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## **Consumer Demand in South Africa**

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## **1. INTRODUCTION**

### **1.1 Context**

A major argument for trade liberalisation has been that openness increases efficiency, ensures greater market access to goods and employment, and these factors in due course raise growth rates and reduce poverty. However, it is also recognized that distribution of trade benefits among trading partners may be skewed, and that transmission of such benefits as may devolve within the national economies, may be uneven between different income groups. The lines of transmission may be clogged far too often, for far too long. There is a fair amount of evidence now that indiscriminate liberalization without adequate national policies and proper safeguards, can spell disaster for poor communities in developing countries across the world.<sup>1</sup>

The lines of transmission of impact of international trade on the levels and structure of poverty can run through several channels. Of the two major ones, one runs through the labour market and the other, through commodity prices. In the context of South and Southern Africa, some work has been done in the former but hardly any systematic study is available on transmission of trade impact through changes in commodity prices.<sup>2</sup> Yet the labour market related effects could very well be less pronounced than is often presumed. For one thing, the recorded unemployment rates in the country are very high. Unless the export sector expands at such rates and in such a manner that there is significant absorption of the surplus workforce in the sector, one could expect little effect of such growth on levels of poverty, since there is a fairly high correlation among poverty and unemployment in the country (Bhorat). Considering also that the sectors which currently have high export potential are also relatively skill intensive, and that the poor are generally concentrated in the unskilled segments of the labour market, the perceived benefits from expansion in the export sector in terms of poverty reduction may be less pronounced than presumed.

On the other hand, lines of transmission of trade impact through trade-induced changes in commodity prices might be fairly substantial. Such effects are likely to be strong especially if prices of standard items of consumption by the poor, such as prices of cereals are significantly affected by international trade.

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<sup>1</sup> For arguments against uncritical acceptance of neo-classical doctrines in this regard, see Winters and McCulloch and Swapna Mukhopadhyay. For a cogent set of arguments that is essentially pro-liberalization yet critical of unthinking 'market fundamentalism' and irresponsible modes of functioning of international organizations such as the IMF, see Joseph Stiglitz's book on *Globalization and Its Discontents*, Norton 2002. For a telling documentation on how poor communities in the developing world have suffered the consequences of indiscriminate liberalization, see Oxfam International's "Making Trade Fair Campaign" launched in April 2002, and the documents therein.

<sup>2</sup> An exception to this is an unpublished paper by Anne. Case 'Income Distribution and Expenditure Patterns in South Africa' November 1998.

## **1.2 Distributional consequences of changes in price levels and price structure**

Distributional consequences of changes in commodity prices will depend crucially on the nature of insertion of the poor in the commodity markets. To the extent the trading status of the poor is different from that of the non-poor in different markets, trade induced changes in commodity prices are likely to have an impact both on poverty levels and on income distribution.

There is a great deal of heterogeneity in the trading status of the poor in the food market of the developing world. Although in many countries of Africa the poor are net producers of food, available statistics in South Africa seem to suggest that in this country they are net buyers of food.<sup>3</sup> Like everywhere else in the world, food constitutes by far the most important item of consumption for the poor. The poor spend the largest chunk of their income on food.<sup>4</sup> Trade induced fluctuations in domestic availability and prices of important items of consumption such as food is likely to be a direct channel through which trade could be impacting poverty in the region

It is not difficult to see how trade could affect food prices. A major item of consumption for the poor in South Africa is maize or mealie meal, a commodity which is freely exported from the country. Prices of mealie meal can be seen to have risen sharply in recent years. Between 1990 and 2000, the index of food prices on the whole have gone up in South Africa from 36.2 to 100 at 2000 price levels, recording one of the sharpest increases among the price indices of all commodity groups.<sup>5</sup> How much of it is due to trade induced factors and how much can be ascribed to other reasons is something that needs to be looked into. A rise in the price of any item of consumption, other things remaining the same, signifies a fall in real incomes. To the extent it is an important item of consumption, i.e., it constitutes a significant fraction of total consumption expenditure, the impact of the fall will be more pronounced. The differential values of the income and price elasticities of demand for different income groups will be instrumental in determining what the impact of the price change will be at the margin for different income groups.

One reason why it is important to look at the impact of commodity prices on demand especially food demand, is because the South African poor is heavily dependent on

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<sup>3</sup> The extent of home production as apparent from the official statistical information released by the Government of RSA suggests that it is virtually non-existent, although a number of micro studies have suggested that much of the sustenance of the poor, especially in rural areas, comes from home production of commodities such as mealie meal. While the special kind of history of the land during Apartheid era which saw the native population being huddled into infertile and overpopulated Homelands explains why in both the wherewithal and the skills needed for farming in the local population had been depleted beyond redemption, there is reason to believe that this is an area which needs proper documentation and much more research than it has attracted so far, especially for recording the productive activities carried out by the women in rural areas who stayed back in the Homelands while their men slogged away at the mines in cities like Johannesburg.

<sup>4</sup> See Appendix Table 1 for the statistics on South Africa.

<sup>5</sup> The consumer price index (CPI) Base 2000. Statistical release during PO141.4 dated 20<sup>th</sup> March 2001, Statistics South Africa

purchased food. They are net consumers rather than net producers of food. As a result food security for the poor is directly dependent on the vagaries of the export market. Only last year the unprecedented fall in the value of Rand would have provided a price incentive to sell commodities in the export market. To what extent this had contributed to reduction in domestic availability of food grains and famine like conditions in some of the provinces of South Africa is something which needs to be investigated.

This paper seeks to provide some preliminary analysis of the structure of consumption demand by the poor as opposed to the non-poor in South Africa using the 1995 Income Expenditure Survey data. Much of the effort in trying to do this exercise however was spent on making sense of the information on prices that is available to us, and in trying to splice together information available from various different sources that could be used to put in place some preliminary investigations along these lines. While some results of estimation of demand systems has been attempted in the paper, the more important part of the effort could be seen as an attempt to analyse of the data gaps which exist in the statistical system of the country making such estimation exercises rather difficult. The following sections look into the data used for the analysis, and reports some results of demand estimation using the household survey data from the South African Income Expenditure Survey of 1995 supplemented by information from other sources.

## **2. DATA**

### **2.1 Income Expenditure Survey 1995**

The Income Expenditure Survey of 1995 (IES95) was the first of its kind carried out in South Africa by Statistics South Africa. The idea was to canvas the same households as were covered by the October Household Survey of 1995. However, a few hundred households that belong to the one do not belong to the other. It is possible that some household units in OHS 95 could not be traced during canvassing the IES 95 questionnaire and were therefore replaced to the extent possible by new units. It is likely that this indeed is what had happened because the distributions of the non-congruous units in the two surveys are very similar across the provinces. There are in fact a total of 29596 households that belong to both. This is the sample that we have used in this paper.

For the purpose of this exercise we have spliced the two data sets together. The most compelling reason for doing so is that the data set on IES95 does not have any information on some essential variables such as the size and composition of households. The main findings of IES-1995 can be obtained from SSA monograph titled : "Earnings and Spending in South Africa – Selected Findings"<sup>6</sup> and are not being repeated here.

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<sup>6</sup> Dr. F.M. Orkin, Head Central Statistics 1997.

The IES95 was conducted with the primary purpose of re-weighting the Consumer Price Index in the country to derive a new CPI with a new base. The basic purpose of the survey was quite different from the use to which we have used it here, i.e., for estimation of consumer demand. There are a number of problems of using the IES95 data set for this purpose, and one has had to deal with these in one way or another for the purpose of doing this exercise.

One of them is that the reported differences between income and expenditure in the survey in a large number of cases is very high, especially at the top ranges of the income scale. Some differences between these can be expected in all such surveys. But the magnitudes of some of these in the IES95 are truly very high.

One reason this may have happened is that collection of income data from single point interviewee response can be suspect for a number of reasons. The problems could be compounded if there are no in-built mechanisms for consistency checking.<sup>7</sup>

There are well known problems of collecting income data in developing countries with significant non-monetised sector. There is reason to believe that in the area of recording home production and non-monetised sector activities, especially in rural areas, the South African data sets may be deficient.

Treatment of durables and used goods in the survey are also problematical. Expenditure on "Furniture equipment and vehicles" for instance are included in the annual total expenditure, if payments on these were made anytime during the past 12 months independent of their expected life spans. Similar problems emerge with the treatment of savings and dis-savings during the year.

There are some problem with income calculations as well. Income is supposed to include all kinds of subsidies, kind payments and fringe benefits. While in principle this is fine, one must remember that subsidies are commodity/service specific. A subsidised bus ticket for instance can only be used for the bus ride. One cannot use this subsidy for anything else. Subsidies for the purpose of estimating demand would therefore have problems.

Recording of expenditure on education like in other item of expenditure can also have problems. There are conceptual problems in measuring the links between income and human capital outcomes, not least because the links generally operate both ways.

## **2.2 Available information on 1995 prices**

One of the major problems of using the IES95 data for demand estimation has been that while the survey collected information on total expenditure on various commodities, it has no information on the quantities consumed. As a result, unlike many Income Expenditure Surveys done elsewhere, there is no information in the IES95 on unit prices of commodities.<sup>8</sup>

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<sup>7</sup> Angus. Deaton 1997.

<sup>8</sup> This is standard practice in many countries. The National Sample Survey Organization in India has been doing so over the last five decades or so. In South Africa, SALDRU 1993 has information on

SSA does provide CPI for five different income groups. However these indices are derived by using the budget shares of different expenditure groups on the various commodities. Thus budget share calculations provide the basis for getting differences in prices indices relevant for different expenditure groups rather than the other way round. For the purpose of demand estimations, one needs to start with the price indices in order to see the implications of changes in them for poverty calculations.

Also the major thrust of the IES for Statistics South Africa has been to get time series information on prices, primarily to get a handle on inflation rates. For the purpose of demand system estimation, one needs variations across observations in a cross section. However the only available information one has is for the year 1995.<sup>9</sup>

Finally, while SSA does collect information on commodity prices (outside the ambit of the IES), does not collect any price information from rural areas at all. This is a very strong disadvantage of using this information for poverty analysis, considering that much of South African poverty is concentrated in rural areas. Even for urban areas, small towns which are being covered only recently, information on variations in prices across locations are collected but not available for use by researchers. Prior to 1995, income expenditure surveys that were carried out, such as the one carried out in 1991, were not country wide surveys. The 1991 IES was conducted only in 12 urban areas of South Africa. Smaller towns and rural areas were totally excluded. While the 1995 IES covered the entire country including the rural areas for the purpose of the household survey, no price data was collected from rural areas. In fact in 1995 for the first time retail outlets in some of the smaller towns were included. Prices are generally collected monthly for some items (such as food) via postal surveys from retail outlets such as supermarkets, quarterly (for items such as furniture), and annually (for items such as medical aids and hospitalisation). These are aggregated over locations and then over items within a commodity group for the construction of CPI. As mentioned earlier on, the expenditure information from the household survey is utilised in order to get the weights to be attached to different commodity groups for construction of CPI which is relevant for different income groups.

### **2.3 SALDRU – 1993**

The World Bank/SALDRU 1993 income expenditure survey seems to be the only data set which collected cluster specific prices across the country in both rural and urban areas. However, the range of commodities on which this survey was conducted was very different from that covered under IES1995. In some commodity groups such as food, the level of dis-aggregation was wider whereas on a large number of other, especially non food items of consumption, SALDRU has collected no information.

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cluster specific prices. The cost of collection of this additional information could only be marginal, but the potential cost of not collecting it is high because without this information, this body of data cannot be meaningfully utilized for demand estimations.

<sup>9</sup> The results of the IES 2000 should be released soon. Once that is done, one could do a two-point comparison of parameter estimates.

If one makes the assumption that the relative variation in prices of commodities across locations as reflected in the SALDRU data had remained constant between 1993 and 1995, then one could apply these variation on the 1995 prices collected by SSA to get the dispersion in prices one needs to carry out a cross-sectional demand estimation exercise. Under this assumption, price variations over nine provinces and rural and urban areas in each may be calculated separately for different commodities and applied on prices obtained under IES 1995. Thus absolute levels of prices 1995 can be obtained from Statistics South African sources and the SALDRU variations can be applied on these to obtain price dispersion in 18 locations for each commodity group.

### **3. ESTIMATION**

There are two broad varieties of complete demand systems that have been tried out in the literature. The first of these seek to derive the system from some form of utility maximization exercise. These could be additive in form, thereby simplifying estimation problems, or they could be non-additive, requiring more complicated estimation procedures. The much used Linear Expenditure System (Stone 1954), Houthakker's Addilog Demand Systems (Houthakker 1960), the Dynamic LES (Phlips 1973), Extender LES (Lluch 1975) and Hierarchic LES (Deaton 1975) are examples of additive demand systems that can be traced to maximization of specific utility functions. However the additive demand systems, though far easier to estimate, have some rather restrictive properties. The Linear Expenditure System for instance, which is the basic model in this category of demand systems, is not capable of handling inferior goods : a limitation which may be very restrictive under certain conditions.

The non-additive Demand systems in this category can take care of some of this problems. The most widely used of these is the Almost Ideal Demand System (AIDS) of Houthakker and Deaton (1980) which takes care of some of the restrictive properties of additive models at the cost of some complications in the estimation procedure while retaining its links with theory. The other commonly used functional form in this category is Christenson's Translog Demand System.

The second variety of demand models is not geared to any implicit theory of demand but goes by pure statistical goodness of fit requisites. The Rotterdam models (Barten 1968), the CES models (Byron 1968) and the Quadratic Expenditure System (Pollack and Wales 1978) fall in this category.

The results of the estimation exercises that are reported here are at best preliminary, in the sense not all that was planned could be carried out, partly for data problems that could not be tackled satisfactorily and partly because the work is still not finished.

In the absence of reliable price data, one of the exercises that could be carried out relatively easily is estimation of income elasticities in the population. This has been done for different categories of commodities, different income groups and different racial groups. The results are reported in the first four tables of the Appendix.



Some regularities emerge from the data which are worth noting. These are :

Interesting as these are, they do not contain any price effect. So an effort was made to use the 1993 SALDRU prices on items of food consumption --- items for which SALDRU does have price data, apply the SSA commodity groups specific inflation rates on them and derive price indices for four categories of food items. A Linear Expenditure System was fitted out on this data set. Appendix Table 5 contains the results of regression exercise and the estimated price and income elasticities.

A larger exercise encompassing the whole IES data set with price variations imported from the SALDRU data is in progress. What is being done here is to use locational variations in price indices (nine provinces, separately for rural and urban areas), apply these on 1995 SSA price data, use the 1995 IES household level information on expenditures and incomes for constructing the rest of the data set and test various complete demand system models for estimating the most acceptable values for the elasticities.

#### **4. CONCLUDING OBSERVATION**

It must be remembered that although the starting point in the exercise has been an inquiry into the links between trade-induced changes in consumer prices and poverty, international trade has not been involved in the story as yet in any manner. The effort has simply been to explore what kind of differential changes in consumption demands can be expected if real incomes and price structures change. To understand under what conditions trade can induce changes in the level and structure of prices, one needs to go into detailed sectoral and sub-sectoral studies, including value chain analysis, which has not been attempted at all in this paper, but which needs to be done to complete the loop. Desk-based econometric research needs to be supplemented with micro level studies, which look into the ground level constraints imposed in the efficient functioning of markets. These could be anything, ranging from informational or physical infra-structural bottlenecks to poor governance, or transactions costs of any other kind. But without a hands-on knowledge and appreciation of such bottlenecks, policies aimed at facilitating the transmission of trade benefits to the poor are not likely to be successful.

**APPENDIX TABLES**

**Table 1: Proportion of total expenditure on 10 commodity groups for five income groups**

COMMODITY GROUPS	I	II	III	IV	V	VI	VII	VIII	IX	X
<b>Income groups</b>										
1. Poorest 0-20%	54.70	6.92	18.95	6.42	2.17	0.59	3.37	0.97	0.40	5.51
2. Poor 20% - 40%	46.06	6.56	14.47	7.56	3.66	1.13	5.44	1.19	0.55	13.37
3. Middle income 40% - 60%	36.14	5.99	12.97	7.52	4.85	2.05	7.69	1.58	0.84	20.38
4. Relatively rich 60% - 80%	26.66	5.17	13.71	6.35	5.22	4.08	9.70	2.15	1.05	25.90
5. Richest 80% - 100%	16.50	3.49	15.09	4.16	3.52	4.96	13.17	2.52	1.46	35.11

Note : I: Food;            II: Personal care and services;            III: Housing & Fuel;  
 IV: Clothing & Footwear;    V: Furniture & Equipment; VI: Health;  
 VII: Transport;            VIII : Education;            IX : Recreation & Entertainment;  
 X : Others

**Table 2 : Regression Coefficients and Income Elasticities for Alternative Specifications of the Engel Curve for 10 commodity Groups**

	<i>Linear</i>		$\zeta$	<b>Quadratic</b>			
	$\acute{a}$	$\hat{a}$		$\acute{a}$	$\hat{a}$	$\tilde{a}$	$\zeta$
<b>W<sub>1</sub></b>	1.605 (192.04)	-0.126 (-156.98)		2.354 (36.44)	-0.277 (-21.997)	0.0007 (12.30)	
<b>W<sub>2</sub></b>	0.168 (68.81)	-0.113 (-47.42)		0.028 (1.49)	0.017 (4.66)	-0.001 (-7.98)	
<b>W<sub>3</sub></b>	0.267 (36.64)	-0.012 (-16.08)		1.047 (17.19)	-0.169 (13.92)	0.008 (13.02)	
<b>W<sub>4</sub></b>	0.142 (39.82)	-0.008 (-22.65)		-0.427 (-15.42)	0.107 (19.42)	-0.006 (-21.16)	
<b>W<sub>5</sub></b>	-0.016 (-4.60)	0.006 (15.47)		0.635 (-25.23)	0.130 (25.36)	-0.006 (21.16)	
<b>W<sub>6</sub></b>	-0.112 (-40.65)	0.014 (46.94)		-0.329 (-17.05)	0.058 (14.75)	-0.002 (-11.16)	
<b>W<sub>7</sub></b>	-0.253 (-39.59)	0.034 (50.01)		-0.149 (-2.64)	0.013 (1.08)	0.001 (1.73)	
<b>W<sub>8</sub></b>	-0.037 (-15.75)	0.005 (22.12)		-0.078 (-4.35)	0.014 (3.73)	-0.001 (2.21)	
<b>W<sub>9</sub></b>	-0.028 (-22.16)	0.004 (28.45)		-0.022 (-2.41)	0.002 (1.35)	0.000 (0.62)	
<b>W<sub>10</sub></b>	-0.736 (-70.64)	0.095 (88.02)		-0.783 (-9.29)	0.106 (6.04)	-0.001 (-0.55)	

**Figures in the brackets are t-values**

Linear :  $W_i = \acute{a}_i + \hat{a}_i \log Y$  ;  $W_i$  = share of total expenditure on commodity i

Quadratic :  $W_i = \acute{a}_i + \hat{a}_i \log Y + \tilde{a}_i (\log Y)^2$

Commodity Groups : I: Food; II: Personal care and services;

III: Housing & Fuel; IV: Clothing & Footwear;

V: Furniture & Equipment; VI: Health; VII: Transport;

VIII: Education; IX: Recreation & Entertainment; X:

Others

**Table 3a : Income elasticities in income sub groups - Linear case**  
 $W_i = \hat{\alpha}_i + \hat{\beta}_i \log Y$

	1	2	3	4	5
$W_1$	0.88	0.70	0.57	0.57	0.56
$W_2$	0.96	0.88	0.88	0.78	0.69
$W_3$	0.70	0.74	1.09	1.14	0.78
$W_4$	1.30	1.13	1.05	1.86	0.91
$W_5$	1.90	1.73	1.75	1.25	0.83
$W_6$	1.50	1.73	1.30	8.15	0.68
$W_7$	1.85	1.78	1.45	1.34	1.33
$W_8$	1.30	1.50	1.63	1.41	1.04
$W_9$	1.75	1.80	1.63	1.36	1.20
$W_{10}$	1.84	1.64	1.25	1,10	1.30

Note : I : Food;      II : Personal care and services;      III : Housing & Fuel;  
 IV : Clothing & Footwear;      V : Furniture & Equipment;      VI :  
 Health;  
 VII : Transport;      VIII: Education;      IX : Recreation &  
 Entertainment;  
 X : Others

**Table 3b : Income elasticities in income sub groups - Quadratic case**

$$W_i = \hat{a}_i + \hat{a}_i \log Y + \tilde{a}_i (\log Y)^2$$

	1	2	3	4	5
<b>W<sub>1</sub></b>	0.85	0.72	0.58	0.59	0.45
<b>W<sub>2</sub></b>	0.94	0.99	1.00	0.79	0.51
<b>W<sub>3</sub></b>	0.78	0.72	1.13	1.12	0.85
<b>W<sub>4</sub></b>	1.22	1.13	0.97	0.97	0.41
<b>W<sub>5</sub></b>	1.84	1.54	1.89	1.23	1.55
<b>W<sub>6</sub></b>	0.99	1.91	1.36	1.77	0.77
<b>W<sub>7</sub></b>	1.89	1.68	1.47	1.44	1.33
<b>W<sub>8</sub></b>	1.59	2.05	1.14	1.73	1.49
<b>W<sub>9</sub></b>	2.74	0.92	0.56	1.82	1.62
<b>W<sub>10</sub></b>	1.86	1.62	1.25	1.09	1.25

Note : I : Food; II : Personal care and services; III : Housing & Fuel;  
 IV Clothing & Footwear ; V : Furniture & Equipment;  
 VI : Health; VII : Transport; VIII : Education;  
 IX : Recreation & Entertainment; X : Others

**Table 4a : Income elasticities for racial sub groups in the linear case**

$$W_i = \hat{a}_i + \hat{a}_i \log Y$$

Community Groups	African	Coloured	Indian	White	Total
Gp. 1	0.67	0.66	0.62	0.62	0.65
Gp. 2	0.89	0.87	0.79	0.80	-0.74
Gp. 3	0.70	0.81	0.72	0.72	0.91
Gp. 4	1.03	1.11	1.04	1.07	0.89
Gp. 5	1.38	1.21	1.01	1.21	1.13
Gp. 6	1.59	1.63	1.18	0.82	1.49
Gp. 7	1.41	1.57	1.31	1.14	1.38
Gp. 8	1.50	1.50	1.91	1.24	1.43
Gp. 9	1.43	1.18	1.08	1.20	1.34
Gp. 10	1.57	1.55	1.47	1.42	1.46

**Table 4b : Income elasticities for racial sub groups in the quadratic case**

$$W_i = \hat{a}_i + \hat{a}_i \log Y + \hat{a}_i (\log Y)^2$$

Community Groups	African	Coloured	Indian	White	Total
Gp. 1	0.67	0.67	0.59	0.66	0.62
Gp. 2	0.94	0.93	0.68	0.87	0.95
Gp. 3	0.58	0.80	0.70	0.68	0.90
Gp. 4	1.00	1.08	1.13	0.87	0.93
Gp. 5	1.51	1.46	1.41	1.62	1.32
Gp. 6	1.47	1.64	1.09	0.70	1.20
Gp. 7	1.47	1.42	1.15	1.14	1.46
Gp. 8	1.39	1.47	1.54	0.79	1.21
Gp. 9	2.71	0.48	0.72	0.53	2.03
Gp. 10	1.57	1.60	1.43	1.41	1.43