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Abstract

This paper evaluates how tariff liberalisation affected households in South Africa over the period 1995, 2000 and 2004, focussing specifically on the incidence of tariffs over the expenditure distribution. Results suggest that trade liberalisation has reduced the tariff burden for households across the expenditure distribution, implying significant welfare improvement to consumers in the form of reduced prices. However, the gains from liberalisation and the continued burden of continued protection are not uniform across household and wealth categories. Poor households continue to bear a disproportionate share of the tariff burden indicating the regressive nature of import tariffs. Wealthy households also gained relative to all but the very poor between 1995 and 2000. Between 2000 and 2004, this trend was reversed, and the poor gained relatively more than the wealthy. Our results indicate potentially large pro-poor gains to consumers from further liberalisation, but the realisation of these gains is dependent on the pass-through of tariff reductions to consumers.

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1 Introduction

Trade liberalisation has non-uniform impacts on individuals within an economy. Liberalisation gives rise to adjustments in production, product prices and government revenue. Because households differ in their links to employment, consumption and government transfers, the impact of these adjustments affects households differently. Similarly, the heterogeneity of the poor and the dynamic nature of poverty imply that it is difficult to build a systematic relationship between trade liberalisation and poverty. By creating opportunities liberalisation can pull individuals and households out of poverty. However, liberalisation also destroys markets which may force some households into poverty. These linkages are extensively discussed by McCulloch *et al*. (2004).

The impact of liberalisation on poverty is dependent on numerous factors, many of which are country, region and household specific. Empirical investigation of the trade-poverty relationship is therefore case-specific. South Africa presents a useful case study of the impact of trade liberalisation on poverty amongst middle-income economies. The economy made substantial progress in liberalising its trade regime during the 1990s (Edwards, 2005). This included a simplification of the tariff structure and substantial reductions in protection, sometimes in excess of that required by the World Trade Organisation (WTO). South Africa is also characterised by relatively high levels of unemployment, poverty and inequality.

This paper investigates the impact of trade liberalisation in South Africa on the poor via its impact on household consumption. The focus of the impact of liberalisation on poverty via its effect on the prices of goods consumed is a neglected area of study, at least relative to studies on the effect of liberalisation on income and employment. Yet in economies such as South Africa, where a high proportion of individuals are not engaged in formal employment in traded sectors, much of the benefit of liberalisation may be experienced through lower product prices. In South Africa's case the perceived bias of import protection against goods consumed by the poor, was one reason for the democratically elected government's enthusiasm for trade reform in the early 1990s (Bell, 1997).

In this paper we use data from the 2000 Income and Expenditure Survey to profile consumption patterns across various households in urban and rural areas, and identify the extent to which the existing tariff structure is biased against or towards poor households. In addition, we then evaluate the effect of changes to tariff levels in 1995, 2000 and 2004 on households across the expenditure distribution.

This approach taken is similar in principal to a standard benefit incidence analysis (BIA), as discussed by Demery (2000), Bourguignon, Pereira da Silva and Stern (2002), and Nicita, Olarreaga and Soloaga (2003). Typically, these studies evaluate the impact on the distribution of living standards and poverty of some policy intervention (e.g. increased education expenditure or taxation levels). Our innovation in this paper is to treat tariff levels analogously to such interventions. Since tariffs contribute to government revenue, but at the same time are passed on to consumers by tariff-inflated prices, a reduction in tariffs has the combined impact of reducing (government) revenue and reducing (retail) prices. Under the *ceteris paribus* assumption, households can only gain. However, where this becomes ambiguous is (a) in the tariff exposure of the bundle of goods that poorer relative to wealthier households consume; and (b) in the production side of the economy as opposed to the consumption side. We focus entirely on the consumption side of the economy, and only with the household (microeconomic) component of consumption.

The rest of this paper proceeds as follows: In the next section we present the BIA framework as applied to the trade liberalisation context. This is followed by a description of the data. The results follow, providing a sequential breakdown of the various applications of the BIA framework. We also consider alternative scenarios associated with a violation of

some of the primary assumptions used in the implementation of the BIA framework (still to be completed). Lastly, the conclusion summarises.

2 Methodology

This section is comprised of two parts: an explanation of the benefit incidence analysis framework, and an explanation of how we intend to compare the various distributions.

2.1 The Benefit Incidence Analysis Framework

Benefit incidence analysis is commonly used to measure the distribution of transfers or taxes across the population. To apply this methodology to an analysis of tariff incidence, we are first required to identify how tariffs modify prices of goods consumed by households. Assuming import tariffs are the only distortion and assuming perfect pass through of tariffs to domestic prices, household expenditure on commodity *i* (E_i^d) can be represented as:

$$E_i^d \equiv p_i^d q_i = p_i^w (1+t_i) q_i \tag{1}$$

where p_i^d is the domestic price, q_i is the quantity consumed, p_i^w is the world price and t_i is the import tariff. Domestic expenditure on commodity *i* is therefore made up of two components: consumption at world or border prices ($p_i^w q_i$) plus the implicit expenditure on import tariffs ($p_i^w t_i q_i$). Recalibrating output such that p_i^w=1 and drawing on household expenditure (E_i^d) and tariff data, we are able to impute the tariff revenue paid by household on commodity *i* as

$$t_i q_i = E_i^d - \frac{E_i^d}{(1+t_i)}. \tag{2}$$

Summing tariff revenues across households yields the total implicit tariff expenditure on commodity *i* (T_i). Note that this exceeds the total tariff revenue collected by government, as it includes expenditure on domestic products whose prices are tariff-inclusive.

The estimation of implicit tariff revenue as above requires a number of assumptions, many of which are not met when dealing with available household level data. Firstly, the pass-through of tariffs to domestic prices is often incomplete and is affected by institutional structures, market power, marketing boards, storage costs, transport costs and other taxes (VAT, specific taxes, marketing tariffs, excise duties) (McCulloch et al. 2004: 86). Where pass-through is incomplete, estimates of the implicit tariff revenue using equation (2) will be biased upwards. Where these factors reduce the pass-through uniformly and in a proportional manner, the upward bias is uniform across households. However, this is unlikely, and we expect large differences in the pass-through rate across regions and products. The transmission of tariff changes is expected to be particularly poor in remote rural areas that are isolated from transport infrastructure. Further, even where the pass-through of tariffs is complete, proportionate changes in product prices from tariff liberalisation will be lower in products containing a fixed price wedges.[2]

[2] If local prices are influenced by import tariffs (t_i), other taxes (ot_i) and a fixed transport margin per unit (δ_i) ($p_i^d = (1+t_i)(1+ot_i)+\delta_i$ where output is normalised on p_i^w=1), the implicit tariff expenditure calculated using equation (2) becomes $E_i^d - \frac{E_i^d}{(1+t_i)} = t_i(1+ot_i)q_i + \frac{t_i \delta_i q_i}{(1+t_i)}$. The

Secondly, equation (2) does not take into account the substitution effects that arise as households substitute products with low tariffs for products with high tariffs. This will reduce estimates of the implicit tariff revenue.

Thirdly, consumption of household production also valued at local prices. The true price of these products should reflect the opportunity cost of these goods, and therefore should be valued at the market price minus transport costs. Failure to do so will bias estimate of tariff expenditure upwards. However, if home production is not included as part of expenditure, then estimates of tariff expenditure will be biased downwards for these households.

We now consider the benefit incidence (or rather burden incidence) of import tariffs. The total incidence of tariffs on one group (e.g. the poorest expenditure decile or household) depends on two factors: the share of expenditure on tariffs by that group, and the level of tariffs across the commodities. Benefit incidence will be greater as the government reduces tariffs on the commodities used relatively intensively by a particular group. In this sense, a reduction in tariffs works similarly to a reduction in taxes (which is where incidence analyses have traditionally been applied).

Following Demery (2000) and Bourguignon *et al*. (2002), the group-specific incidence is calculated as:

$$X_j \equiv \sum_{i=1}^{I} E_{ij} \frac{T_i}{E_i} \equiv \sum_{i=1}^{I} \frac{E_{ij}}{E_i} T_i \qquad (3)$$

where X_j is an estimate of the total cost of import tariffs borne by group j. E_{ij} represents the expenditure on commodity i of group j, and E_i the total expenditure on commodity i across all groups. T_i is the total implicit tariff expenditure on commodity i, calculated by summing equation (2) across groups. T_i/E_i is the proportion of the tariff expenditure to total expenditure for commodity i.

Although groups are generally selected on the basis of some common characteristics, there may be a number of other cross-cutting characteristics such as location that affect expenditure patterns and the price transmission mechanism. To capture these variations equation (3) can be modified to

$$X_j \equiv \sum_{k=1}^{K} \sum_{i=1}^{I} \frac{E_{ijk}}{E_i} T_{ik} \ . \qquad (4)$$

Here, the subscript k denotes the region specified in the unit cost estimate, with a total of K regions distinguished. This formula also allows us to compare the tariff incidence across locations. Further, using this equation, sensitivity analyses can be performed by allowing for regional differences (e.g. rural and urban) in the pass-through of import tariffs to domestic prices.

Dividing equation (4) by the total cost of the tariff ($T = \sum_{k=1}^{K} \sum_{i=1}^{I} T_{ik}$), the share of the total tariff burden born by group j is given by:

$$x_j \equiv \sum_{k=1}^{K} \sum_{i=1}^{I} \frac{E_{ijk}}{E_i} \left(\frac{T_{ik}}{T} \right) \equiv \sum_{k=1}^{K} \sum_{i=1}^{I} e_{ijk} t_{ik} \qquad (5)$$

From this, it follows that the burden incidence is determined by two factors: the share of expenditure by the household or group in total spending and in each region *(e_{ijk})*, and the share

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bias from equation (2) is therefore $t_i o t_i q_i + \frac{t_i \delta_i q_i}{(1+t_i)}$. A combination of high other taxes, fixed transport margins and import tariffs can lead to substantial upward biases.

of tariff revenue for each commodity and region in total tariff revenue (t_{ik}).[3] The e's reflect the groups spending decisions while the t's reflect tariff costs borne by each group as a result of government's trade policy and tariff regime.

Note that by definition, $\sum x_j = 1$, and therefore the methodology is flexible and scalable to account for a greater or lesser degree of specificity. In this analysis we select the household as the unit of analysis. In this case, x represents the share of tariff revenue that household j bears at a given point. To analyse the concentration of tariff expenditure, the cumulative distribution of x_j can be plotted against the cumulative population ranked by increasing welfare, e.g. expenditure per capita. Comparisons with the expenditure Lorenz curve (the cumulative distribution of total household expenditure against the cumulative population ranked by increasing wealth), enable us to determine whether import tariffs are progressive or regressive (see later).[4]

2.2 Comparing Distributions

The ability to apply equation (5) to the BIA framework is not restricted to inter-regional analyses. Given data over time, it is possible to analyse the change in the tariff incidence in response to tariff liberalisation. Comparing how these curves are related to each other then provides an indication of the relative gains (losses) across the expenditure distribution of the different tariff regimes.

Ideally we require a panel of household expenditure during the liberalisation period. However, such data are not currently available for South Africa. Nevertheless, some insight into the changing incidence of tariffs can be gained through exploiting the time variation of tariff levels, while assuming constant household expenditure patterns.[5]

Let us consider this more fully within the context of equation (5). It implies that when comparing x across households ($j = 1,\ldots J$), e_{ijk} varies over commodities (i), households (j), and regions (k), but not over time. On the other hand, t_{ik} varies over commodities (i), regions (k, assuming different transportation costs implicit in the final retail price), and time, but not over households. Therefore, when we compare how the cumulative distribution of x differs across regions k, we are essentially comparing the differences in expenditures over households j in each region. However, when we compare how the cumulative distribution of x differs over time, we are comparing the differences in tariff regimes t for commodities ($i = 1,\ldots,I$) over the three time periods under investigation, given a fixed expenditure level e_j.

It is possible to take this comparison a step further by evaluating which households gained or lost, relative to other households in the expenditure distribution, given the changes in tariffs. Important to note is the fact that gains and losses associated with the benefit incidence framework can only be interpreted in relative terms. That is, a given value of x_j is a relative number not an absolute one. We are thus not only interested in whether this number increases or decreases, but also whether the number increases while other households' decrease. This requires an analysis of the differences between the various years to be analysed separately from anything else. Below we discuss how this may be accomplished.

We are interested in the impact of different tariff regimes on x_j. Two such differences are created, namely (1995-2000) and (2000-2004). For each of these differences, we then analyse who gained or lost in relative terms by evaluating the direction of change in x_j, where this direction is indicated by a binary variable. Let this variable be characterised as:

[3] Note that uniform proportional taxes do not affect t_{ik} as they are found in both the numerator and denominator.
[4] Import tariffs are regressive if the concentration curve derived from x_j lies above the Lorenz curve.
[5] Imposing a Cobb-Douglas utility function, for example, gives constant expenditure shares.

$$\Delta x_j = \begin{cases} 1, \text{ if } x_j^{1995} - x_j^{2000} > 0 \\ 0, \text{ if } x_j^{1995} - x_j^{2000} < 0 \end{cases} \quad (6)$$

The equation states that if the difference between the value of x_j between 1995 and 2000 is positive – implying that the value of x_j is lower in 2000 compared to 1995 – then the household bears a relatively smaller share of the total tariff burden in 2000 than in 1995 ($\equiv \Delta x_j = 1$). Alternatively, if the difference between the value of x_j between 1995 and 2000 is negative, then the household bears a larger share of the total tariff burden ($\equiv \Delta x_j = 0$). The same method is applicable to the difference between 2000 and 2004. Note that in each case, the total expenditure on tariffs by each household may have declined or risen, i.e. we are only interested in the change in each household's share of total tariff expenditure (T) in South Africa.

Graphically, it is then possible to display the binary Δx_j across the continuous expenditure distribution ordered from lowest to highest. We do this by evaluating the cumulative sum of the proportion of ones in the sample (a constant number) minus Δx_j,

$$c_n = \sum_{m=1}^{n} \left[\left(\sum_{1}^{J} \Delta x_j / J \right) - \Delta x_m \right] \text{ where } 1 \leq n \leq J, \quad (7)$$

against household expenditure placed in ascending order ($E_{m+1} \geq E_m$).[6] We have used the m subscript to identify that Δx_j and E_j are ordered such that $E_{m+1} \geq E_m$. What we are able to tell from undertaking this analysis is:

1. Whether there is a negative or a positive relationship between Δx_j and the ordered expenditure distribution. In other words, we are able to identify whether poor households gained(lost) relative to wealthier households?
2. Whether there is any evidence of monotonicity between Δx_j and expenditure. The significance of a monotonic relationship is that it could indicate that a particular part of the expenditure distribution gained(lost) proportionately relative to another.
3. Whether there is no evidence of monotonicity, for example if there is a sinusoidal relationship (i.e. characterised by a succession of waves) between the two variables. The significance of such a relationship is that we could then postulate whether there is a systematic non-linear relationship, or simply a random impact of the change of the tariff regime on households.
4. Whether all of these findings are significant or not, using a variety of nonparametric tests. This simply allows us to express a level of confidence (or not) in our findings.

Given the methodology above, can now answer the question: who benefited from the change in tariff regime between 1995, 2000 and 2004? The results, explicated in tabular and graphical form, are discussed below.

3 Data

This section describes the data used in the analysis. It commences with a brief introduction of where tariff data were obtained, before discussing the procedure used to match tariff data with household expenditure data. A brief descriptive analysis follows, focussing on the percentage of total household expenditure calculated to be apportioned to tariffs.

[6] Note $c_J = 0$.

3.1 Tariff Levels

Scheduled tariff data at the 8-digit Harmonised System level are obtained for South Africa from Edwards (2005). This data includes surcharges that were imposed during the early 1990s as well as estimates of *ad valorem* equivalents for specific, formula, compound and mixed tariffs. Details on the construction of this database can be obtained from Edwards (2005).

Simple average tariff were then calculated for 96 commodities according to a classification used by Statistics South Africa in their Supply-Use (SU) tables (SSA, 2003). The SU-based classification is based on the 4-digit Standard Industrial Classification (SIC) system. Non-traded sectors were given a nominal tariff rate of zero. This gave a fairly detailed breakdown of average commodity tariffs. For example, food is disaggregated into eleven categories: meat, fish, fruit, oils, dairy, grain, animal feeds, bakeries, sugar, confectionary, and other food. Clothing and textiles were disaggregated into textiles, textile articles, carpets, other textiles, knitting mills, wearing apparel, leather, handbags, and footwear (see Appendix One for a complete list of all 96 Supply and Use commodity codes).

Tariff data are provided for three years: 1995, 2000, and 2004. We therefore evaluate the incidence of tariffs for these three years as a comparative exercise.

3.2 Matching Commodity Tariffs & Expenditures

In order to calculate the incidence of tariffs across the income or expenditure distribution, it is necessary to match the same commodities for which there is tariff data to commodities for which there is expenditure data. The 2000 Income and Expenditure Survey (IES) (StatsSA, 2000) is used for this purpose.

The explicit code for aggregating IES commodities to Supply and Use commodity groups is described in detail in PROVIDE (2005). In practise, the various disaggregated expenditure items contained in the public use version of the IES are simply added together to form new commodity groups that conform to the Supply and Use definition, rather than to the commodity groups defined by Statistics South Africa. This results in the identical number of commodity groups as contained in Appendix One.

3.3 Tariffs and Expenditures: 1995, 2000, 2004

As found in Edwards (2005), we find significant liberalisation of the South African economy from 1995 to 2004. The simple average tariff rate applied on the 80 traded sectors fell from 16% to 10% between 1995 and 2000 and then to 8% in 2004. Large reductions in tariffs occurred in the clothing and textiles sectors, although these sectors remain the most protected with tariffs in excess of 20% in many cases (For a full list of tariffs over the period, consult Appendix One).

There is substantial variation in the change in protection across commodities, although protection fell in most cases. Of the ninety-six total commodity codes, tariff protection rose in only four between 1995 and 2000 and ten between 2000 and 2004 (Table 1). These increases had a small impact on product prices, particularly in the 2000-2004 period. In the case of food products (grain, sugar, oils, animal feeds), the rise in protection reflects changes in the *ad valorem* equivalent of the specific duties imposed on these products.

Table 1: Tariffs that increased between 1995, 2000, and 2004

Increase 1995-2000	Percent Change	Increase 2000-2004 (a)	Percent Change	Increase 2000-2004 (b)	Percent Change
Grain	2.52	Oils	0.90	Other non-metallic	0.31
Sugar	6.07	Animal feeds	0.02	Machine-tools	0.03
Tyres	2.29	Paper	0.23	Mining machinery	0.03
Motor vehicle parts	3.00	Basic chemicals	0.02	Optical instruments	0.00
		Pharmaceuticals	0.19	Other transport	0.05

Note: Change in tariff is calculated as $(t_1-t_0)/(1+t_0)$.

The decline in tariff protection has reduced the tariff burden imposed on consumers. Table 2 presents estimates of the implicit expenditure on tariff protection, calculated as the sum of total household expenditure on tariffs estimated according to equation (2).

Table 2: Total implicit tariff expenditure: 1995, 2000, 2004

Year	Estimate (Billions)	Std. Err.	95% Confident Interval		Observations	Population Size
			Lower Limit	Upper Limit		
1995	34.78	0.66	33.50	36.10	26,263	11,041,055
2000	24.15	0.44	23.30	25.00	26,263	11,041,055
2004	19.97	0.37	19.20	20.70	26,263	11,041,055

First thing to note in this table is the fact that standard errors and confidence intervals are presented for the estimates of the total. This is mandated by the fact that we use household survey data drawn from a random (probability-based) stratified, two-stage design with sampling weights. Consequently, the estimate of the weighted total is a random variable, and estimates based on this data must account for potential error introduced by the survey design.

To a large extent, the results in the table are expected owing to the reduction in tariffs over the time period. 1995 had the highest expenditures at approximately R35 billion, reducing by a rather substantial amount (approximately 31 percent) to R24.2 billion in 2000, before decreasing by approximately 18 percent to R20 billion in 2004.

With this as our context, we now proceed to evaluate consumption trends, the change in tariff regime, and the incidence of tariffs.

4 Results

This section presents the results of the analysis. It commences with an overview of consumption patterns across the expenditure distribution, before proceeding to analyse tariff spending as a percentage of total spending, and then tariff incidence and changes to incidence.

4.1 Consumption Patterns

The expenditure effect of tariff protection on household welfare is a function of households' consumption patterns. Table 3 presents the consumption schedules across the expenditure distribution, calculated from the Income and Expenditure Survey (2000).

Table 3: Mean consumption schedules for the total population

Decile	Food & Non-alcoholic Beverages	Alcohol & Tobacco	Clothing & Textiles	Housing (Not Owned)	Tradable Vehicle Parts	Personal Goods	House-hold Goods	House-hold Services
1	53.55	3.59	5.50	2.65	0.01	10.46	10.40	13.86
2	54.48	2.95	6.41	3.12	0.01	8.58	9.07	15.37
3	51.24	2.92	7.38	3.71	0.03	8.03	9.28	17.42
4	47.86	3.08	7.89	4.39	0.06	7.50	9.00	20.21
5	44.02	3.47	8.79	4.40	0.05	6.92	9.89	22.44
6	40.34	3.84	8.71	4.72	0.31	6.30	10.13	25.65
7	35.73	3.74	8.75	5.45	0.24	5.79	10.88	29.42
8	30.84	3.25	8.04	5.93	0.69	5.20	11.76	34.29
9	23.53	2.28	6.67	6.80	2.37	4.39	12.94	41.02
10	15.27	1.88	4.23	4.69	6.81	3.44	13.63	50.05

Consumption expenditures are split into major categories broadly separated into tradable goods (that incur tariffs) and non-tradable goods and services (that incur no tariffs). Housing as defined does not include expenditure on bond and related costs associated with owning a house; it only includes rental costs as this is what conventions in the Supply and Use codes require. Housing (Not Owned) is defined as the sum of all expenditure on (1) rent paid; (2) rent for a garage or extra service room if paid separately to (1); (3) levy for sectional title or share-holding schemes; (4) boarding; and (5) payment for the right to access land (e.g. tribal land or land for shacks). Expenditure on housing for those who own a house is included in the household services line item, mandated by the Supply and Use accounting conventions. Expenditure on tradable vehicle parts are included as a separate line item, while private and public transport costs are included in the household services aggregation as they incur no tariffs.

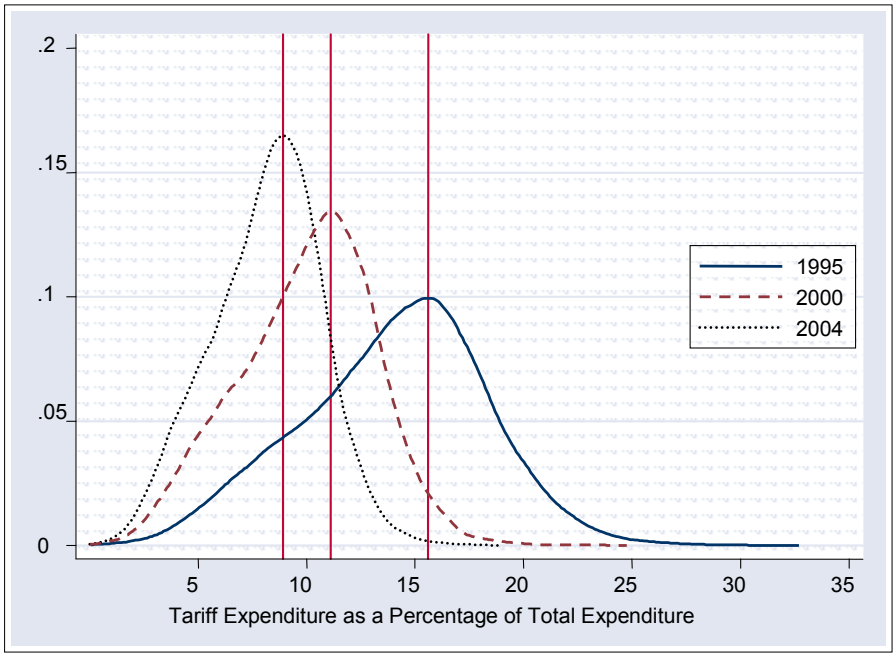
Table 3 shows quite clearly that poorer deciles spend the majority of their income on tradable goods, while wealthier deciles spend proportionately more on non-tradable household services. Of tradable goods, most expenditure is directed to the purchase of food, as expected. Food, alcohol and tobacco account for over 50% of household expenditure for households in the first three deciles. These results therefore suggest that tariffs on tradable products and particularly food products fall disproportionately on poor households.

4.2 Total implicit expenditure on tariffs

This section evaluates the percentage of total implicit expenditure devoted to tariffs, which provides an indication of how much households are taxed by the setting of tariff rates. In Table 2 above, it was calculated that total (national) expenditure on tariffs decreased from approximately R35billion in 1995, to R24billion in 2000, to R20billion in 2004. Consequently, we expect to see a reduction in the percentage of total expenditure on tariffs. However, the implications of these reductions are not uniform across the expenditure distribution, requiring further analysis.

Figure 1 plots the densities of tariff expenditure in 1995, 2000 and 2004. Estimates of the modal value of each density give us an approximate indication of the overall change in the distribution of tariffs to total expenditure over the time period.

Figure 1: Kernel density estimates of the percentage of tariffs to total expenditure



The figure shows the densities for the three years. Modal values (the vertical lines in the densities above) are approximated at 15.6% for 1995, 11.1% for 2000, and 8.9% for 2004. It is clear that most households have witnessed a reduction of their level of expenditure on tariffs between 1995, 2000 and 2004, and that these reductions constitute Pareto enhancing welfare improvements since the entire distribution is affected in each instance.

Disaggregating these trends further, it is possible to evaluate the magnitude of tariff expenditure decreases per decile.

Table 4: Mean decile estimates of expenditure on tariffs as a percent of total expenditure

Decile	1995 (%)	2000 (%)	2004 (%)	Observations	Population Size
1	15.84	11.31	9.01	2,891	1,103,610
2	15.50	11.30	8.99	2,900	1,104,301
3	15.36	11.12	8.92	2,842	1,104,290
4	15.04	10.86	8.80	2,795	1,104,003
5	14.93	10.68	8.73	2,707	1,104,094
6	14.50	10.33	8.51	2,678	1,104,745
7	13.74	9.75	8.08	2,610	1,103,543
8	12.52	8.82	7.33	2,567	1,104,569
9	10.67	7.43	6.17	2,297	1,103,901
10	8.83	5.97	4.98	1,976	1,103,999
Decile	1995 estimate minus 2000 (1)	2000 estimate minus 2004 (2)	Difference: (1) – (2)	% Change: 1995 – 2000	% Change: 2000 – 2004
1	4.53	2.30	2.23	-28.61	-20.33
2	4.20	2.31	1.89	-27.12	-20.44
3	4.24	2.20	2.04	-27.58	-19.78
4	4.17	2.06	2.11	-27.74	-18.98
5	4.24	1.95	2.29	-28.43	-18.24
6	4.17	1.82	2.34	-28.73	-17.66
7	3.99	1.67	2.32	-29.06	-17.18
8	3.69	1.49	2.21	-29.51	-16.87
9	3.24	1.25	1.99	-30.40	-16.90
10	2.86	1.00	1.86	-32.38	-16.71

In the top half of the table, mean decile estimates of expenditure on tariffs are calculated, including the number of (survey) and (weighted) total observations used to derive

the estimate. The bottom half of the table carries out a simple analysis of the data above, including differencing the values and obtaining the percentage change.

Results indicate that in all three years, the poor are taxed relatively heavily by import tariffs, and this percentage decreases monotonically the wealthier a household is (where wealth is proxied by total expenditure). Poor households, defined as those who fall in the first 2 deciles, implicitly spend the equivalent of over 11.3% of their expenditure on tariff protection. Wealthier households, who fall in the top deciles, spend less than 4% of their expenditure on tariff protection. This bias is expected given the relatively greater percentage that wealthier households spend on services or non-tradable goods, which incur no tariffs. These estimates are based on the assumption of perfect pass-through of tariffs to domestic prices and therefore may exaggerate the welfare costs of tariff protection on households. However, the vast differences in consumption profiles between wealthy and poor households suggest that the regressive nature of import tariffs is unlikely to change.

Between 1995 and 2000, poorer households witnessed the largest absolute decreases in tariff taxes (starting at 4.53 percent and generally declining afterward), though in percentage terms it was in fact the wealthiest decile that experienced the greatest reduction in tariff taxes at -32%. This trend was reversed between 2000 and 2004, where the two poorest deciles witnessed the largest reductions (approximately20%).

In summary then, we can say that:

1. All households have witnessed absolute welfare gains (i.e. Pareto enhancing) between 1995, 2000 & 2004, as measured by the percentage of total expenditure spent on tariffs. In other words, households in all deciles are on average paying less for tradable goods;
2. Poorer income groups have experienced the greatest welfare gains over this period in absolute (percentage point) terms;
3. In relative (percentage change) terms, the wealthier gained more from the change in tariff regime between 1995 and 2000, whereas the poor gained more from the change between 2000 and 2004.

4.3 Benefit Incidence Analysis: 1995, 2000, 2004

In this section we present results for the estimate of the share of the incidence of tariffs, which we termed x_j in the methodology section. We begin with an analysis of mean incidence per decile, whereafter we test whether the distributions are significantly different given the change of tariff regime. Once this is established, Lorenz curves are plotted to compare the cumulative distribution of the incidence of tariffs to the cumulative distribution of expenditure. Finally, additional analyses of the distributions over 1995, 2000 and 2004 are undertaken.

The table below presents mean incidence estimates per expenditure decile.

Table 5: Mean incidence of tariffs per decile: 1995, 2000, 2004

Decile	1995*	2000*	2004*	Observations	Population Size
1	0.0056	0.0057	0.0055	2,891	1,103,610
2	0.0104	0.0109	0.0105	2,900	1,104,301
3	0.0140	0.0145	0.0141	2,842	1,104,290
4	0.0182	0.0188	0.0185	2,795	1,104,003
5	0.0235	0.0240	0.0238	2,707	1,104,094
6	0.0298	0.0305	0.0304	2,678	1,104,745
7	0.0386	0.0392	0.0393	2,610	1,103,543
8	0.0518	0.0522	0.0526	2,567	1,104,569
9	0.0740	0.0737	0.0741	2,297	1,103,901
10	0.1598	0.1537	0.1549	1,976	1,103,999

* Estimates multiplied by 1000 for interpretation purposes

Results shows the mean estimates multiplied by a factor of 1,000 to bring the range of the values within a more easily readable format. Since they are designed to sum to one, the actual incidence estimates are very small numbers with up to seven decimal places. By multiplying by 1,000 the sum of the incidence over the entire sample of households is 1,000.

What we're interested in here is both the actual value of the incidence and the relative values. From the table we see a monotonic relationship between the incidence and expenditure deciles, suggesting that the wealthier one is (proxied by total expenditure), the greater the share of tariffs borne by the group. This is entirely expected and is formulaically driven to a large degree (to see this, consult equation (5) above).

Between 1995 and 2000 the estimate of the mean tariff incidence shows an increase for all eight of the bottom deciles. This suggests that poorer households witnessed an increase in the tariff incidence during this time. Wealthier households, namely those in deciles nine to ten, saw a reduction in their tariff incidence. Between 2000 and 2004, mean estimates for deciles one to six decreased, while deciles seven to ten saw an increase in the tariff burden.

These results would suggest that the tariff incidence shifted in favour of the wealthy between 1995 and 2000, and in favour of the poor between 2000 and 2004. However, a degree of caution should be exercised when drawing this conclusion at this stage since we have only presented mean shares, which aggregate the within-decile distribution. Later on in this analysis we disaggregate the expenditure distribution further to investigate the effects over time in more detail.

Despite the differences between the distributions over 1995-2004, the magnitude of the differences in the table are rather small, prompting one to ask the question: are the differences significant? Below we test for statistically significant differences between the distributions by using a nonparametric test based on the sign of the difference of (1995 minus 2000) and (2000 minus 2004).

Table 6: Nonparametric testing for equality of incidence distributions: 1995, 2000, 2004

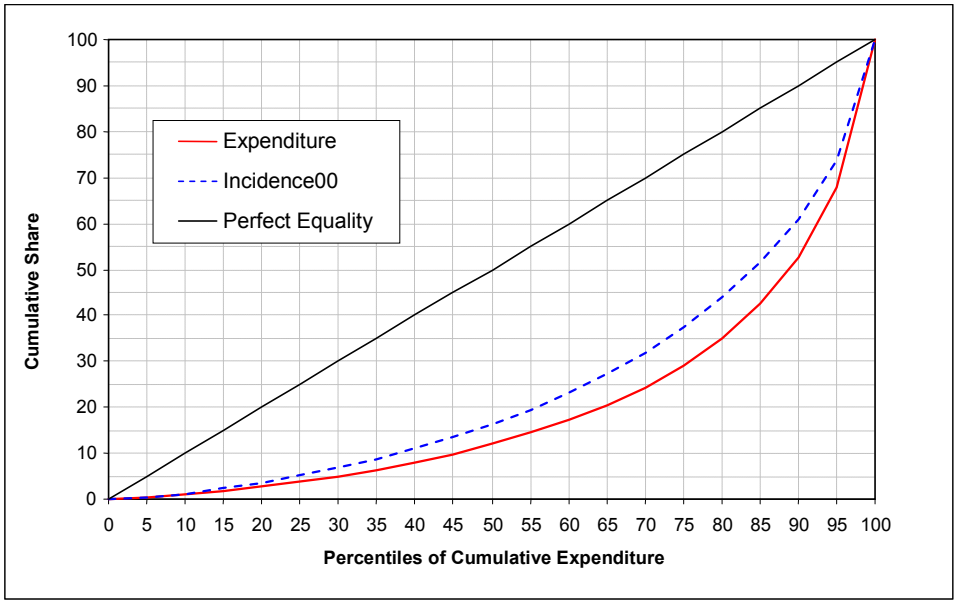
(a) Difference: 1995 – 2000			(b) Difference: 2000 – 2004		
Sign	Observed	Expected	Sign	Observed	Expected
Positive	9646	13135	Positive	15276	13135
Negative	16624	13135	Negative	10994	13135
Zero	0	0	Zero	0	0
All	26270	26270	All	26270	26270
One-sided tests: *Ho: median of share1995 – share2000 = 0 vs.* *Ha: median of share1995 – share2000 < 0*			One-sided tests: *Ho: median of share2000 – share2004 = 0 vs.* *Ha: median of share2000 – share2004 > 0*		
Pr(#negative >= 16,624) = Binomial (n=26270, x >= 16,624, p = 0.5) = 0.0000			Pr(#positive >= 15,276) = Binomial (n = 26270, x >= 15,276, p = 0.5) = 0.0000		

The table is split to show the results for 1995 and 2000 separately from 2000 and 2004. A nonparametric test based on the signs of the differences of the distributions is conducted to evaluate the equality of matched pairs of observations over the three time periods. The null hypothesis in both instances is that the median of the differences is zero; no additional assumptions about the properties of the distributions are made. The test is most similar to the Wilcoxon signed-rank test, except that here we do not assume that the distributions are symmetric. All that is needed are the signs of the differences (see StataCorp, 2003 for an explanation of the sign test).

We can conclude from the 1995-2000 findings that the distributions are indeed different, since the one-sided test for the difference between the two distributions demonstrates that we fail to accept the null. In fact, the test demonstrates that the incidence predominantly increased over the period. The findings for 2000-2004 also demonstrate that we fail to accept the null that the median of the difference is zero, although here we see that the 2000 incidence estimates are predominantly greater than the 2004 estimates.

Having established this, it is now possible to proceed to a comparison of households' share of the tariff burden compared to their share of expenditure. This is the 'classical' incidence analysis component usually applied to taxation or government expenditure. By applying to the tariff incidence, the results may be interpreted analogously.

Figure 2: Incidence of tariffs versus expenditure: 2000



The Figure shows an approximate Lorenz curve based on the cumulative value of total expenditure in 2000 for each of twenty quantiles, ordered sequentially in increments of five. A concentration curve using the tariff incidence data for 2000 is also constructed. This curve plots the cumulative of x_j in equation (5) against the quantiles.

From Figure 2 it is immediately evident that the concentration curve of tariff expenditure lies above the expenditure Lorenz curve for all income deciles. This reinforces the results derived earlier in Table 5 that import tariffs are a regressive tax and poor household bear a disproportionate share of the tariff burden relative to their income. For example, poor households who make up the first two income deciles account for 2.6% of total expenditure in South Africa. However, they account for 3.4% of the total tariff burden. The poorest 50% of households account for approximately 12% of total expenditure, but bear over 16% of the tariff burden.

To evaluate whether this burden has changed over time, Table 7 compares the cumulative distribution of tariff expenditure for 1995, 2000 and 2004.

Table 7: Cumulative share of the incidence by percentile: 1995, 2000, 2004

Percentile	2000 Total Expenditure	1995 Tariff Incidence	2000 Tariff Incidence	2004 Tariff Incidence
5	0.31	0.41	0.41	0.40
10	0.89	1.17	1.21	1.16
15	1.67	2.19	2.26	2.18
20	2.60	3.42	3.55	3.42
25	3.68	4.86	5.05	4.88
30	4.91	6.52	6.78	6.55
35	6.34	8.41	8.73	8.47
40	7.98	10.55	10.95	10.65
45	9.85	12.99	13.47	13.12
50	11.98	15.75	16.31	15.93

[Continued from above]

Percentile	2000 Total Expenditure	1995 Tariff Incidence	2000 Tariff Incidence	2004 Tariff Incidence
55	14.41	18.87	19.51	19.10
60	17.21	22.42	23.14	22.71
65	20.47	26.46	27.26	26.83
70	24.34	31.09	31.97	31.55
75	29.02	36.46	37.40	36.99
80	34.88	42.78	43.80	43.41
85	42.41	50.39	51.45	51.11
90	52.64	59.91	60.94	60.64
95	67.88	72.85	73.78	73.57
100	100.00	100.00	100.00	100.00

Results from the table suggest:

1. The tariff concentration curves always lie above expenditure Lorenze curve, irrespective of year. Import tariffs are therefore regressive in all years.
2. The tariff concentration curves deviate only marginally from one another, suggesting relatively small changes in the incidence of tariffs.
3. The 2000 concentration curve lies on or above the 1995 curve for all quantiles. This suggests that the tariff burden shifted marginally against the poor during this period.
4. The 2004 concentration curve for tariffs lies below the 2000 equivalent, suggesting that the tariff burden shifted marginally against the wealthy during this period.
5. The 2004 concentration curve lies above the 1995 level, except for the poorest four percentiles (P5-P20). This suggests that over the entire period, the poorest four quantiles saw favourable shifts in their tariff burden while the balance of the distribution saw unfavourable shifts.

A more nuanced analysis of these findings is possible in a comparison of selected percentile ratios (Table 8).

Table 8: Selected percentile ratios

Year	p90/p10	p75/p25	p90/p50	p75/p50	p25/p50	p10/p50
1995	12.09	3.77	3.70	1.99	0.53	0.31
2000	11.54	3.65	3.57	1.95	0.54	0.31
2004	12.12	3.76	3.65	1.99	0.53	0.30

It is useful to split the analysis of the percentiles into those that deal with the ratios of quantiles other than the median (the fiftieth percentile) and those that deal with the median. Results show that the p90/p10 ratio has the greatest variation of all others. The lower this value, the *worse-off* those in the poorest quantiles are compared to the highest. This is because it suggests that the share of tariff burden accounted for by the poor measured at the tenth percentile has increased, or alternatively that the share of the tariff burden accounted for by the wealthy measured at the ninetieth percentile has decreased. Generally, the results suggest that the poor gained relatively less from lower consumption prices in response to liberalisation between 1995 and 2000, and gained relatively more between 2000 and 2004. A comparison of 2004 and 1995 reveals that price decreases in response to liberalisation were moderately biased towards goods consumed relatively intensively by the poor. Similar results are derived using other percentile ratios.

4.4 Comparing Distributions: (1995-2000) and (2000-2004)

In this section we present a more robust analysis of the changing distribution of tariff incidences. We evaluate the differences between the three time periods using the methodology presented in Section 3.4. This involves calculating two distributions: (1995

minus 2000) and (2000 minus 2004). From this it is possible to examine the direction of change in the tariff incidence, and to locate this analysis within a class perspective.

The initial focus in this section is on changes within expenditure deciles. Since deciles have been used throughout this paper, this is a logical first step. However, while deciles go some way towards locating the discussion of tariff liberalisation within a class dimension, it limits the ability to draw conclusions for the population as a whole. Therefore, the cumulative sum of the differences of the distributions of tariff changes over (1995-2000) and (2000-2004) are presented. Here, there is a shift from analysis by expenditure decile to analysis over the continuous expenditure distribution. The advantage of this is that it is then possible to graph the relationship between the changes in incidence, and locate precisely where in the expenditure distribution these changes take effect.

Table 9: Differences between distributions by decile

Decile	Description	(1995-2000)			(2000-2004)		
		Unfavourable	Favourable	Total	Unfavourable	Favourable	Total
1	Proportion	0.578	0.422	1	0.292	0.708	1
	Std.Err.	-0.012	-0.012		-0.011	-0.011	
	Obs.	1,643	1,248	2,891	857	2,034	2,891
2	Proportion	0.700	0.300	1	0.270	0.730	1
	Std.Err.	-0.011	-0.011		-0.012	-0.012	
	Obs.	2,020	880	2,900	780	2,120	2,900
3	Proportion	0.706	0.294	1	0.299	0.701	1
	Std.Err.	-0.011	-0.011		-0.011	-0.011	
	Obs.	2,019	823	2,842	823	2,019	2,842
4	Proportion	0.715	0.285	1	0.352	0.648	1
	Std.Err.	-0.011	-0.011		-0.012	-0.012	
	Obs.	2,017	778	2,795	976	1,819	2,795
5	Proportion	0.687	0.313	1	0.407	0.593	1
	Std.Err.	-0.012	-0.012		-0.012	-0.012	
	Obs.	1,907	800	2,707	1,084	1,623	2,707
6	Proportion	0.683	0.317	1	0.461	0.539	1
	Std.Err.	-0.012	-0.012		-0.013	-0.013	
	Obs.	1,869	809	2,678	1,217	1,461	2,678
7	Proportion	0.666	0.334	1	0.540	0.461	1
	Std.Err.	-0.013	-0.013		-0.013	-0.013	
	Obs.	1,779	831	2,610	1,376	1,234	2,610
8	Proportion	0.619	0.381	1	0.590	0.411	1
	Std.Err.	-0.012	-0.012		-0.012	-0.012	
	Obs.	1,604	963	2,567	1,473	1,094	2,567
9	Proportion	0.506	0.494	1	0.537	0.463	1
	Std.Err.	-0.013	-0.013		-0.013	-0.013	
	Obs.	1,182	1,115	2,297	1,274	1,023	2,297
10	Proportion	0.252	0.748	1	0.600	0.400	1
	Std.Err.	-0.013	-0.013		-0.016	-0.016	
	Obs.	579	1,397	1,976	1,132	844	1,976
Total	Proportion	0.611	0.389	1	0.435	0.565	1
	Std.Err.	-0.005	-0.005		-0.005	-0.005	
	Obs.	17,000	9,644	26,000	11,000	15,000	26,000
1995-2000 Model Statistics Pearson Uncorrected chi2(9) = 2022.8432 Design-based F(8.57, 28364.69) = 137.2033 P = 0.0000; Weighted N=11,041,055					2000-2004 Model Statistics Pearson Uncorrected chi2(9) = 1569.1820 Design-based F(8.47, 28047.40)= 103.3410 P = 0.0000; Weighted N=11,041,055		

The table shows results for the differences between the time periods. Change is denoted as either unfavourable or favourable. A favourable change means that the household's share of the tariff burden has decreased between 1995 and 2000, or 2000 and

2004. An unfavourable change means that a household's share of the tariff burden has increased over the time period (see equation (6) in the methodology for a discussion). The proportions of each decile that experienced positive (favourable) or negative (unfavourable) changes are presented in the first row, its standard error in the second row, and the number of observations associated with the calculation in the third row of each decile comparison. All estimates are significant at the 99.9% level, as is the model and design-based statistics (presented at the bottom of the table).

It is evident from the table that between 1995 and 2000 the proportion of households that experienced unfavourable change is the largest up until the ninth decile, where after the trend reverses and most households experience favourable changes to their tariff incidence. Between 2000 and 2004, favourable changes dominate until the sixth decile, after which unfavourable changes are experienced for the remainder of the expenditure distribution. These results generally suggest that the change in tariff regime between 1995 and 2000 disproportionately benefited the wealthiest, while the change in tariff regime between 2000 and 2004 disproportionately benefited the poor.

Overall, the change in tariff incidence between 1995 and 2000 is unfavourable, demonstrated by the proportion in the total row of the table above, where 61 percent of all households saw an increase in their share of the tariff burden. Between 2000 and 2004, this trend is reversed to yield the result that 57 percent of all households witnessed favourable changes (i.e. a decline) in the share of the tariff burden.

Plots of the running sum of c_n in equation (7) against the ordered household expenditure enable us to further investigate the relationship between changes in the incidence of tariffs and household wealth (as measured by expenditure). These are presented in Figure 3 and Figure 4 for the periods 1995-2000 and 2000-2004. The advantage of these diagrams is that we can fully exploit the household level heterogeneity to the robustness of the bias in the change in incidence discussed above. Non-parametric tests of departures from randomness with respect to changes in incidence and expenditure levels are presented in Table 10.

Figure 3: Cumulative sum of differenced distribution on ordered expenditure: (1995-2000)

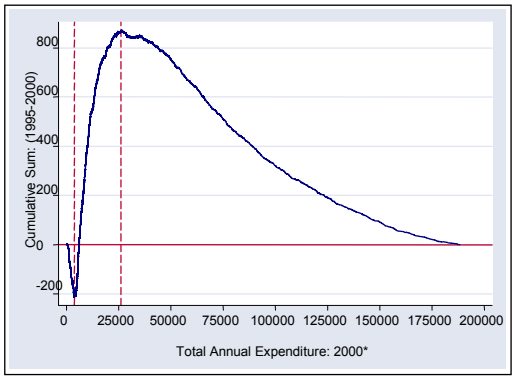
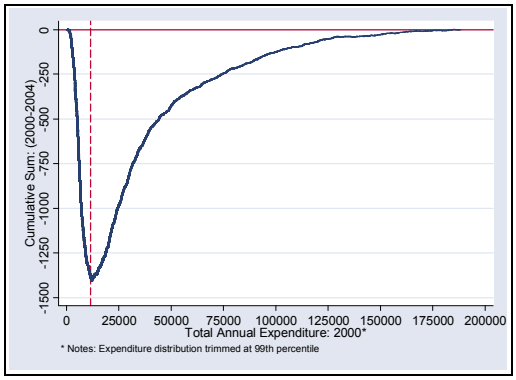


Figure 4: Cumulative sum of differenced distribution on ordered expenditure: (2000-2004)



Notes: Expenditure distribution trimmed at 99th percentile

Table 10: Selected test statistics for cumulative sums: (1995-2000) & (2000-2004)

Figure Ref.	Obs	Pr(1)	CusumL	zL	Pr>zL	CusumQ	zQ	Pr>zQ
Figure 3 (1995-2000)	26,008	0.3621	870.74	8.196	0.000	1,013.84	8.525	0.000
Figure 4 (2000-2004)	26,008	0.5829	1,407.84	9.632	0.000	120.32	1.848	0.032

These graphs are best thought of analogously to probability densities. A U-shaped or inverted U-shaped cumulative sum curve indicates, respectively, a negative or a positive trend between those households that experienced favourable shifts in their tariff incidence and total expenditure. The dashed vertical lines in the figures approximate the modal values of the curve: in Figure 3, the first dashed vertical line is at R3,700.00 total household expenditure per annum, while the second dashed line is at R26,000.00 per annum. In Figure 4, the dashed vertical line (approximate mode) is R11,500 per annum.

The diagrams show two distinct relationships that support the earlier findings based on Table 9. An inverted U-shaped curve indicates that the change in tariff incidence was biased towards wealthier households. In contrast, a U-shaped curve indicates that the tariff incidence shifted in favour of poor households, i.e. the share (not total) of the tariff burden borne by poor households declined.

Figure 3 closely resembles an inverted U-shaped curve, although a U-shaped section is found at very low levels of household income. This suggests that households with an annual expenditure of less than R3,700 on average experienced a declining share of the tariff burden between 1995 and 2000. However, the tariff incidence shifted against households with expenditures between R3,700 and R26,000 and these households on average experienced a rising share of the (declining) tariff burden. It is the wealthier households with annual expenditure in excess of R26,000, that were most favoured by the changing tariff incidence. Overall, 36% of households experienced favourable changes in their tariff incidence between 1995 and 2000. These relationships are statistically significant, as shown in Table 10.

In contrast, Figure 4 presents a U-shaped curve, indicating that the tariff incidence declined for poor households relative to wealthy households. 58 percent of households experienced favourable changes in their tariff incidence. Total household expenditure in most of these households was less than R11,500 per annum, the modal point in the diagram. The relationship between wealth, as measured by expenditure, and the change in incidence is statistically significant.

These results, therefore show that while all households on average gained from liberalisation, the gains were disproportionately experienced in very poor and wealthy households between 1995 and 2000, but were disproportionately experienced in poor households between 2000 and 2004.

5 Conclusion

This paper has investigated the incidence of tariff liberalisation across the expenditure distribution of the South African population. It is a *ceteris paribus* study in the sense that the sole use of 2000 expenditure data is equivalent to holding all household characteristics constant. In many ways, this is the paper's greatest strength, for it is then possible to isolate the impact of the change in the tariff regime on households. As we have demonstrated, the study has proven to be a highly varied and nuanced exercise.

However, the assumption of fixed expenditure patterns is also a limitation in that we fail to take into account behavioural responses in response to price changes arising from liberalisation. Future work could be directed at including substitution elasticities or including the 1995 Income and Expenditure Survey's findings into the analysis, as well as the forthcoming 2005 Income and Expenditure Survey.

The story of the incidence of tariff liberalisation as defined in this paper essentially begins at the household level, where consumption decisions are linked to tariff levels via the price mechanism. It was calculated that the implicit cost of tariffs to consumers decreased by 31 percent between 1995 and 2000 and a further 18 percent between 2000 and 2004. This absolute decrease in the level of expenditure attributable to tariffs implies a significant welfare improvement to consumers in the form of reduced prices. The gains to households in

terms of lower tariff burdens in found in all income deciles. Both the poor and the wealthy appeared to have gained.

However, the gains from liberalisation and the continued burden of continued protection are not uniform across household and wealth categories. An examination of the incidence across percentiles of the expenditure distribution showed that all households other than the most wealthy bear a disproportionate share of the tariff burden, relative to their share in total expenditure. Tariff distortions in 2004 are estimated to account for 9% of expenditure of poor households who are found in the lowest two expenditure deciles, compared to 5% in the top decile. Import tariffs are therefore shown to be a regressive tax, as they tax traded products that make up a high proportion of poor households' consumption bundles. Not analysed in this study, is the effect of continued domestic regulation in services that limit international competition in this industry. These regulations disproportionately affect wealthy households who are relatively intensive consumers of services products.

This has major implications for trade policy initiatives, and suggests that the more comprehensive the tariff liberalisation effort, the greater the benefits in terms of lower product prices for less wealthy segments of the expenditure distribution.

The paper also found that the change in incidence of tariffs was not uniform between 1995 and 2000 and 2000 and 2004. Investigating the average incidences by decile for 1995, 2000 and 2004, we find that the change in tariff regime between 1995 and 2000 benefited the wealthy disproportionately to the poor. Between 2000 and 2004, this trend was reversed, and the poor gained relatively more than the wealthy. Using cumulative sum curves based on household level data, confirms this insight. However, the approach added further gradation to the findings for 1995-2000, where positive shifts in the incidence were also notable for households spending less than R3,700 per annum.

Having noted these findings, it is important to discuss some of the limitations of this report. Firstly, this study does not take into consideration the effect liberalisation may have had on, amongst others, factor income derived from production, economic growth and government transfers. The analysis is partial and focuses only on the consumption impact of liberalisation.

Secondly, the analysis has assumed that there is perfect pass through of tariff adjusted prices to domestic prices. Further analyses should examine how sensitive the incidence results are to changes in this key assumption.

Thirdly, the analysis has assumed uniform proportional transportation costs implicit in the final price, rendering the results insensitive to location (urban, rural, etc). Note that since the Income and Expenditure Survey conflates prices with quantities, a basic separation between urban and rural households would not reveal the extent of the price differences. One method to account for this is to develop an index of transportation costs based on some locational factor of the household, and this should also be part of further work in this area. As already mentioned above, a more dynamic analysis could be achieved by including the results of the 1995 and forthcoming 2005 Income and Expenditure Surveys into the analysis. Another issue that should be taken into account is changes to excise taxes for cigarettes and tobacco, which should be incorporated into the tariff or expenditure data since these goods have been subject to significant 'sin tax' increases over the period.

Finally, given the high correlation between race and class in South Africa, a useful extension to this report would be to investigate the racial and gender dimensions of the incidence of tariff liberalisation.

These results and limitations therefore suggest that liberalisation alone may not be sufficient to guarantee advantages to the poor. The impact is dependent on the relationship between the type of goods consumed by the poor and the tariff line items subject to reduction. Further, other factors such as transport costs, market structure, location and other taxes may be both more important determinants of product prices, as well as mediate the pass-through of

lower border prices to retail prices paid by the consumer. Nevertheless, our results indicate potentially large pro-poor gains to consumers from further liberalisation.

6 References

Bell, T. (1997). "Trade policy." In J. Michie and V. Padayachee, V. (eds.), *The Political Economy of South Africa's Transition*. London: Dryden press.

Bourguignon, F., Pereira da Silva, L. & Stern, N. (2002): *"Evaluating the Poverty Impact of Economic Policies: Some Analytical Challenges"*, Washington D.C.: The World Bank, Draft Mimeo

Demery, L. (2000): *"Benefit Incidence: A Practitioner's Guide"*, Washington D.C.: The World Bank, Mimeo.

Edwards, L. (2005): "*Trade Liberalisation in South Africa during the 1990s*" mimeo.

Nicita, A., Olarreaga, M., and Soloaga, I. (2003): *"A Simple Methodology to Assess the Poverty Impact of Economic Policies using Household data"*, Washington D.C.: The World Bank, Mimeo

Provincial Decision-making Enabling Project (PROVIDE), (2005): *"Creating a 2000 IES-LFS Database in Stata"*, Technical Paper 2005:1, Cape Town: PROVIDE

South African Reserve Bank (SARB), (1999): *"South Africa's National Accounts: 1946-1998. An Overview of Sources and Methods"*, Pretoria: SARB

StataCorp, (2003): *"Stata Statistical Software, Release 8.0: Reference S-Z"*, Texas: Stata Corporation, Pg. 66

Statistics South Africa, (2000): *"Income and Expenditure Survey"*, Pretoria: Stats SA.

Statistics South Africa, (2003): *Final Supply and Use Tables 2000* (Report no. 04-04-01). Pretoria: Government Printers.

Appendix 1: Supply & use (SU) average tariffs (including duties) per commodity group: 1995, 2000, 2004

SU Code	Description	1995	2000	2004	SU Code	Description	1995	2000	2004
1	Agriculture	8.18	5.74	3.28	49	Iron and steel	7.44	4.33	3.89
2	Coal	0.00	0.00	0.00	50	Non-ferrous metals	7.20	2.43	1.98
3	Gold	8.00	0.00	0.00	51	Structural metal	10.54	4.17	4.04
4	Other mining	2.24	0.97	0.90	52	Treated Metal Products	0.00	0.00	0.00
5	Meat	25.26	17.67	15.45	53	General hardware	14.31	10.46	10.24
6	Fish	18.25	11.55	4.53	54	Fabricated metal	15.04	7.05	6.80
7	Fruit	20.06	16.65	15.01	55	Engines	6.86	3.75	2.13
8	Oils	13.03	6.48	7.44	56	Pumps	8.99	5.40	4.89
9	Dairy	32.78	31.97	18.95	57	Gears	7.62	6.33	5.96
10	Grain mills	6.28	8.96	6.46	58	Lifting equipment	9.29	3.73	3.09
11	Animal feeds	5.65	4.00	4.02	59	General machinery	6.59	3.22	2.94
12	Bakeries	43.34	23.75	20.45	60	Agricultural machinery	5.25	2.12	2.03
13	Sugar	25.96	33.60	13.32	61	Machine-tools	3.27	1.59	1.62
14	Confectionery	29.15	15.25	14.82	62	Mining machinery	5.31	0.69	0.72
15	Other food	14.21	12.70	12.08	63	Food machinery	3.12	0.00	0.00
16	Bev_Tob	39.53	23.87	20.97	64	Special machinery	6.75	3.26	2.40
17	Textiles	40.64	27.78	15.77	65	Household appliances	24.35	13.25	12.53
18	Textile articles	40.55	29.29	24.17	66	Office machinery	0.00	0.00	0.00
19	Carpets	38.49	30.00	25.49	67	Electric motors	14.10	7.75	7.30
20	Other textiles	18.50	15.44	12.98	68	Electricity apparatus	12.32	7.92	7.11
21	Knitting mills	51.40	31.46	19.75	69	Wire and cable	14.30	13.50	12.78
22	Wearing apparel	77.01	52.94	34.66	70	Accumulators	19.51	7.90	7.37
23	Leather	8.25	4.35	4.02	71	Lighting equipment	24.79	11.12	10.70
24	Handbags	38.25	25.00	24.73	72	Electrical equipment	8.00	2.78	2.73
25	Footwear	37.74	22.96	22.40	73	Radio and television	17.19	3.16	2.73
26	Wood	13.68	8.93	8.67	74	Optical instruments	8.13	0.33	0.33
27	Paper	7.06	5.38	5.62	75	Motor vehicles	31.59	19.25	15.31
28	Paper Containers	15.86	10.57	8.72	76	Motor vehicle parts	12.05	15.41	13.97
29	Other paper	12.79	8.93	8.53	77	Other transport	8.04	0.80	0.85
30	Publishing	10.69	6.21	6.09	78	Furniture	28.97	17.60	17.37
31	Recorded media	15.03	0.91	0.45	79	Jewellery	23.93	8.33	7.73
32	Petroleum	12.91	4.56	3.37	80	Other manufacturing	20.96	6.56	5.81
33	Basic chemicals	7.28	1.37	1.39	81	Electricity	0.00	0.00	0.00
34	Fertilizers	0.35	0.00	0.00	82	Water	0.00	0.00	0.00
35	Primary plastics	6.31	4.62	4.26	83	Buildings	0.00	0.00	0.00
36	Pesticides	9.20	6.67	6.66	84	Other constructions	0.00	0.00	0.00
37	Paints	14.79	4.09	4.09	85	Trade services	0.00	0.00	0.00
38	Pharmaceuticals	6.14	0.84	1.03	86	Accommodation	0.00	0.00	0.00
39	Soap	39.55	16.11	15.21	87	Transport services	0.00	0.00	0.00
40	Other chemicals	9.18	3.84	3.48	88	Communications	0.00	0.00	0.00
41	Tyres	15.53	18.17	12.51	89	FSIM	0.00	0.00	0.00
42	Other rubber	15.19	10.00	9.54	90	Insurance services	0.00	0.00	0.00
43	Plastic	16.44	10.11	9.65	91	Real estate services	0.00	0.00	0.00
44	Glass	14.09	7.56	7.31	92	Other business services	0.00	0.00	0.00
45	Non-structural ceramics	23.36	11.33	11.33	93	Government services	0.00	0.00	0.00
46	Structural ceramics	9.53	4.44	4.44	94	Health and social work	0.00	0.00	0.00
47	Cement	0.73	0.00	0.00	95	Other services/activities	0.00	0.00	0.00
48	Other non-metallic	9.07	5.07	5.40	96	Household domestic services	0.00	0.00	0.00