities were calculated on the basis of 1978 information

(we assume that elasticities do not vary that significantly over time).

(N.B. Meat and fish are aggregated as meat in the column "Dairy Products vs Meat".

SECTION 5

IMPLICATION OF THE RESULTS FOR CONSUMER BEHAVIOUR

The results show that imported meat (aggregated pork, mutton, beef) is a marginally elastic commodity. Own price elasticities for this item range from -1.02 to -.81. Budget shares for meat are tentatively more responsive to changes on expenditure allotments. Dairy products show the same income elastic response though marginally higher. Own price elasticity for dairy products is higher than average own price elasticity for meat. Again, cross price elasticity for meat is on average lower than that for milk.

When meat is aggregated with fish the results are:-
(1) own elasticity of the aggregated commodity is lower than that for meat; (2) expenditure elasticity is marginally lower, just bordering on being elastic; (3) cross price effects of the aggregated commodity are of the same magnitude as the average crossprice elasticity for meat.

With only a two commodity system the study was not able to implement test of the structure of consumer preferences.

Manser et al (1977) were able to test for additivity, direct and indirect. They applied the two forms of the translog to an analysis of four principal categories of meat: fish, beef, poultry and pork. They found that beef and (fish, poultry, pork) can be considered as additively separable subgroups of meat. They achieved this by imposing various subsets of the additivity restrictions previously mentioned.

Direct (indirect) additivity implies that the relative budget shares for fish, poultry and pork are independent of the price (quantity) of beef purchased (Manser et al (1977)).

Manser found that the demand for beef was expenditure elastic under all restrictions. The demand for pork was price elastic under the direct translog but inelastic under the indirect. Similarly the price elasticity of demand for beef was highly elastic under the direct, but moderately elastic under the indirect. In general the reported elasticities of this study are somewhere between these two polarities.

Fish, in Manser's study, is a substitute under the direct translog and under the indirect translog a compliment. Here, (this study) the reported elasticities show meat and fish to be complimentary.

There is not that significant a difference between elasticities calculated by Manser and those calculated by this study. This might lead some to suggest that Barbadian consumer preferences for imported meat (pork, beef, mutton) are similar to consumer preferences for meat and fish in the United States of America.[5] This line of reasoning however would need deeper research.

(5) Given that the direct translog correctly approximates import preferences in the Barbadian economy.

It must be emphasized, however, that the elasticities for the direct translog were not easily available. Therefore a full investigation was not possible. This was due mostly to the lack of a maximum likelihood computer program.

CONCLUSION

The aim of this study was a demonstration of the elegance and organisation of results, obtainable by using the formal as opposed to the pragmatic approach. This was achieved by the use of flexible functional forms. These were used to provide elasticities consistent with the theory of demand.

The paper was based primarily on work done by Napier (1982), Christensen et al (1975) and Manser et al (1977).

One spin off of the study was the degree of similarity between consumer preferences for meat products in the Barbadian economy and consumer preferences in the United States of America for the same commodity. An examination of the elasticities provided by Manser et al (1977) and this paper provide an indication of this degree. On the assumption that consumer preferences can be modelled by an indirect translog utility function in both economies, and for these commodities, there is a reasonable degree of similarity.

In demonstrating the above the parameters of the translog functions utilised had to be estimated. One measuring rod of the performance of the formal approach is the degree of explanation of budget share variation. Given the non linear framework, the standard error is perhaps a better measure than R^2. In three out of four cases the direct translog out performed the indirect translog.

The theory indicates that there is no real apriori reason why one functional form (direct) should perform better than the other (indirect).

However, there may be several reasons for this discrepancy.

Four basic problems usually plague any demand study: "Ceteris Paribus" assumptions, identification, aggregation and theoretical plausibility.

Specifically, we have assumed that the consumer preference structure does not change overtime - it is not dynamic. This assumption is arguably unreasonable. The small standard errors of the direct translog give some indication that this is not a very serious problem - at least, in the case of the direct translog.

Identification is the second problem alluded to. This relates to the occurrence of shifting demand and supply curves. Given agents on the short side of the market are not suppliers and that prices are determined externally, a constant demand curve is not an outrageous assumption. The high degree of explanation of budget shares by the direct utility function be interpreted as a stable demand curve.

Aggregation is the third problem. This concerns the applicability of demand functions derived from individual utility maximation problems to the explanation of aggregate consumption behaviours.

The literature in this area is voluminous (Phlips (1983) Theil (1977)).

Resolutions of this problem can be divided into two schools; those who believe that one should make aggregate theory consistent with individual theory; those who believe that aggregation results not so much in bias as in gain (Grundeld and Griliches (1960)). Grunfeld's position is adopted here.

Finally, theoretical plausibility of the demand function is precisely the problem addressed by this study, the pragmatic viz-a-viz the formal approach.

One basic problem not discussed above is the degree of approximation of the flexible forms to the underlying structure. That is: is the approximation a local or global one? Caves and Christensen (1980) demonstrate that the proper choice of flexible form depends upon the nature of the utility function and consumer preferences over the entire range of observed consumption bundels, price and incomes. That is, some approximations fall short of approximating the underlying structure. They are local rather than global.

If the approximation is local or other, flexible forms can improve it, conclusions about the inconsistency of utility maximization (Wales 1977) or the nature of preferences are special to the selection of the functional form and are arbitrary decisions.

Guilkey and Lovell (1980) support the use of the translog by the results obtained from Monte Carlo studies. They show that the translog function approximates most underlying structures relatively well over extended ranges.

From the point of view of practice therefore, the analyst is safe in the use of translog functions but his results must be subject to the qualifications discussed above.

SOURCE: BARBADOS STATISTICAL SERVICES
ANNAUL OVERSEAS TRADE
1957 - 1978

APPENDIX

MEAVAL

ANNUAL DATA FROM 57 1 TO 78 1

PER CAPITA EXPENDITURE ON MEAT

57-	1	3.169236	4.054408	2.466876	2.632108
61-	1	3.789416	4.743636	4.806920	5.292280
65-	1	9.156923	6.807828	8.488296	13.873648
69-	1	15.169244	15.778512	19.002213	29.953272
73-	1	20.740796	30.317308	32.195784	45.718712
77-	1	45.860396	63.341016		

MIVAL

ANNUAL DATA FROM 57 1 TO 78 1

PER CAPITA EXPENDITURE ON MILK

57-	1	2.597904	7.479540	8.136052	10.370848
61-	1	9.502140	9.137464	9.359784	12.695172
65-	1	13.207960	12.081972	10.188072	11.452856
69-	1	14.024840	12.655400	16.863608	20.062532
73-	1	14.428324	28.335268	11.040108	9.309196
77-	1	7.794592	12.414432		

POTVAL

ANNUAL DATA FROM 57 1 TO 78 1

57-	1	1.656240	2.049296	2.007756	1.783808
61-	1	1.987912	2.127552	2.504312	2.519172
65-	1	2.362312	2.666588	2.933068	3.027120
69-	1	4.076444	4.642392	4.148432	5.345412
73-	1	.631476	6.119632	4.148432	5.345412
77-	1	13.546768	14.774744		

CMEAT

ANNUAL DATA FROM 57 1 TO 78 1

PER CAPITA EXPENDITURE ON MEAT 1975 CONSTANT DOLLARS

57-	1	11.284174	11.760469	6.435435	6.578637
61-	1	8.991267	12.107423	11.695174	11.407759
65-	1	18.145091	11.959819	15.375011	20.751397
69-	1	21.054700	20.400403	23.251943	32.124922
73-	1	17.746212	21.020081	32.195791	42.729055
77-	1	40.511251	48.344111		

CMILK

ANNUAL DATA FROM 57 1 TO 78 1

PER CAPITA EXPENDITURE ON MILK 1975 CONSTANT DOLLARS

57-	1	19.658893	21.131058	25.225127	26.777991
61-	1	30.157851	31.220882	37.843264	38.599546
65-	1	40.010959	34.160612	26.902650	31.519370
69-	1	41.727763	37.462818	45.406375	41.001218
73-	1	30.072930	40.975929	11.040108	10.753804
77-	1	11.27269	13.686639		

CPOT

ANNUAL DATA FROM 57 1 TO 78 1

PER CAPITA EXPENDITURE ON POTATOES 1975 CONSTANT DOLLARS

57-	1	7.170607	8.223907	7.769559	7.287488
61-	1	8.657925	8.782295	9.400648	9.613688
65-	1	7.909753	8.126818	9.786357	11.018802
69-	1	11.525456	10.632560	11.383254	10.781119
73-	1	7.626246	8.821663	10.256730	11.155557
77-	1	12.812414	16.222989		

PMEAT

ANNUAL DATA FROM 57 1 TO 78 1

PRICE INDEX FOR MEAT 1975 = 100

57-	1	.280857	.344749	.383327	.400099
61-	1	.421455	.391796	.411017	.463919
65-	1	.504650	.569225	.552084	.668565
69-	1	.720468	.773441	.817231	.932400
73-	1	1.168745	1.442302	1.000000	1.069968
77-		1.132041	1.310212		

PMILK

ANNUAL DATA FROM 57 1 TO 78 1

PRICE INDEX FOR MILK 1975 = 100

57-	1	.132149	.309955	.322538	.387290
61-	1	.315080	.292672	.247330	.328894
65-	1	.330109	.353681	.378701	.363359
69-	1	.336103	.337812	.371393	.489316
73-	1	.479778	.691510	1.000000	.865665
77-		.691458	.907047		

PAPP

ANNUAL DATA FROM 57 1 TO 78 1

57-	1	.754991	.573646	.528196	.516285
61-	1	.483384	.420133	.417691	.419854
65-	1	.419141	.439284	.489953	.621584
69-	1	.578775	.598433	.644058	.723571
73-	1	.890994	1.001317	.999999	1.210108
77-	1	1.238194	1.448338		

PPOT

ANNUAL DATA FROM 57 1 TO 78 1

PRICE INDEX FOR POTATOES 1975 = 100

57-	1	.230976	.249188	.258143	.244777
61-	1	.229606	.242255	.266398	.262040
65-	1	.298658	.328122	.299710	.274723
69-	1	.353690	.436620	.364433	.495812
73-	1	.082781	.693705	1.000001	1.08799
77-	1	1.057316	.910729		

FISVAL

ANNUAL DATA FROM 57 1 TO 78 1

PER CAPITA EXPENDITURE ON FISH

57-	1	3.352092	2.794420	3.177764	2.949096
61-	1	3.011960	3.178528	3.096376	3.586320
65-	1	3.664504	3.332660	3.173680	3.181680
69-	1	3.924200	3.723312	4.553768	5.183144
73-	1	3.117404	15.330140	9.848092	7.390200
77-	1	6.926144	6.149800		

BUTVAL

ANNUAL DATA FROM 57 1 TO 78 1

PER CAPITA EXPENDITURE ON BUTTER

57-	1	3.045844	1.430968	3.895952	3.906724
61-	1	3.855920	4.010528	4.118008	4.723184
65-	1	4.543680	4.696776	4.558284	5.016044
69-	1	5.184772	5.002680	5.387360	7.601944
73-	1	3.553944	6.925716	6.795916	7.885748
77-	1	6.270440	8.928836		

VEGVAL

ANNUAL DATA FROM 57 1 TO 78 1
PER CAPITA EXPENDITURE ON VEGETABLES

57-	1	.049684	.086696	.073168	.089740
61-	1	.164752	.194032	.248120	.396580
65-	1	.419128	.923940	.481860	.816860
69-	1	.880844	1.153232	1.063160	.981928
73-	1	.872932	.746412	1.063160	.981928
77-	1	1.170656	1.9993968		

PFISH

ANNUAL DATA FROM 57 1 TO 78 1
PRICE INDEX FOR FISH 1975 = 100

57-	1	.25937	.248382	.268727	.278291
61-	1	.266618	.280615	.291346	.318274
65-	1	.340509	.343884	.363780	.386391
69-	1	.444189	.473657	.636573	.599074
73-	1	.756596	1.181798	.999999	.732559
77-	1	1.036687	1.294073		

CFISH

ANNUAL DATA FROM 57 1 TO 78 1
PER CAPITA EXPENDITURE ON FISH 1975 CONSTANT DOLLARS

57-	1	12.9255617	11.2050478	11.825256	10.5797179
61-	1	11.296922	11.327004	10.627827	11.268039
65-	1	10.761831	9.691240	8.724164	8.2343481
69-	1	8.8344521	7.860781	7.153564	8.651930
73-	1	4.120305	12.971881	9.848106	10.101958
77-	1	6.681037	4.752285		

PVEG

ANNUAL DATA FROM 57 1 TO 78 1
PRICE INDEX OF VEGETABLES 1975 = 100

57-	1	.468443	.499977	.510244	.560354
61-	1	.681234	.571567	.474895	.500267
65-	1	.608410	.703190	.562432	.931412
69-	1	.651801	1.246027	.873598	.899779
73-	1	1.335798	1.593121	1.000000	2.333598
77-	1	3.642676	2.148965		

PBUT

ANNUAL DATA FROM 57 1 TO 78 1
PRICE INDEX OF BUTTER 1975 = 100

57-	1	.589251	.242444	.605853	.632812
61-	1	.600814	.588404	.603265	.631224
65-	1	.604483	.594920	.609021	.631024
69-	1	.534673	.578389	.642273	.805850
73-	1	.770269	.942296	.99997	.895914
77-	1	.824937	.988244		

CVEG

ANNUAL DATA FROM 57 1 TO 78 1
PER CAPITA EXPENDITURE ON VEGETABLES 1975 CONSTANT DOLLARS

57-	1	.106062	.173400	.143398	.160149
61-	1	.241843	.339474	.522474	.792736
65-	1	.688891	1.313926	.856744	.877012
69-	1	1.351400	.925527	1.216990	1.091299
73-	1	.653491	.468552	1.620584	.719879
77-	1	.321373	.927873		

CBUT

ANNUAL DATA FROM 57 1 TO 78 1
PER CAPITA EXPENDITURE ON BUTTER 1975 CONSTANT DOLLARS

57-	1	5.169013	5.902263	6.430525	6.173590
61-	1	6.417824	6.815941	6.826200	7.482581
65-	1	7.516634	7.894796	7.484567	7.949051
69-	1	9.697091	8.649330	8.387957	9.433450
73-	1	4.613900	7.349827	6.795935	8.768416
77-	1	7.601114	9.035051		

FMINDEX

ANNUAL DATA FROM 57 1 TO 78 1
PRICE INDEX FOR AGGREGATED FISH AND MEAT

57-	1	.269367	.293299	.322142	.335066
61-	1	.338788	.332436	.347125	.386159
65-	1	.4107016	.448915	.451549	.517912
69-	1	.572963	.613386	.720778	.754437
73-	1	.948699	1.303219	.999999	.889292
77-	1	1.081132	1.301595		

CFMVALAG

ANNUAL DATA FROM 57 1 TO 78 1
PER CAPITA EXPENDITURE ON (FISH AND MEAT) 1975 CONSTANT DOLLARS

57-	1	24.209790	23.351025	17.522208	16.657043
61-	1	20.075636	23.830615	22.767880	22.992072
65-	1	30.745689	22.588861	25.826616	32.930916
69-	1	33.324038	31.793699	32.681326	46.573018
73-	1	25.148346	35.026690	42.043912	59.720470
77-	1	48.825271	53.388958		

FMVALAGG

ANNUAL DATA FROM 57 1 TO 78 1
PER CAPITA EXPENDITURE ON (FISH AND MEAT)

57-	1	6.5231328	6.848828	5.644640	5.581204
61-	1	6.801376	7.922164	7.903296	8.878600
65-	1	12.821432	10.140488	11.661976	17.055328
69-	1	19.093444	19.501824	23.555984	35.136416
73-	1	23.858200	45.647448	42.043876	53.108912
77-	1	52.786540	69.490816		

MBINDEX

ANNUAL DATA FROM 57 1 TO 78 1
PRICE INDEX FOR DAIRY PRODUCTS 1975 = 100

57-	1	.227315	.295900	.381522	.438406
61-	1	.374568	.354241	.321434	.391838
65-	1	.387232	.403906	.426653	.419086
69-	1	.377444	.387899	.427789	.555216
73-	1	.540256	.743722	1.000000	.871963
77-	1				

MBAGG

ANNUAL DATA FROM 57 1 TO 78 1

PER CAPITA EXPENDITURE ON DAIRY PRODU...

57-	1	5.643748	8.910508	12.032004	14.277572
61-	1	13.358060	13.147992	13.47792	17.418356
65-	1	17.751640	16.778748	14.746356	16.468900
69-	1	19.209612	17.658080	22.250968	27.664476
73-	1	17.9892268	35.260984	17.836024	17.164944
-	1	14.065032	21.343268		

CMBAGG

ANNUAL DATA FROM 57 1 TO 78 1

~~PER CAPITAL EXPENDITURE ON DIRY PRODUCTS 1975 = 100~~

57-	1	24.827904	30.113272	31.536842	32.566984
61-	1	35.662551	37.115919	41.930239	44.453003
65-	1	45.842417	41.541225	34.562850	39.297226
69-	1	50.893888	45.522363	52.013629	49.826499
73-	1	33.284693	47.411481	17.836027	19.685396
77-	1	19.555206	23.09963		

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