GENDER DIMENSIONS OF THE INCIDENCE OF TARIFF LIBERALIZATION

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ABSTRACT

This paper evaluates how tariff liberalization impacted male- and female-headed households in South Africa during 1995, 2000, and 2004. An analysis of consumption trends by sex of household head show statistically significant differences, and these are transmitted through the impact in the tariff incidence. On the whole, it was found that: (1) male-headed households almost always bear a greater share of the tariff incidence compared to female-headed ones; (2) both male- and female-headed households—across all expenditure quantiles other than the most wealthy—bear a greater share of the tariff burden compared to their share of total expenditure; and (3) changes to the incidence over 1995, 2000, and 2004 between the sexes mimicked the trends for the population as a whole, but showed crucial differences at the bottom end of the expenditure distribution. This suggests that the sex of the household head matters, and must be considered in addition to other household-identifying factors (e.g., socio-economic status) when evaluating the impacts of tariff liberalization.

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INTRODUCTION

This paper explores the gender dimension of tariff incidence by focusing on the sex of the head of household. A growing body of literature confirms that resources in the hands of women are more likely to be channeled toward household expenditures that promote the welfare and well being of other family members.[1] As a result of gender differences in the use and disposition of household income, it is likely that the incidence of tariffs upon households headed by men and women differ.

Trade liberalization in South Africa has progressed steadily since the early 1990s. In many instances, South Africa has fully complied and sometimes exceeded the requirements of the World Trade Organization (WTO) as far as both tariffication and reducing tariff levels are concerned. Associated with this process has been a degree of ambiguity with respect to the net benefits, and this paper examines one such dimension, namely the relationship between tariff levels and household consumption. The primary objective is to calculate how much of a given household's expenditure on commodities is due to tariffs, to incorporate this into a benefit incidence analysis framework, and then to evaluate how this differs across the income distribution and between the sexes.

In order to evaluate the scale of the expected price effects, it is important to identify the goods consumed by the poor and the extent to which the poor would benefit from, or are vulnerable to, changes in border prices arising from tariff revision. Consumption patterns differ significantly across household income categories, with poor households spending relatively more of their income on tradable goods as opposed to services. In this paper we use data from the Income and Expenditure Survey to profile consumption patterns across various households,[2] which is then incorporated into the analysis of changes to the tariff regime in 1995, 2000, and 2004. Sex of the household head is defined directly from the Income and Expenditure Survey (IES), which asks the respondent to identify the head of the household. This implies that the distinction between a *de jure* or *de facto* household head may in fact be subjective relative to the respondent; this is an important limitation with respect to gender.

The methodological approach taken in this paper is similar in principal to a standard Benefit Incidence Analysis (BIA), as discussed by Demery; Bourguignon, Pereira da Silva, and Stern; and, Nicita, Olarreaga, and Soloaga.[3] Typically, these studies evaluate the impact on the distribution of living standards and poverty of some policy intervention (e.g., raising education expenditure or taxation levels). The innovation in this paper, initially proposed by Daniels and Edwards,[4] is to treat regime changes in tariff levels analogously to such interventions.

Given this context, it is useful to review the primary hypotheses concerning the impact of a reduction in tariffs on household expenditure, irrespective of whether they are headed by men or women. This helps reinforce our theoretical priors and augment the empirical context that will assist us in drawing valid conclusions from the analysis as far as gender is concerned. Two primary hypotheses may be stated concerning the impact of tariff liberalization on prices and their transmission to households:

1. That all households benefit from a reduction in tariffs in the form of reduced prices.
2. That poorer households benefit disproportionately to wealthier households.

The motivation for the first hypothesis is that a reduction in tariffs necessarily implies cheaper imported goods when this reduction is passed on to the consumer. We therefore make the additional (restricting) assumption that tariff reductions transmit perfectly to retail prices via (benevolent) retail corporations.

The second assumption stems from the welfare implications of Engel's law, which states that the poor spend a greater share of their income on tradable commodities (particularly food). Wealthier households are therefore more likely to consume a larger proportion of non-tradable goods and services, thereby reducing their exposure to tariff changes. In order to identify the precise implications of the gender analysis, it is thus important to separate out the above components of the analysis.

The rest of this paper proceeds as follows: In the next section we present the methodology to formally account for (1) the manner in which tariffs were estimated, (2) the mapping of tariff lines onto expenditure items, and (3) the adaptation of the BIA equations to the trade liberalization context. The results follow, providing a sequential breakdown of the various applications of the BIA framework.

METHODOLOGY

This section is comprised of four parts: (1) an explanation of the method used to calculate tariffs, (2) an explanation of how tariff lines were mapped onto expenditure items, (3) an explanation of the BIA framework, and (4) an explanation of how we intend to compare the various distributions.

TARIFF LEVELS

Tariff levels were aggregated for approximately 96 commodities using Supply and Use (SU) tables.[*] 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 1 for a complete list of all 96 SU 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.

MATCHING COMMODITY TARIFFS AND 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 expenditure data. The IES is used for this purpose.[5]

The explicit code for aggregating IES commodities to SU commodity groups is described in detail in the Provincial Decision-making Enabling Project (PROVIDE).[6] In practice, 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 SU definition, rather than to the commodity groups defined by Statistics South Africa. This results in the identical number (96) of commodity groups as contained in the SU data (see Appendix 1).

THE BENEFIT INCIDENCE ANALYSIS FRAMEWORK

Given that we now have matching tariff and expenditure codes, it is possible to proceed to the specifics of the BIA framework. Before doing so, however, it is useful to separate out the components of retail prices due to tariffs. In this paper, we calculate household expenditures on commodities in the following way:

$$E_i^d \equiv p^d q_i = p^w q_i + p^t q_i \qquad (1)$$

where E_i^d is domestic household expenditure on commodity *i*, $p^d q_i$ is the domestic price *(p^d)* per quantity unit *(q)* of commodity *i*, which equals the world (or border) price per unit *($p^w q_i$)*, plus a domestic tariff per unit *($p^t q_i$)*. Therefore, expenditure on commodity *i* equals the world price for that commodity inflated by a domestic tariff (this

[*] For an explanation of the SU framework within the context of national accounting conventions, see South African Reserve Bank, 1999, 12 & Stats SA, 2003.

is the data obtained from the IES recorded as household expenditures). It is not necessary in this instance to identify the vectors of quantities and prices because we continue the analysis based on budget shares rather than prices.

Since tariff data are expressed as a percentage of the total price, we manipulate Equation 1 to calculate p^w before p^t can be quantified in local currency (Rands). World prices are calculated as:

$$p^w q_i = p^d q_i \Big/ (1 + t_i) \qquad (2)$$

We now have data for both domestic and world prices, allowing us to rearrange Equation 1 and solve for the amount that households spend on tariffs ($p^t q_i$). Note that by corollary implication, $\Sigma_i p^t q$ equals total expenditure on tariffs at the national level.

One of the implications of the above is that it assumes that all commodities households purchase includes a tariff in the final retail price. In other words, it assumes an import penetration ratio of one, or perfect pass-through of foreign to domestic prices. While this is reasonable in the case of uniform import parity pricing for domestically produced goods, it is rather unlikely for the majority of commodities included in the SU tables. This constitutes one of the limitations of the present study, and future work should examine alternative specifications of this assumption.

Now let us consider the benefit incidence of tariffs. The total incidence of tariffs on one group (e.g. the poorest expenditure decile) 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 in the commodities used relatively more by a particular group. In this sense, a reduction in tariffs works similarly to a reduction in taxes. To show this result formally, we have the group-specific benefit incidence defined as:

$$X_j \equiv \sum_{i=1}^{96} E_{ij} \frac{T_i}{E_i} \equiv \sum_{i=1}^{96} \frac{E_{ij}}{E_i} T_i \qquad (3)$$

Here, X_j is an estimate of the total tariff revenue 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 tariff revenue for commodity *i*, and *(i*=1,…,96*)* denotes the full range of SU commodities.

Note that T_i / E_i is the proportion of the tariff to total expenditure for commodity *i*. Equation 3 assumes that this proportion only varies by commodity and not across groups. However, it is common that the prices of commodities vary significantly by region and sometimes within a region. These variations in prices need to be captured in the analysis. Consequently, we estimate:

$$X_j \equiv \sum_{k=1}^{K} \sum_{i=1}^{96} \frac{E_{ijk}}{E_i} T_{ik} \qquad (4)$$

Here, the subscript *k* denotes the region specified in the unit cost estimate, with a total of *K* regions distinguished. This formula allows us to calculate *between-region* estimates, but it does not allow for *within-region* variation. In this paper, we calculate one dimension of within-region variation by evaluating change between rural and urban areas.

The incidence of the total tariff *(T)* accruing to the group is then given by:

$$x_j \equiv \sum_{k=1}^{K} \sum_{i=1}^{96} \frac{E_{ijk}}{E_i} \left(\frac{T_{ik}}{T} \right) \equiv \sum_{k=1}^{n} \sum_{i=1}^{96} e_{ijk} t_{ik} \qquad (5)$$

From this, it follows that the benefit 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 of tariff revenue for each commodity and region in total tariff revenue *(t_{ik})*. The *e's* reflect household spending decisions, while the *t's* reflect tariff costs borne by households 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. This property is exploited to explore various subgroup specifications of Equation 5 later on in the analysis.

Background for such an exercise is provided by considering the standard transformation of the respective probability densities *(f(x))* and cumulative distribution functions *(F(x))*, given by:

$$F(x) = \int_0^x f(t)dt \qquad \text{and} \qquad f(x) = dF(x)/dx \qquad (6)$$

Now, given the analytical framework provided by Equations 5 and 6, it is possible to conduct incidence analysis at the household level along with a range of additional variables. In this case, *x* represents the share of tariff revenue that household *j* bears at a given point. We can then plot the cumulative distribution *F(·)* of x_j against any other variable when all households are ranked by increasing welfare (e.g., expenditure per capita). This may be expressed as:

$$F(x_j) = g(F(\cdot)) \qquad (7)$$

The specification of Equation 7 to include cumulative income against the cumulative population distribution would be most familiar to researchers as the Lorenz curve applied to analyses of income inequality. We use this framework in a more flexible manner as denoting the concentration curves of a given set of variables, and so are able to plot one subgroup against another for example, and determine which is relatively better off.

The combination of Equations 5 and 7 allows us to compare tariff regimes between 1995, 2000, and 2004 for the same sample of households contained in the IES2000. This is the heart of the incidence analysis story. By evaluating how these curves are related to each other, it is then possible to obtain an indication of the relative gains/losses) across the expenditure distribution of the different tariff regimes. This is how we introduce the gender dimension to the analysis.

It should be noted that methodologically, the comparison of the three tariff regimes with a fixed expenditure distribution is equivalent to invoking the *ceteris paribus* assumption, in that we isolate the impact of the change in tariffs on the same set of households, and therefore hold all else (e.g., preferences) constant. Let us consider this more fully within the context of Equation 5. It implies that when comparing x across households (j = 1,…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 (1995, 2000, 2004), 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,…, 96) over the three time periods under investigation, given a fixed expenditure level e_j.

COMPARING DISTRIBUTIONS

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 analyzed 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 analyze 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 characterized as:

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

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,

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

against household expenditure placed in ascending order ($E_{m+1} \geq E_m$).* 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 (characterized 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.

Given the methodology above, we can now answer the following 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.

* Note $c_J = 0$.

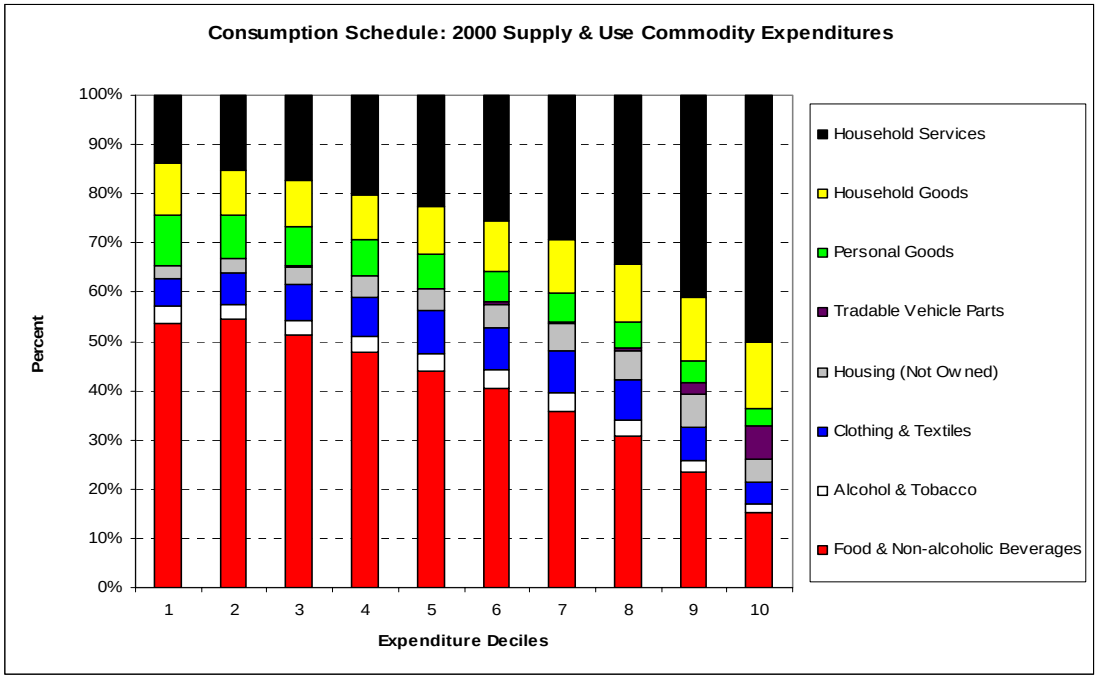
RESULTS

This section presents the results of the analysis, commencing with an overview of consumption patterns over the expenditure distribution. Thereafter we evaluate tariffs directly; these can be broadly separated into sections that deal with absolute changes in the tariff regime on households, and relative changes in the tariff regime on households. In the section on absolute changes, we evaluate how changes in tariff levels affect total household expenditures. This allows us to identify the broad implications of a reduction in tariff levels attributed to South Africa's tariffication drive in line with the WTO. Relative changes refer to changes in the tariff incidence, and are dealt with in the latter sections of this document. Here, the actual levels of the incidence are presented before changes in the incidence between 1995, 2000, and 2004 are discussed.

CONSUMPTION PATTERS

In this section the profile of consumption patterns is investigated. It commences with an overview of consumption trends over the entire South African population, before separating out the gender dimensions of these trends. All data are taken from the IES (2000).

Figure 1: Mean consumption schedules for the total population



The consumption schedules are split into major categories of expenditure, broadly separated into tradable goods (that incur tariffs) and non-tradable goods and services (that incur no tariffs). Alcohol and tobacco are isolated from the food and beverages data in order to examine whether there are significant differences in spending on these items within the expenditure distribution and between male- or female-headed households. Housing as defined does not include expenditure on bond* and related

* A housing "bond" in South African financial terms is equivalent to a "mortgage" internationally.

costs associated with owning a house; it only includes rental costs as this is what conventions in the SU codes require. Housing (without ownership) 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 shareholding 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 SU 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.

Figure 1 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 far as alcohol and tobacco are concerned, at the national level there is very little to distinguish between the various expenditure categories.

However, the above results change somewhat when separating the consumption trends by sex of household head. In the table below, only the differences between the two household heads are displayed (for the actual results per decile and gender, see Appendix 2). The differences below are calculated as the estimate for male-headed households minus the estimate for female-headed households. A negative figure implies that male-headed households spend less on a particular group of products, while a positive figure implies that male-headed households spend more than females.

Table 1: Differences in mean percent consumption expenditure by decile and gender of household head

Decile	Food & Bevs.	Alcohol & Tob.	Cloth & Textile	Accommodation	Traded Vehicle Parts	Personal Goods	HH Goods	HH Service
1	-2.62*	4.79*	-1.31*	-0.32	0.01	-0.91*	0.21	0.15
2	-2.69*	4.22*	-0.49	0.70	0.03	-0.98*	-0.08	-0.70
3	-3.54*	3.21*	-0.49	1.41	0.05*	-0.91*	0.36	-0.09
4	-4.79*	3.65*	0.22	2.07*	0.08*	-0.99*	-0.37	0.13
5	-4.29*	2.74*	0.98*	1.18*	0.08*	-1.14*	0.30	0.16
6	-4.52*	3.34*	0.88*	0.77*	0.43*	-0.93*	0.94*	-0.92
7	-3.24*	3.05*	0.25	0.00	0.18	-0.69*	1.23*	-0.79
8	-1.25	1.61*	-0.69	0.06	0.52*	-0.50*	1.71*	-1.45
9	0.32	1.00*	-0.74*	-1.85*	0.76	-0.63*	1.95*	-0.82
10	-0.97	0.08	-0.46	-2.31*	0.99	-0.25	0.14	2.79*

* Indicates a statistically significant difference (at the 95% level or above), between the distributions of mean consumption estimates per decile for men compared to women (where the null is that the linear combination of the difference equals zero).

Immediately evident from the table is the greater level of expenditure on alcohol and tobacco by male-headed households, and these differences are statistically significant across the expenditure distribution for all deciles except the wealthiest. Results also suggest that the figures generally (though not monotonically) decrease as we move up the expenditure distribution, implying that poorer households have the greatest discrepancy.

If we read across the rows of the table, it seems that the greater expenditure on alcohol and tobacco among male-headed households reduces the amounts spent on food and beverages particularly, possibly also in clothing and textiles, and personal goods.

For household services on the other hand, there are rarely statistically significant differences between male- and female-headed households, except among the wealthiest.

The importance of the above information will become fairly fundamental to our understanding of tariff incidence, since it is the relative proportions of commodity expenditures and their associated tariffs that will eventually find their way through to the incidence analysis. In light of these differences, we can evaluate the percentage of total expenditure devoted to tariff taxes. This precedes the tariff incidence analysis, and helps establish the general household context.

TARIFFS AND EXPENDITURES: 1995, 2000, 2004

This section evaluates the percentage of total expenditure devoted to tariffs. We commence by evaluating the direction of change in tariffs between 1995, 2000 and 2004, then proceed to estimate total tariff revenue in each of the three years, before proceeding to summarize the proportion of spending devoted to tariffs. At this stage, we are not interested in the tariff incidence yet; that is explored below.

Since the early 1990s, South Africa liberalized its trade policy in line with WTO recommendations, in some cases faster than was required. In this section we summarize only those goods that saw an increase in tariffs over the specified time period. These goods represent a small subset of the total number of commodities that experienced a decline in tariffs (see Appendix 1 for the full range of SU commodity tariffs in 1995, 2000 and 2004).

Table 2: 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	29.9	Oils	12.9	Other non-metallic	6.0
Sugar	22.7	Animal feeds	0.5	Machine-tools	1.9
Tires	14.5	Paper	4.2	Mining machinery	5.1
Motor vehicle parts	21.8	Basic chemicals	1.2	Optical instruments	0.4
		Pharmaceuticals	18.3	Other transport	5.1

The table shows only those commodities that experienced a tariff increase in either (1995–2000) or (2000–2004). Of the 96 total commodity codes, only four increased between 1995 and 2000, compared to 10 between 2000 and 2004. Between 1995 and 2000, important food groups (grain and sugar) saw tariff increases, whereas only oils and animal feeds in the food group category saw increased tariffs between 2000 and 2004. However, the percentage of the tariff increases was generally smaller in 2000–2004 compared to 1995–2000.

As can be expected, the impact of this change in tariff regime on total tariff revenue was not uniform. The table below presents estimates of total tariff revenue, calculated as the sum of total household expenditure attributable to tariffs.

Table 3: Total tariff revenue: 1995, 2000, 2004

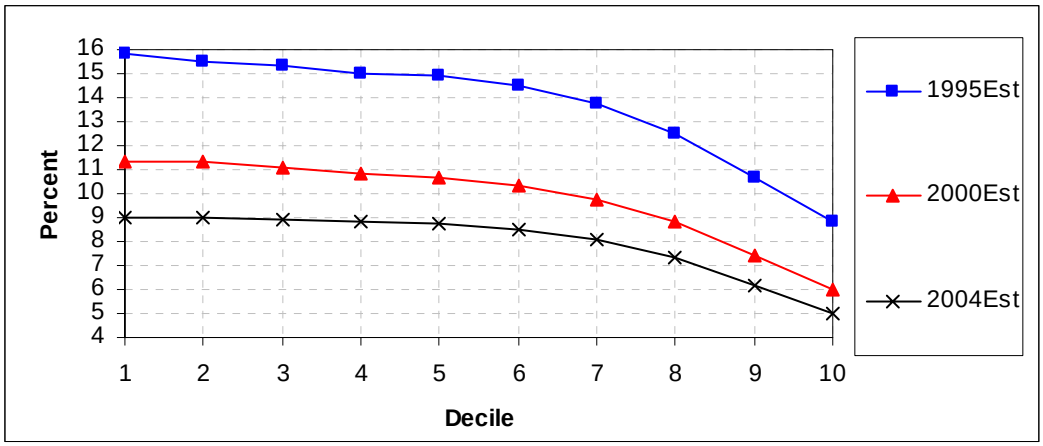
Year	Estimate (Billions)	Standard Error	95% Confident Interval		Observations	Population Size
			Lower Limit	Upper Limit		
1995	34.78	0.66	33.50	36.10	26,263	11,041,055
2000	24.15	0.44	23.30	25.00	26,263	11,041,055
2004	19.97	0.37	19.20	20.70	26,263	11,041,055

The 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 specified time period. 1995 had the highest revenue 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.

The implications of these tariff declines for all households (irrespective of gender of household head) is displayed in the figure below, where results are differentiated by expenditure decile.

Figure 2: Percent of tariff expenditure to total expenditure



The figure shows that all households have witnessed absolute welfare gains (i.e., Pareto enhancing) between 1995, 2000, and 2004, as measured by the percentage of total expenditure spent on tariffs. In other words, all households are paying less for tradable goods. In addition, poorer income groups have experienced the greatest welfare gains over this period, measured by the size of the reductions in total spending on tariffs.

Disaggregating these trends further, it is possible to evaluate the magnitude of tariff expenditure declines for each decile of the expenditure distribution differentiated by sex of household head.*

Table 4: Differences in mean estimates per decile and gender of household head of expenditure on tariffs as a percent of total expenditure

Decile	1995: Difference between Male & Female Headed HH	2000: Difference between Male & Female Headed HH	2004: Difference between Male & Female Headed HH
1	0.4831*	0.1521	0.2843*
2	0.6414*	0.2284*	0.3622*
3	0.3455*	-0.0004	0.1423
4	0.1997	0.0485	0.1321
5	0.4049*	0.2122	0.2404
6	0.6993*	0.3728*	0.4075*
7	0.5211*	0.2607	0.2882*
8	0.2607	0.1035	0.1028
9	0.3431	0.1820	0.1547
10	-0.2278	-0.1582	-0.1507

* Indicates a statistically significant difference (at the 95% level or above), between the distributions of mean tariff share estimates per decile for men compared to women (where the null is that the linear combination of the difference equals zero).

The table shows that there are relatively small differences between the amounts that male- and female-headed households spend on tariffs, which are rarely greater than half a percent over all three periods. Despite this, there are clearly some important and significant differences in the distributions that are worth noting. The first point is that where a difference exists it is almost always positive, indicating that male-headed households have greater exposure to tariffs. This may simply be due to their greater expenditure on alcohol and tobacco, which are commodities with generally high associated tariffs over all three periods (see Appendix 1).

In 1995, statistically significant differences exist in the bottom three deciles and also in deciles 5 through 7. The change in tariff regime generally reduces this difference—a function largely resulting from the “shift of the curve” between the periods—as displayed in Figure 2 above. It also reduces the number of deciles that produce statistically significant differences (from 6 to 2).

However, in 2004 the differences between male- and female-headed households increase once more, for all but the highest two deciles. This suggests that changes in tariff regime may have had differential impacts—both in terms of sex of head of household and class.

Reading across the rows of the table, it is evident that the differences between households headed by men and women in 1995 were always larger than the differences in 2000, whereas the differences between 2000 and 2004 were smaller for deciles 1 through 7, and larger for deciles 8 through 10. Therefore, while the change in tariff regime between 1995 and 2000 generally saw not only lower expenditure on tariffs but also smaller differences between male- and female-headed households, the change in

* For the actual mean estimates per gender and expenditure decile, consult Appendix 3.

tariff regime between 2000 and 2004, while also reducing the absolute levels of expenditure on tariffs, actually served to increase the disparity between male- and female-headed households.

Note that these are very tentative findings, and should be treated as such at this stage of the analysis. Below we proceed to evaluate the incidence of tariffs, which will provide the analytical foundations from which more authoritative conclusions may be drawn.

BENEFIT INCIDENCE ANALYSIS

This section presents results for estimates of the incidence of tariffs, which was termed x_j in the Methodology section. We begin with an analysis of mean incidence per decile. Next, Lorenz curves are plotted to compare the distribution of the incidence of tariffs to the distribution of expenditure. Finally, we undertake additional analyses of the distributions over the specified time period.

Table 5: Mean incidence of tariffs per decile for the entire population: 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 presentation purposes, therefore sum of incidence equals 1000.

We are interested in both the actual and relative values of the incidence. From the table we see a monotonic relationship between the incidence and expenditure deciles, suggesting that the wealthier the household (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 (see Equation 5).

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 burden during this time. Wealthier households, namely those in deciles 9 to 10, saw a reduction in their overall tariff burden. Between 2000 and 2004, mean estimates for deciles 1 to 6 decreased, while deciles 7 to 10 saw an increase in the tariff burden.

It is also possible to disaggregate the above results such that we separate out the comparison of within-gender differences over time, from between-gender differences in a single period (e.g., 1995). Within-gender differences are presented below.

Table 6: Within-gender differences in mean tariff incidence over time

Decile	Male		Female	
	1995–2000	2000–2004	1995–2000	2000–2004
1	-8.66E-08*	1.51E-07*	-1.92E-07*	2.57E-07*
2	-3.43E-07*	2.90E-07*	-5.52E-07*	4.92E-07*
3	-3.55E-07*	2.98E-07*	-6.64E-07*	5.20E-07*
4	-5.49E-07*	2.56E-07*	-7.03E-07*	4.49E-07*
5	-5.14E-07*	1.67E-07*	-6.74E-07*	3.45E-07*
6	-4.82E-07*	-4.40E-08	-8.22E-07*	3.09E-07*
7	-4.70E-07*	-2.35E-07*	-8.86E-07*	1.25E-07
8	-3.23E-07*	-3.87E-07*	-7.63E-07*	-2.64E-07*
9	5.27E-07*	-4.60E-07*	-6.82E-08	-4.16E-07*
10	6.34E-06*	-1.20E-06*	4.64E-06*	-1.63E-06*

* Indicates a statistically significant difference (at the 95% level or above), between the distributions of mean incidence estimates per decile for men in 1995 or 2000 compared to men in 2000 or 2004.

The table shows very small differences in the estimates, largely a result of the fact that the values of the incidence are themselves very small with approximately seven decimal places. Unlike Table 5 above, the estimates in this table have not been multiplied by 1000, but instead utilized in original form (therefore, they sum to one). In this table, the difference is calculated for male-headed households in 1995 minus male households in 2000, and likewise for 2004. A positive sign indicates that the value in 1995 exceeded the value in 2000, and vice-versa for negative signs.

From the table it is evident that the incidence increased across eight of the expenditure deciles for male-headed households between 1995 and 2000, suggesting that these households were made *worse off* by the change in tariff regime. This is similarly so for 1995–2000 for female-headed households, though here even the ninth decile was made worse off. Importantly, all of these findings are statistically significant, with the exception of the ninth decile for women.

Between 2000 and 2004, however, we see that the bottom five deciles for male- headed households had positive signs, suggesting that the tariff incidence was higher in 2000 compared to 2004. This is similarly so for female-headed households up until the seventh decile. In these comparisons, all findings are statistically significant for all deciles, suggesting far-reaching tariff reform and changes to the incidence across households. Importantly, the results also suggest class-specific differences, which are discussed later.

The results may also be analyzed invariant to time. Here we separate out the differences within a given year and compare between the sexes.

Table 7: Between gender differences in mean tariff incidence by decile

Decile	1995	2000	2004
1	9.35E-08	-1.22E-08	9.33E-08
2	3.83E-07*	1.73E-07	3.75E-07*
3	4.44E-07*	1.35E-07	3.57E-07*
4	3.46E-07	1.92E-07	3.85E-07
5	7.49E-07*	5.89E-07	7.67E-07*
6	1.40E-06*	1.06E-06*	1.41E-06*
7	1.25E-06	8.37E-07	1.20E-06
8	2.06E-06*	1.62E-06	1.74E-06
9	5.34E-06*	4.75E-06*	4.79E-06*
10	3.07E-05*	2.90E-05*	2.86E-05*

* Indicates a statistically significant difference (at the 95% level or above), between the distributions of mean incidence estimates per decile for men compared to women.

In this table, as has been consistently applied in this report, the difference is calculated for male minus female estimates (see Appendix 4 for mean estimates by gender and expenditure decile). A positive sign indicates that the value for male households is greater than that for female; statistical significance indicates that confidence may be placed in the findings that these differences are in fact meaningful.

We can see from the table that there are important differences between the estimates based on the sex of the household head. In 1995, male incidence estimates were always larger than female; in fact, the only time that female incidence was ever larger than the male was in 2000 in the first expenditure decile. This suggests that male-headed households generally have a more unequal distribution of the tariff incidence compared to women. In addition, it should be noted that seven of the estimates in 1995 are statistically significant, compared to three in 2000 and six in 2004. This suggests that the impact of the change in tariff regime had no consistent relationship across 1995, 2000, and 2004.

An additional dimension of this relationship may be investigated by plotting the Lorenz curves of the cumulative incidence by sex of household head for each of the three years (see Appendix 5 for the figures). What we investigate here is whether each group bears a greater burden of the tariff incidence compared to their share in total expenditure. This would indicate that tariffs fall disproportionately on a particular group relative to total expenditure.

Figure 3: Lorenz curve of the tariff incidence by gender of household head; 1995 Incidence compared to share of expenditure

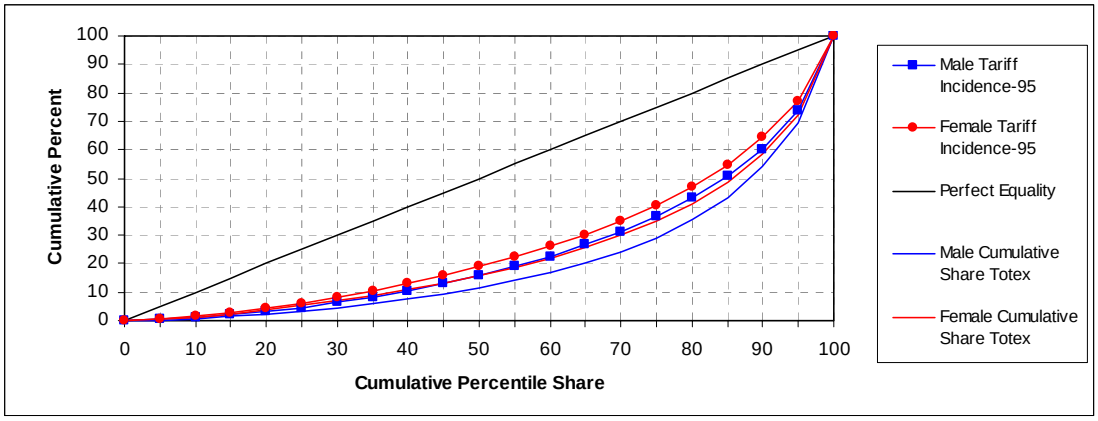


Figure 4: Lorenz curve of the tariff incidence by gender of household head; 2000 Incidence compared to share of expenditure

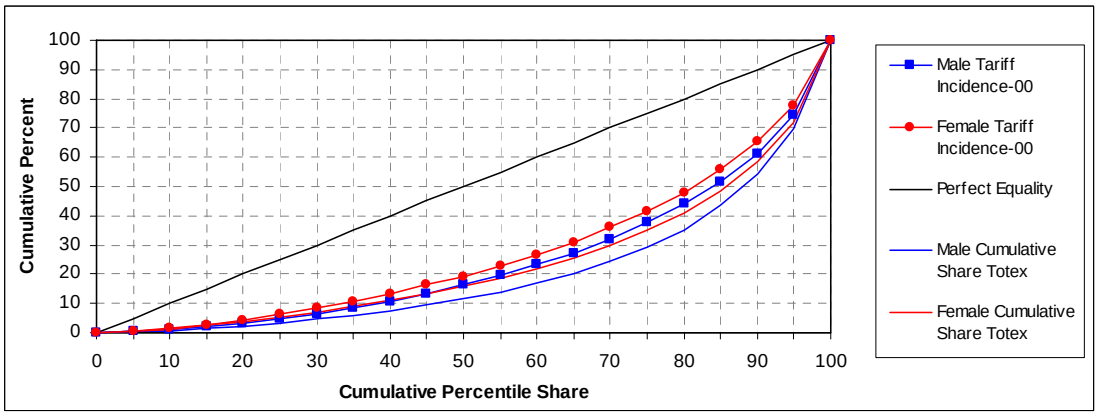
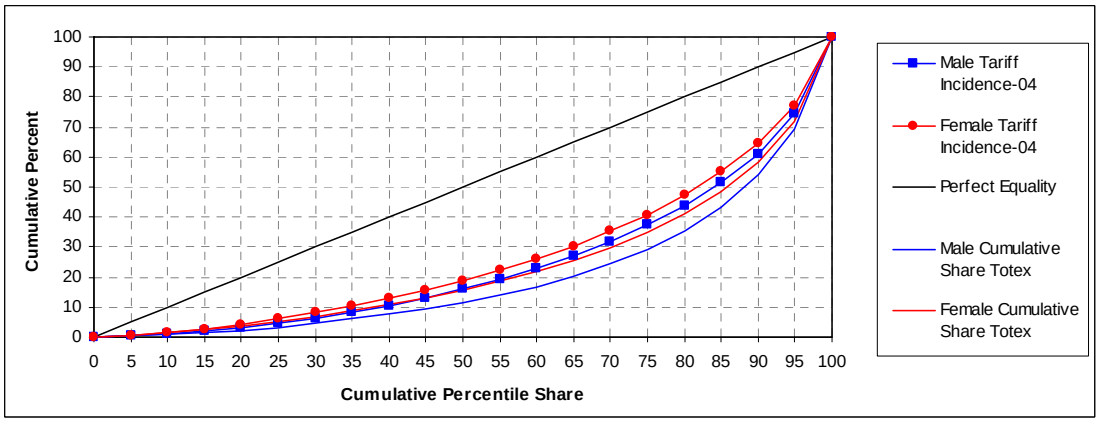


Figure 5: Lorenz curve of the tariff incidence by gender of household head; 2004 Incidence compared to share of expenditure



We can see from the figures that in each of the three years, all but the wealthiest expenditure quantile bear a disproportionate share of the tariff burden compared to their share of total expenditure. This is true for both male- and female-headed households. Furthermore, the cumulative incidence for men shows greater inequality compared to

women for all three years, both in terms of their share in total expenditure and their share in the tariff burden.

However, it is very difficult to see the changes in the trends over time using these figures. For this purpose, it is far more useful to deal with each of the changes explicitly.

CHANGE IN INCIDENCE: (1995–2000) and (2000–2004)

In this section we analyze the change in incidence for households between 1995, 2000, and 2004 by focusing only on the direction of change (see Methodology).

Table 8: Change in incidence: (1995–2000) and (2000–2004)

Decile	Male Households in (1995–2000)		Female Households in (1995–2000)		Male Households in (2000–2004)		Female Households in (2000–2004)	
	Unfavorable	Favorable	Unfavorable	Favorable	Unfavorable	Favorable	Unfavorable	Favorable
1	0.54	0.46	0.61	0.39	0.33	0.67	0.25	0.75
	802	694	839	555	494	1,002	363	1031
2	0.65	0.35	0.75	0.25	0.33	0.67	0.22	0.78
	906	473	1,114	407	449	930	331	1190
3	0.64	0.36	0.77	0.23	0.36	0.64	0.24	0.76
	940	470	1,078	352	487	923	336	1094
4	0.70	0.30	0.73	0.27	0.41	0.59	0.29	0.71
	1,035	429	981	349	581	883	394	936
5	0.67	0.33	0.71	0.29	0.45	0.55	0.35	0.65
	1,132	494	775	306	713	913	371	710
6	0.65	0.35	0.74	0.26	0.51	0.49	0.37	0.63
	1,128	556	741	253	845	839	372	622
7	0.65	0.35	0.71	0.29	0.57	0.43	0.48	0.52
	1,152	577	625	254	949	780	426	453
8	0.60	0.40	0.65	0.35	0.60	0.40	0.57	0.43
	1,078	680	526	283	1,011	747	462	347
9	0.48	0.52	0.58	0.42	0.54	0.46	0.52	0.48
	795	857	387	258	934	718	340	305
10	0.25	0.75	0.24	0.76	0.59	0.41	0.67	0.33
	487	1,209	89	187	958	738	172	104
Total	0.56	0.44	0.69	0.31	0.49	0.51	0.35	0.65
	9,455	6,439	7,155	3,204	7,421	8,473	3,567	6,792

The table shows the proportion of households observing unfavorable or favorable changes to their tariff incidence between 1995–2000 or 2000–2004. The number of observations for each decile is displayed directly beneath the proportion. Favorable changes imply that the tariff incidence decreased; unfavorable changes imply that they increased.

Regarding the change in incidence between 1995 and 2000 first, it is evident from the table that there are differences between male- and female-headed households as we move up the expenditure distribution. Male households experience predominantly favorable shifts from the eighth decile upward, while female households experience predominantly favorable shifts only from the ninth decile. Otherwise, within-decile changes for men compared to women are generally very similar in direction (rather than

magnitude—which we are not interested in here but graph below to help isolate this component of the relationship).

Between 2000 and 2004 on the other hand, both male- and female-headed households experience identical trends in the change in incidence as we move up the expenditure distribution. All deciles witness favorable changes in their tariff incidence up until the tenth decile, which experiences predominantly unfavorable changes.

Generally, we can see from the table that the change in tariff incidence is predominantly unfavorable between 1995 and 2000, with the change in tariff regime benefiting the very wealthy. However, between 2000 and 2004, the change in tariff regime was generally pro-poor, *irrespective of the gender of the household head*. We can see these trends fairly clearly by plotting the binary indicator of unfavorable/favorable change against the continuous expenditure distribution.

Figure 6: Cumulative sum of differenced distribution on ordered expenditure: (1995–2000)

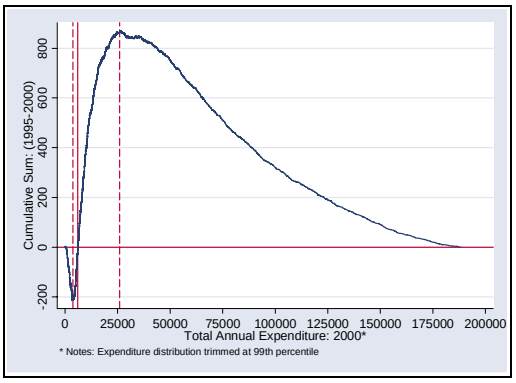
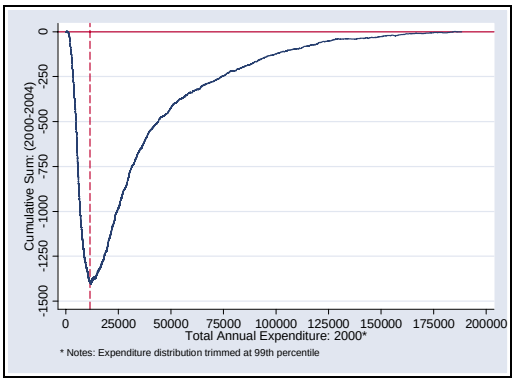


Figure 7: Cumulative sum of differenced distribution on ordered expenditure: (2000–2004)



In these diagrams, a U-shaped or inverted U-shaped cumulative sum curve indicates, respectively, a negative or a positive trend between those households that experienced favorable shifts in their tariff incidence and total expenditure. The dashed vertical lines in the figures approximate turning points in the distribution: in Figure 6, the first dashed vertical line is at R3,700 total household expenditure per annum, while the second dashed vertical line is at R26,000 per annum. The solid vertical line is at R6,000, which separates the cumulative sum curve from below-zero to above-zero. In Figure 7, the dashed vertical line (approximate turning point) is at R11,500 per annum.

The figures show quite clearly that the change in tariff regime between 1995–2000 was very different to 2000–2004. They confirm that the former change was biased against the poor, while the latter is in favor of the poor. Below we separate the trends by gender.

Figure 8: Cumulative sum: (1995–2000): Male Headed Households

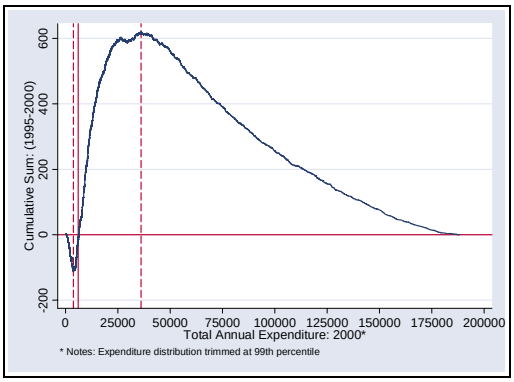
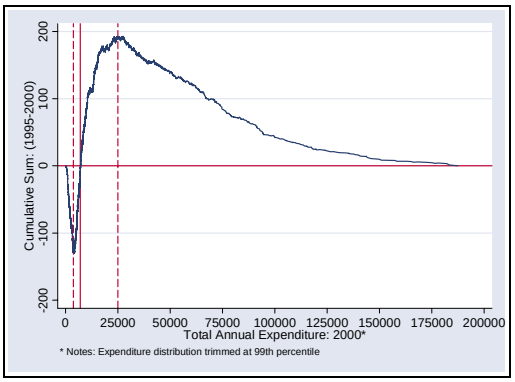


Figure 9: Cumulative sum: (1995–2000): Female Headed Households



These graphs display the results for (1995-2000) only. The general direction of the curve for both male- and female-headed households is identical, though the turning points differ. For male-headed households, the dashed vertical lines (which approximate turning points) are placed at R3,700.00 and R36,000.00 per annum. For female-headed households, the lines are R3,700.00 and R25,000.00 respectively. The solid vertical line is approximated at R6,000.00 for male-headed households compared to R7,000 for female-headed households.

Therefore, while the general direction is similar to the overall population, the turning points are different between the sexes, with male-headed households experiencing predominantly negative changes for a greater range of the expenditure distribution: R3,700–R36,000 for men compared to R3,700–R25,000 for women. Consequently, it may be stated that male-headed households experienced unfavorable changes for a greater range of the expenditure distribution, which implies that even if they earned more than female-headed households (up to R37,000), their profile of consumption spending was sufficiently different to predispose them to negative impacts more than female-headed households. By corollary implication, female-headed households starting experiencing predominantly favorable changes to their tariff incident sooner than male-headed (>R25,000 compared to >R36,000)

Between 2000 and 2004, these curves change direction, mimicking the trends for the total population in Figure Seven.

Figure 10: Cumulative sum: (2000–2004): Male Headed Households

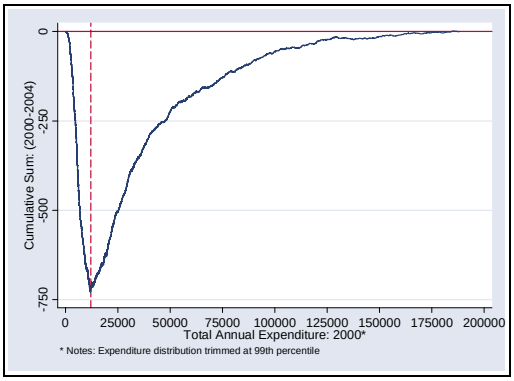
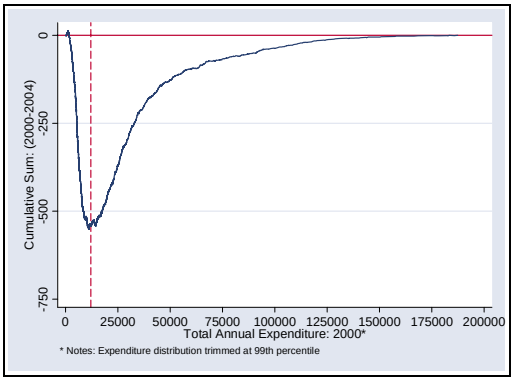


Figure 11: Cumulative sum: (2000–2004): Female Headed Households



We can see that the curves are similar in direction and shape for both male- and female-headed households. In both graphs, the turning points (dashed vertical lines) are at R12,000 per annum, suggesting most household that spend that level (or less) per month experienced positive changes to their tariff incidence. Therefore, both male- and female-headed households experienced changes to their tariff incidence in an identical manner between 2000 and 2004.

In summary it may be stated that the change in tariff incidence between 1995–2000 and 2000–2004 was very different; the cumulative sum curves confirmed the fact that the former period promoted change in favor of the wealthy, with the exception of the very poor (spending less than R3,700 per annum). The change between 2000–2004 was completely the opposite, favoring the lower parts of the expenditure distribution.

Returning to the question of the below-R3,700 per annum finding for 1995–2000, further analysis (not presented here) suggests that this is largely attributable to the population group of the household head, where only African households experience this below-R6,000 benefit while no other countries do. Further work should explore this dimension of the incidence in more detail.

As far as gender is concerned, it should be noted that the shape of the curves for male-headed and female-headed households followed exactly the same direction as the national trends in both comparisons. However, the range of the households that gained and lost between 1995–2000 differed, with clear advantages associated with living in a female-headed household. This was not evident between 2000–2004, indicating that the change in tariff regime does not necessarily affect all households—even those earning similar incomes—equally.

CONCLUSION

This paper has investigated the incidence of tariff liberalization and its differential effect on male- and female-headed households. 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 tariff regime on households. However, it also constitutes a weakness to some extent, and future work should be directed at including the 1995 IES's findings into the analysis, as well as the forthcoming 2005 IES.

Changes to the tariff incidence by sex of household head must be situated theoretically at least within consumption theory. In this there is an *a priori* reason to suspect differences between male- and female-headed households. To the extent that material differences exist in consumption patterns, these are then transmitted through to the tariff incidence analysis.

In this paper, it was demonstrated that there are statistically significant differences between households with respect to their consumption habits, with male-headed households spending more on alcohol and tobacco. This seemed to reduce the level of spending on food and non-alcoholic beverages, as well as clothing and textiles to a lesser extent. With this established, we then proceeded to analyze tariff revenue before the share of tariffs in total expenditure was discussed.

Tariff revenues between 1995 and 2000 decreased by 31 percent compared to 18 percent between 2000 and 2004. This suggested that the level of the decrease in tariffs for most of the SU commodities was greater in the former period compared to the latter, despite the fact that fewer tariff lines increased in 1995–2000, as compared to 2000–2004.

There were two implications of this reduction in tariffs: first, everybody benefited in the form of lower levels of expenditure on tariffs, constituting Pareto-enhancing welfare effects. Second, the differences between households headed by men and women in 1995 were always larger than the differences in 2000, whereas the differences between 2000 and 2004 were smaller for deciles 1 through 7, and larger for deciles 8 through 10. Therefore, the change in tariff regime between 1995 and 2000 led to smaller differences between male- and female-headed households, whereas the change between 2000 and 2004 actually served to increase the disparity for the majority of deciles in the expenditure distribution. These changes were not attributable to increases in tariff duties on alcohol and tobacco, which suggests a more complex dynamic at the household consumption level.

Results for the tariff incidence were separated into within-sex differences over time and between-sex differences in a single time period. Over time, there were almost always statistically significant changes to the incidence, suggesting that the change in tariff regime not only affected the absolute expenditures on tariffs (as discussed in the previous paragraph), but also the relative distribution of the incidence of those tariffs. This is an incredibly important finding, for it suggests that while there were Pareto-enhancing welfare improvements in the levels of spending on tariffs, there were *not* similar improvements to the incidence. In fact, between 1995 and 2000, all but the

wealthiest two (one in the case of women) deciles witnessed an increase in their tariff burden. Between 2000 and 2004, this result changed and showed pro-poor improvements to the incidence.

Between-sex differences revealed that male-headed households always have a higher incidence estimate compared to female-headed, suggesting a more unequal distribution in the tariff incidence. This may be due to a more tariff-dependent consumption profile; further analysis is necessary to confirm this. Lorenz curves based on the cumulative incidence for male-headed compared to female-headed households confirmed the greater inequality, and exposed the more worrying trend that regardless of sex of head of household and the time period, all but the wealthiest deciles bear a disproportionate share of the tariff burden compared to their share in total expenditure.

The change in tariff incidence between 1995–2000 and 2000–2004, relative to the continuous expenditure distribution, was very different for the population as a whole. The cumulative sum curves confirmed the fact that the former period promoted change in favor of the very poor (spending less than R3,700 per annum) and lower-middle to upper classes (>R26,000). Between 2000 and 2004, the cumulative sum curves demonstrated that the change in tariff regime promoted favorable change for those earning less than approximately R11,500, with all others above this level of expenditure experiencing predominantly unfavorable changes.

However, when these trends were separated by sex of household head, only the result for 2000–2004 remained completely valid. While the general direction of the curve between 1995–2000 was similar at the national level and between the sexes, the turning points were very different. Here, male-headed households experienced predominantly negative changes for a greater range of the expenditure distribution (R3,700–36,000) compared to women (R3,700– 25,000).

Consequently, it may be concluded that male-headed households experienced unfavorable changes for a greater range of the expenditure distribution, which implies that even if they earned more than female-headed households (up to R37,000), their profile of consumption spending was sufficiently different to predispose them toward negative impacts more than female-headed households. Consequently, female-headed households started experiencing predominantly favorable changes to their tariff incident sooner (relative to expenditure) compared to males between 1995 and 2000 (>R25,000 for women compared to >R36,000 for men). This suggests that the sex of the household head *matters*, and must be considered independently from anything else when considering the full scope of tariff liberalization.

In the *ceteris paribus* context of this study, and noting the partial nature of benefit incidence analyses, the policy recommendations clearly point to the risks associated with imposing additional costs on consumption goods that constitute a large fraction of poorer households' expenditures. This is not limited to tariff reform, but applies equally to other forms of taxation.

Having noted these findings, it is important to discuss some of the limitations of this report. First, the analysis has focused on an implicit *de jure* definition of the household head, taken directly from the IES. This is known to be a highly imperfect measurement,

and additional analyses of within-household dynamics should be explored in connection with headship status to determine the extent of measurement error in this regard.

Second, the analysis has also assumed that there is a perfect pass-through of tariff-adjusted prices to domestic prices, which, while justifiable from a trade theory point of view, may not necessarily be defensible given a middle-income country context with market imperfections. Related to this is the assumption that tariff reductions are passed on to consumers via benevolent retailers. Further research should examine how sensitive the incidence results are to changes in this key assumption.

Third, the analysis has assumed uniform transportation costs implicit in the final price, rendering the results insensitive to location (urban, rural, etc.). Note that since the IES 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 proxy for the household, for example geographical distance to a retail outlet (similar proxies are available in the Labour Force Survey, but would require additional assumptions before they could be used). This should also be part of further work in this area.

Fourth, changes to excise taxes for cigarettes and tobacco need to be incorporated into the tariff or expenditure data, since these goods have been subject to significant “sin tax” increases over the period.

Fifth, budget share analyses per gender of household head would significantly strengthen the section on consumption schedules. This would then provide a more coherent theoretical basis to observed consumer behavior, and would also provide greater clarity in understanding the changes to tariff incidence over time. In this regard, the non-monotonic change in incidence across the expenditure distribution between 1995 and 2000 has proven to be one of the most interesting findings of this study, yet our ability to precisely account for this change is limited. A cursory examination of race and gender changes between 1995 and 2000 revealed that only African households experienced the initially positive impact below R3,700, which brings us to the next point.

Additional work should also be directed to the income side of households, where more nuance could be provided to the gender dimension of the analysis by focusing directly on the correlates of poverty, earnings, and income transfers.

Lastly, it should be reiterated that a comparative static analysis could be achieved by including the results of the 1995 and forthcoming 2005 IES into the analysis. This would at least provide some analysis of the sensitivity of the findings and methodology used in this report, even if we retained all existing assumptions.

APPENDIX 1: SUPPLY AND USE TABLE 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	Beverage/Tobacco	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	Jewelry	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	Tires	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

APPENDIX 2: CONSUMPTION SCHEDULES BY DECILE AND SEX OF HOUSEHOLD HEAD

Expen Decile	Sex	Food & Bev.	Alcohol & Tob.	Cloth & Textile	Accommodation	Traded Vehicle Parts	Personal Goods	HH Goods	HH Service.
1	Male	52.3	5.9	4.9	2.5	0.0	10.0	10.5	13.9
	Female	54.9	1.2	6.2	2.8	0.0	10.9	10.3	13.8
2	Male	53.0	5.2	6.1	3.5	0.0	8.1	9.0	15.0
	Female	55.7	1.0	6.6	2.8	0.0	9.0	9.1	15.7
3	Male	49.4	4.6	7.1	4.4	0.1	7.6	9.5	17.4
	Female	53.0	1.4	7.6	3.0	0.0	8.5	9.1	17.5
4	Male	45.5	4.9	8.0	5.4	0.1	7.0	8.8	20.3
	Female	50.3	1.2	7.8	3.3	0.0	8.0	9.2	20.1
5	Male	42.3	4.6	9.2	4.9	0.1	6.5	10.0	22.5
	Female	46.6	1.8	8.2	3.7	0.0	7.6	9.7	22.3
6	Male	38.7	5.1	9.0	5.0	0.5	6.0	10.5	25.3
	Female	43.2	1.7	8.2	4.2	0.0	6.9	9.5	26.2
7	Male	34.7	4.7	8.8	5.4	0.3	5.6	11.3	29.2
	Female	37.9	1.7	8.6	5.4	0.1	6.3	10.0	29.9
8	Male	30.5	3.8	7.8	5.9	0.9	5.0	12.3	33.8
	Female	31.7	2.1	8.5	5.9	0.3	5.6	10.6	35.3
9	Male	23.6	2.6	6.5	6.3	2.6	4.2	13.5	40.8
	Female	23.3	1.6	7.2	8.1	1.8	4.8	11.5	41.6
10	Male	15.1	1.9	4.2	4.4	7.0	3.4	13.6	50.4
	Female	16.1	1.8	4.6	6.7	6.0	3.7	13.5	47.6

APPENDIX 3: MEAN DECILE ESTIMATES OF EXPENDITURE ON TARIFFS AS A PERCENT OF TOTAL EXPENDITURE

Decile	Sex	1995	2000	2004	Observations	Pop. Size
1	Male	16.08	11.38	9.15	1,496	562,008
	Female	15.59	11.23	8.86	1,394	540,642
2	Male	15.85	11.42	9.18	1,379	507,312
	Female	15.21	11.19	8.82	1,521	597,170
3	Male	15.53	11.12	8.99	1,410	536,028
	Female	15.19	11.12	8.85	1,430	567,701
4	Male	15.13	10.89	8.87	1,464	561,036
	Female	14.93	10.84	8.74	1,330	542,639
5	Male	15.09	10.77	8.83	1,626	661,594
	Female	14.68	10.56	8.59	1,081	442,500
6	Male	14.75	10.47	8.66	1,684	700,960
	Female	14.06	10.10	8.25	994	403,786
7	Male	13.92	9.84	8.17	1,729	740,942
	Female	13.40	9.58	7.88	879	362,048
8	Male	12.60	8.85	7.37	1,758	763,326
	Female	12.34	8.75	7.26	809	341,243
9	Male	10.77	7.48	6.22	1,652	786,939
	Female	10.43	7.30	6.06	645	316,962
10	Male	8.80	5.95	4.95	1,696	951,339
	Female	9.03	6.11	5.10	276	151,549

APPENDIX 4: MEAN INCIDENCE PER DECILE AND SEX OF HOUSEHOLD HEAD

Decile	Sex	1995	2000	2004	Observations	Population Size
1	Male	0.0056	0.0057	0.0056	1,496	562,008
	Female	0.0055	0.0057	0.0055	1,394	540,642
2	Male	0.0106	0.0110	0.0107	1,379	507,312
	Female	0.0102	0.0108	0.0103	1,521	597,170
3	Male	0.0142	0.0146	0.0143	1,410	536,028
	Female	0.0138	0.0144	0.0139	1,430	567,701
4	Male	0.0184	0.0189	0.0186	1,464	561,036
	Female	0.0180	0.0187	0.0183	1,330	542,639
5	Male	0.0238	0.0243	0.0241	1,626	661,594
	Female	0.0230	0.0237	0.0233	1,081	442,500
6	Male	0.0304	0.0308	0.0309	1,684	700,960
	Female	0.0290	0.0298	0.0295	994	403,786
7	Male	0.0390	0.0394	0.0397	1,729	740,942
	Female	0.0377	0.0386	0.0385	879	362,048
8	Male	0.0524	0.0527	0.0531	1,758	763,326
	Female	0.0503	0.0511	0.0514	809	341,243
9	Male	0.0756	0.0750	0.0755	1,652	786,939
	Female	0.0702	0.0703	0.0707	645	316,962
10	Male	0.1640	0.1576	0.1588	1,696	951,339
	Female	0.1333	0.1287	0.1303	276	151,549

* Estimates multiplied by factor 1000

APPENDIX 5: CUMULATIVE INCIDENCE PER QUANTILE AND SEX OF HOUSEHOLD HEAD

Quan-tile	Total EX Male	Total Ex Female	1995 Male	1995 Female	2000 Male	2000 Female	2004 Male	2004 Female
1	0.27	0.46	0.37	0.53	0.38	0.53	0.37	0.51
2	0.79	1.32	1.09	1.54	1.12	1.56	1.08	1.5
3	1.49	2.44	2.05	2.84	2.11	2.89	2.05	2.79
4	2.34	3.78	3.23	4.4	3.34	4.51	3.25	4.34
5	3.37	5.3	4.64	6.21	4.8	6.38	4.67	6.14
6	4.58	6.99	6.29	8.23	6.51	8.48	6.36	8.17
7	6.01	8.85	8.2	10.49	8.5	10.81	8.31	10.44
8	7.63	10.92	10.41	13.01	10.77	13.39	10.56	12.96
9	9.49	13.24	12.9	15.78	13.33	16.25	13.1	15.74
10	11.61	15.82	15.73	18.86	16.23	19.38	15.98	18.83
11	14.05	18.71	18.92	22.26	19.5	22.85	19.24	22.24
12	16.88	21.97	22.53	26.05	23.19	26.71	22.92	26.06
13	20.2	25.65	26.62	30.31	27.35	31.04	27.11	30.33
14	24.22	29.93	31.3	35.16	32.11	35.92	31.85	35.19
15	29.13	34.92	36.73	40.69	37.62	41.52	37.37	40.78
16	35.32	40.98	43.09	47.15	44.04	48.02	43.84	47.31
17	43.4	48.46	50.8	54.89	51.73	55.76	51.51	55.11
18	54.17	58.32	60.34	64.43	61.33	65.33	61.11	64.7
19	69.51	71.96	73.52	77.02	74.34	77.73	74.23	77.31
20	100	100	100	100	100	100	100	100

NOTES

1. Buvinic and Gupta, “Female-Headed Households;” Hoddinott and Haddad, “Testing Competing Models;” Thomas, “Intrahousehold Resource Allocation.”
2. Statistics South Africa, *Income and Expenditure Survey*.
3. Bourguignon, Pereira da Silva, and Stern, *Evaluating the Poverty Impact*; Demery, *Benefit Incidence*; Nicita, Olarreaga, and Soloaga, *A Simple Methodology*.
4. Daniels and Lawrence, *The Benefit Incidence*.
5. See note 2 above.
6. PROVIDE, Creating a 2000 IES-LFS.

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