EQUITY POTENTIALS FOR TAX REFORM IN ETHIOPIA*

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Abstract

In order to analyze the issue of equity potentials for tax reform in Ethiopia, this paper makes use of Household Income, Consumption, and Expenditure Survey data to derive concentration curves for one direct tax and commodity taxes for six goods and a service as well as the Lorenz Curve for Expenditures. The findings indicate that reforming the tax system in such a way as to reduce taxes on food items and salt while compensating the revenue loss by increased collection from the personal income tax and taxes on sugar and telecommunication services may improve social welfare.

1. INTRODUCTION

The development paradigms of the 1960s and the 1970s, which favored a large public sector, induced post-independence African governments to increasingly rely on taxes to meet their fiscal needs. As a result tax policies and reforms were mostly initiated on grounds of revenue adequacy, i.e. enabling governments to raise as much tax revenue as their fiscal needs require.

However, in the derivation of optimal tax system, other features of taxes such as economic efficiency, equity, and administrative efficacy need to be taken into consideration. This is not only because these other canons of a good tax system are worth striving for by their own account but also because all the principles are not mutually exclusive. For instance, the taxes' administrative efficiency characterized by their relative ease of collection might have contributed to heavy reliance on foreign trade taxes in Ethiopia. But, such situations are known to entail large distributional (equity) costs (Hammer 1996).

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In recent years, equity issues have come to take center stage in development debates due primarily to two reasons. First, empirical evidence from successful East Asian economies has gone some way to disprove the long held view that there is a trade-off between augmenting growth and reducing inequality. The idea that unequal distribution of income is necessary for, or the likely consequence of, rapid economic growth stems from the works of Kaldor (1978) and Kuznets (1955).

The former argues that since a high level of savings is a prerequisite for rapid growth, income must be concentrated in the hands of the rich whose marginal propensity to save is relatively high. Kuznets, on the other hand, argues that as labour shifts from sectors with low productivity to sectors with high productivity, aggregate inequality must initially increase substantially and decrease only later.

Second and more importantly, massive social cost of recent economic reforms, in terms of increased incidence and depth of poverty have reinforced interest on equity concerns. A well-evidenced study on how strongly adjustment-induced reductions in government expenditure affected the poor is provided in a United Nations Children Fund report prepared by Cornia, Julia and Stewart(1987).

In light of the changes in development thinking explained above, it would be worthwhile to look into the potentials of the Ethiopian tax system in promoting social justice objectives by reducing inequality in the distribution of income or consumption or any other welfare measure. Accordingly, this article presents a comparative analysis of the performance of some selected taxes in Ethiopia with respect to their equity implications. In broad terms, it tests the presence of equity grounds to reform the tax system in Ethiopia.

It should, nevertheless, be noted that it is beyond the scope of a partial equilibrium analysis such as this study to accommodate simultaneously impacts of other factors like economic and administrative efficiencies of the taxes or viability of using the tax system vis-à-vis other policy instruments as a redistributive tool.

The rest of the paper is organized as follows: Section II assesses equity considerations included in the tax laws of Ethiopia while Section III presents the conceptual framework and analytical methodology. Section IV discusses data and results and Section V is devoted to making conclusions.

2. EQUITY CONSIDERATIONS IN THE ETHIOPIAN TAX LEGISLATION

Identifying individual taxes or the whole tax system or progressive, neutral or regressive is making reference to that section of society which bears most of the tax burdens. By and large, the ultimate distributional outcome of a tax is a function of

two interrelated factors. These are the provisions of the tax legislation and the pattern of shifting tax burdens between economic agents. The former refers mainly to statutory marginal tax rates and levels of tax exemptions while the latter considers changes in price levels and/or factor payments.

Provisions are included in most of the Ethiopian tax laws to address equity concerns. The structure of the personal income tax is examined as an example of direct taxes. According to proclamation No.109/1994, a monthly personal income of up to Birr 120 is untaxed while consecutively rising marginal rates are applied on five income brackets. However such an increasing marginal tax rate structure satisfies only a necessary condition for being classified as a progressive tax. A tax is said to be progressive when the marginal tax line is everywhere above the average tax line. Also, note should be taken of the presumption that for direct taxes physical and effective incidences overlap.

A progressive income tax takes an increasing proportion of a rising income. In other words, the tax rate increases as the base increases. If, for instance, average rates of the tax equal marginal rates it implies that the tax system treats an additional income earned at high and low income brackets equally. Hence average tax rates, calculated over total income, need always lie below marginal rates, which are derived for a given income bracket. Table 1 indicates the extent to which the personal income tax in Ethiopia is progressive.

Table1: Progressiveness of the Ethiopian Personal Income Tax

Income Bracket (Birr/month)	Marginal tax rates (percent)	Average tax rates* (percent)
0-120	0	0
121-600	10	8
601-1200	15	11.5
1201-2000	20	14.9
2001-3000	30	19.9
>3000	40	24.9

Source: Derived from proc. No.107/1994

* In calculating the average rates, the upper class limits of each income bracket are taken. This doesn't compromise the picture as those figures represent the maximum the average rate can go under the given income bracket. For the last income bracket, a hypothetical income level of Birr 4000 is taken.

The impact of tax legislations on the distribution of tax burdens among different socioeconomic groups is limited for indirect taxes mainly imposed upon consumption of goods and services. A number of empirical works prove that producers shift the burden of commodity taxes to consumers through upward changes in retail prices. However, the degree of shifting is very much dependent upon the relative strength of

price elasticities of demand and supply. For commodities characterized by inelastic demand, we may observe prices rising by the full amount of the tax.

This scenario in which producers pass on tax burdens to consumers tells only part of the story concerning the ultimate distributional outcome of indirect taxes. This is because consumers do not share the tax burdens evenly, rather in accordance with amount of the taxed items purchased. Hence, tax burdens of commodity taxes for a particular household are modeled to be linear in the share of income spent on such goods and services.

In Ethiopia, a number of provisions in consumption tax proclamations can be ascribed to vertical equity considerations. The Sales and Excise tax proclamation No.68/1993 and by Proclamation No.77/1997 which amended it exhibit implicit attempt by government to address adverse equity implications of the taxes. Accordingly, basic food items like bread and 'injera' are exempted from such taxes. Similarly, service outputs deemed particularly essential to low income households are not taxed.

These legislations are based on two important economic principles. Firstly, exempting food from consumption taxes conforms with Engel's law which states that proportion of income spent on acquisition of food is higher for poorer households. Hence, the tax burdens on these households correspondingly decline as a result of the exemption. Secondly, the likelihood for producers to pass on such taxes to consumers is so high as to warrant the inclusion of the exemption provision in the tax law.

Once the tax legislations are introduced for equity purposes, assessing their impact on inter household distribution of welfare is important because such provisions cost the government in the form of tax revenue forgone. The reorientation of economic policy towards meeting poverty reduction objectives would be all the more reason to look into the equity implications of the tax system.

Generally, commodity taxes are regressive as saving is a positively monotonic function of income. Put differently, the higher the income of an individual, the higher would be the saving. This implies that the individual would very likely bear a smaller proportion of the expenditure taxes on commodities. In either scenario, i.e. when food is considered taxable or when it is exempted, the overall incidence pattern regressive. Low income households that fall between annual income range of Birr 399.5 and Birr 1699.5 (inclusive) spend more than 85% of their income on purchase of taxable items while the figure for high income households [Birr 14399.5, Birr 20000] is below 74%.

Table 2: Breakdown of household expenditures on taxable items

Income Group (Annual Income in Birr)	Class mark*	% of income spent on taxable items (food taxable)	% of income spent on taxable items (food exempted)
<=599	399.5	87.91	77.31
600-999	799.5	86.21	79.79
1000-1399	1199.5	86.76	80.55
1400-1999	1699.5	85.81	80.60
2000-2599	2299.5	83.53	78.56
2600-3399	2999.5	84.14	79.14
3400-4199	3799.5	84.96	80.74
4200-5399	4799.5	79.82	76.35
5400-6599	5999.5	81.61	77.90
6600-8999	7799.5	78.85	76.61
9000-12599	10799.5	75.83	72.68
12600-16199	14399.5	73.63	71.18
16200-19999	18099.5	74.81	72.35
>=20000	20000	74.74	71.98

Source: calculated from CSA survey (1998).

* In order to have a representative income level for each income bracket, class mark is calculated by dividing by 2 the sum of the lower and upper limits of the income class. Only the floor of the income variable is known for the highest income class and to circumvent this problem its lower limit is taken as its class mark.

Although exemption of food from taxation did not make the tax burden distribution pattern neutral or progressive, it has clearly helped reduce the steepness of the incidence line. In other words, it has made the taxes more acceptable interms of equity. It should be noted that when food is tax exempt, the alterations in the pattern of tax burdens stems primarily from changes that occurred at the lower steps of the income ladder.

Considering the lower income group individually [399.5, 1699.5] this is the only case where the incidence pattern is reversed from regressive to progress as a result of the exemption of food from taxation. Besides, as a consequence of this exemption, the share of income spent on taxable items falls by 10.6 percentage points for the lowest income group but the gains for the highest income group stands at only 2.76 percentage points.

All in all, equity concerns are addressed in Ethiopian tax laws through differential rate structure in direct taxes and for indirect taxes through tax exemption of goods and services that take up the bulk of income of low income households, in indirect taxes.

3. CONCEPTUAL FRAMEWORK AND ANALYTICAL METHODOLOGY

The need to undertake tax incidence analysis arises primarily from the close correlation between a country's economic well-being and its pattern of distribution of income or wealth. The idea that the entities required by law to pay a tax may not necessarily converge with those whose real purchasing power is reduced following the imposition of the tax, dates as far back as to the time of Ricardo. In addition, economic agents differ in their capacities to make uniform responses to reduce tax liabilities as a result of wide ranging factors.

One such case cited by Younger and others (1999) is 'avoiding a tax by changing one's pattern of consumption or income'. Accordingly, households that have high elasticities of demand for, say, gasoline can avoid paying a tax on gasoline consumption by switching to substitutes with little loss in welfare, while those with an inelastic demand cannot do the same so easily.

Most of the earlier theoretical developments regarding tax incidence centered around the direction and size of tax shifting. In the literature the terms "shifting assumptions", incidence assumptions", and "sources and uses side effects" are interchangeably used to refer to the treatments adopted to allocate tax burdens.

Essentially, there are three approaches to incidence: balanced, differential and absolute. The balanced budget incidence approach varies taxes and expenditures simultaneously on condition that full employment is maintained. The differential incidence approach, on the other hand, analyzes the effect of substituting one type of tax by another while real expenditures are held constant. Finally, there is the absolute incidence approach, which is associated with the process of inflation or deflation.

Earlier empirical studies on incidence were mainly undertaken in a Marshallian partial equilibrium framework. Mieszkowski (1969) provides a broader account of earlier tax incidence studies. A pioneering work which represented a departure from such studies was that of Arnold C.Harberger (1962). Harberger made a non econometric study of incidence of the corporate income tax in the U.S. under a general equilibrium framework. He found that imposition of the corporate tax makes, in the short run, the tax burden fall entirely on earnings of fixed capital equipment in the affected industry. In the long run, and in response to the tax induced disequilibrium in the capital market, redistribution of resources will force 'equalization' of net returns to labour and capital in all sectors. However, his model hinges on strong assumptions such as perfect factor mobility, fixed aggregate factor supplies, and a closed economic system.

Other notable works in the area include those of J.F. Due (1970) and Shah and Whalley (1991). Due showed that in imperfectly competitive economies, a general sales or production tax is borne in relation to consumption spending and that a value-added tax of the income type was equivalent to general consumption tax; Shah and Whalley argued in favour of including the particular features of developing countries in tax incidence analysis. An interesting study in this respect was done later by Clarete (1994) who applied an explicit computable general equilibrium model to analyze the burden of the Philippines tax system. By modeling such stylized features of developing countries as foreign exchange rationing, quantitative import restrictions, rent seeking and a Harris-Todaro labour market distortion, Clarete found results which are at variance with conventional, fully-flexible, price models.

The methodological framework for this study is drawn from the work of Yitzhaki and Selmrod (1991). The choice is particularly justified for the following reasons. First, unlike most other approaches, it enables comparison of individual taxes on their effectiveness in distributing tax burdens there-by making it possible to decide on the direction of equity-driven tax reform. Secondly, extent of data required by general equilibrium models makes them prohibitive and beyond the scope of this study.

The analytical methodology basically tests for 'welfare dominance' which refers to the superiority (or inferiority) of a given tax over another on grounds of equity for a welfare measure under consideration. This involves two steps:

i) The first step derives concentration curves which align households grouped in an ascending order of level of welfare along the horizontal axis and the cumulative proportion of taxes paid along the vertical axis. Outstanding issues here are choosing an appropriate welfare measure and estimating the amount of tax incurred by each household welfare group.

We choose household levels of expenditures as welfare measures for both practical and theoretical reasons. Younger, et al (1999) argue that households expenditures are preferred to income as welfare measures because households tend to report their expenditures more accurately than income. Bedsides, according to the life-cycle/permanent income hypothesis, expenditures provide better representation of long-term welfare than income as households try to smooth their consumption given income fluctuations over time.

ii) The second step involves adjusting the tax structure in such a way as to slightly decrease taxes on certain goods while at the same time increase taxes on other goods and still keeping total tax revenue constant. This improves social welfare if the concentration curves for the former are every where above the concentration curves for the latter.

Equivalently, concentration curves for items which slice off a larger proportion of income of the poor than the rich are above those which take up a relatively larger percentage of income of the rich. This was proved by Yizhaki and Slemrod (1991).

Analytical insights can also be drawn by comparing the concentration curves to the Lorenz curve for expenditures and the 45^{o} line. A concentration curve below the Lorenz curve for expenditures implies that the tax is progressive while the reverse represents a regressive tax. Moreover, the nearer the concentration curve for a tax to the 45^{o} line the more regressive the tax is.

4. DATA AND RESULTS

The data for the study is drawn mainly from the revised report of the 1995/96 Household Income, Consumption, and Expenditure Survey (CSA, 1998). Particularly attention is given to that part of the survey on urban locations as market exchange of goods and services is more pronounced in these areas. The choice of the specific items for analysis is based on the value of their relative contributions to total tax revenue as well as on compatibility between tax amount calculations from the survey and actual tax figures.

One direct tax and taxes on six consumption items are considered in the analysis. These are the tax on wage labour (i.e. the Personal Income Tax) and expenditure taxes on alcoholic beverages, tobacco, sugar, salt, communication services, and food. In order to justify the exemption of bread and other basic food items from taxation, the slot on bread and other prepared food in the survey is deducted from per household level of expenditure on food. Taxes are calculated using the following steps:

1) For each of the fourteen income groups of the survey, taxes are derived as functions of levels of consumption of an item except for income tax on wages and salaries which is directly included in the survey. Assuming that commodity taxes are fully shifted to consumers, the per household levels of expenditure are adjusted using tax rates to produce assessed tax payments. The major consumption taxes under consideration are sales and excise taxes.

The following example highlights the calculations of the tax amounts. According to the survey, the per household value of expenditure on alcoholic beverage of income group [3400, 4199] is 20.84. At the time, 12% of sales tax and an excise tax the rate of which differs as per type of drink are levied. Since the survey doesn't differentiate between types of alcoholic drink, a simple average of the rates, which is 90%, is taken to represent excise tax on alcoholic drinks. Hence, the tax amount for this

specific household becomes 21.2 (i.e. [20.84*0.12]+[20.84*0.9]. A similar exercise is followed for all goods and service considered. Another issue to note is that the survey includes consumption of sugar and salt only in volume terms. As a result, price levels of Birr 1.00 and Birr 5.00 are applied for salt and sugar, respectively, to do the conversions into monetary values.

2) The income groupings entered in Survey are not totally convenient for analysis as they comprise a widely differing number of households. Hence, in order to make a better income grouping, the data is reorganized in such a way that each income group represents a decile. In certain cases, the number of households in a given income group directly fits into the corresponding decile while for other situations the number of households for an income group enters two consecutive deciles. For instance the first two income groups directly fit into the first decile that is the poorest 10%. But the leftover which is about 67553.5 is partly drawn from income group [1000,1399]. Expenditure and tax cumulative shares are given in appendix. After all the derivations, the basic data translates into the following table.

As shown in Fig.1, the concentration curves of tax on food and income tax lie above and below the Lorenz curve for expenditure, respectively, implying that the former is regressive and the latter progressive. This result clearly conforms with earlier pattern of the distribution of the tax burdens presented in Tables 1 and 2. Relatively richer households assume the bulk of the income tax burden. Nevertheless, households at the lower income levels take up a larger portion of the food tax burden as a reflection of the underlining importance of food in the budgets of these households.

Table 3: Amount of assessed tax values by decile (in mill. Birr)

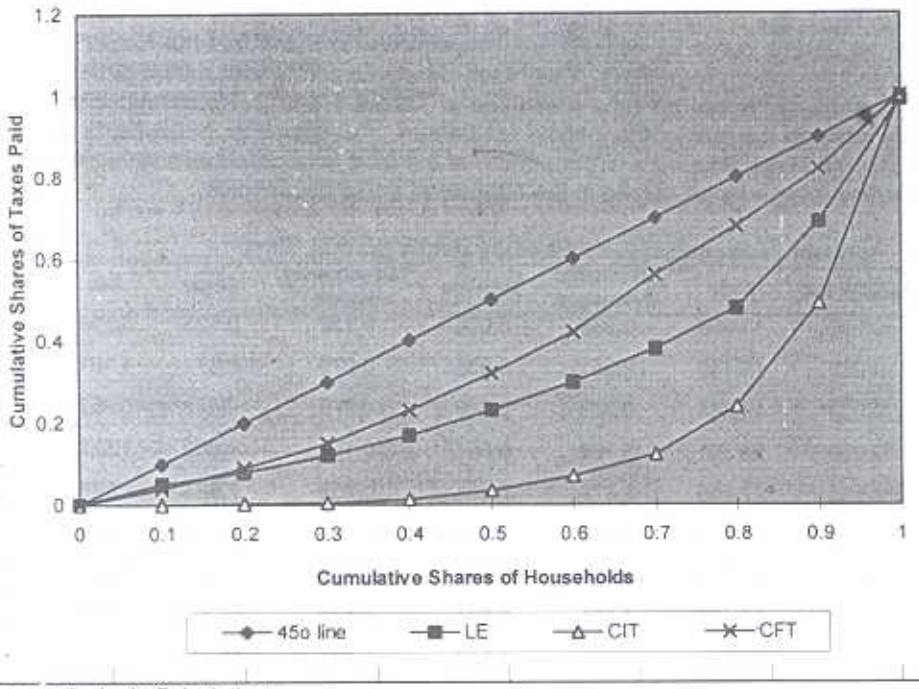
No.	Income tax	Food	Alcoholic Beverages	Tobacco	Telecommuni -cation	Sugar	Salt
1st	0.097	11.355	0.909	0.021	0.132	0.523	0.554
2nd	0.287	15.149	2.551	0.038	0.075	0.871	1.101
3rd	0.524	18.964	0.883	0.046	0.078	2.673	0.952
4th	2.036	24.351	3.736	0.057	0.189	4.902	1.527
5th	4.530	27.646	2.779	0.101	0.239	7.889	1.845
6th	7.040	31.538	4.296	0.089	0.296	6.996	1.974
7th	10.870	43.833	5.400	0.046	0.436	9.515	2.249
8th	24.190	39.383	4.131	0.071	0.413	13.313	2.751
9th	51.260	44.807	4.076	0.045	1.006	26.451	3.551
10th	104.960	60.813	6.111	0.029	3.507	49.441	4.427

Source: Author's Calculations.

The nearness of the concentration curve of tax on food to the 45° line further proves that the tax is regressive. When exemption is not provided (not shown here) tax on food would be extremely regressive since the concentration curve of tax on food would fall much nearer to the 45° line. The Lorenz Curve for Expenditure and the concentration curve of tax on food seem to overlap for the poorest 20% of the households. This suggests that over this range, the tax is either neutral or mildly progressive indicating that the bulk of the gains from the exemption provision had accrued to the lowest income households.

In contrast to the tax on food, the pattern of distribution of income tax burden is highly progressive. The cumulative share of tax paid by the poorest half of the households stands at about 5% while the share for the top decile alone is about 50%. This scenario may, however, be partly explained by a high likelihood for low income households to engage in informal employment which escapes taxation.

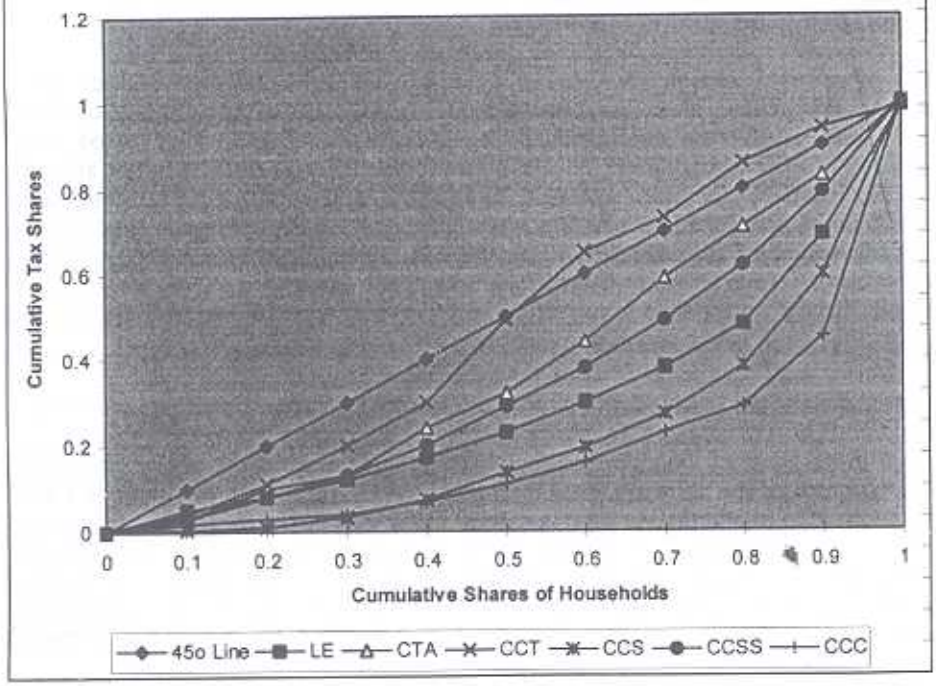
Figure 1. Concentration Curves for Food and Income Tax



Source: Author's Calculations

NB LE stands for Lorenz Curve for expenditures, CIT stands for Concentration Curve for income tax, CFT stands for Concentration Curve for tax on food.

Figure 2. Concentration Curves for Commodity taxes



Source: Author's calculations

NB. CTA stands for concentration curve for tax on alcohol, CCT stands for concentration Curve for tax on tobacco, CCS stands for concentration curve for tax on sugar, CCSS stands for concentration curve for tax on salt, CCC stands for concentration curve for tax on communication services.

The preceding discussions indicate that there may exist some potential to reform taxes in Ethiopia on equity grounds. If exempting a couple of food items benefits the poor, it could be possible to broaden the scope for equity-based reform by further identifying and exempting, large budget goods and services for low income households. The likely loss in tax revenue can be compensated by taking discretionary measures in raising tax collection from the personal income tax.

This can be achieved in at least two ways. Increasing marginal tax rates is an option even if it sparks a strong outcry on the ground that such a move compromises economic efficiency. The economic impact of taxing labour is a net outcome of a positive income effect and a negative substitution effect and therefore unless empirically tested for the specific Ethiopian situation, the option of introducing higher marginal rates should not be rejected outright. In fact, several empirical studies cited

by Auld and Miller (1984) show that the income tax is neutral in its impact on the choice individuals between work and leisure. A less contentious possibility is improving the administrative efficiency of taxation by minimizing not only the cost of collection but also the number of evasions.

On the other hand, commodity taxes in Ethiopia diverge in their performance with respect to distribution of tax burdens (Figure 2). Except for telecommunications services and sugar, the redistributive implications of all the other taxes are regressive. In other words, lower income households assume relatively larger shares of the tax burdens for salt, alcoholic beverages, and tobacco. However, the concentration curves for sugar and telecommunications services are positioned below the Lorenz curve for expenditure and hence it is higher income households which bear the larger share of taxes associated with these commodities. It can also be observed that tax on tobacco is extremely regressive in view of the closeness of its concentration curve to the 45^{o} line.

The cumulative share of taxes on sugar and telecommunication services paid by the poorest thirty percent is less than one- fourth of the tax burden which the same group assumes in the case of tobacco. Tobacco is then welfare dominant over both sugar and telecommunication services. Reducing taxes on tobacco while at the same time taxing sugar and telecommunication services more may improve social welfare as this exercise tantamount to, ceterus paribus, decreasing the taxable outlay of the poor. The wisdom of such reform should, nevertheless, be further explored if raising taxes on the latter makes the commodities increasingly unaffordable to the poor and if tobacco consumption is considered an undesirable good by the social welfare function.

Similarly, measures that decrease tax on salt while increasing tax on sugar and telecommunication services are likely to be welfare improving given that its concentration curve lies entirely above those of the two commodities. It is shown in the figure that the poorest and the richest deciles pay about the same tax shares, which violates the "ability-to-pay" principle for tax equity. Yet, the reverse is true for sugar and telecommunication services. To tax salt less while at the same time taxing sugar and telecommunication services more would be equivalent to changing the income distribution pattern in pro-poor direction.

At first sight, the virtue of imposing higher taxes on sugar and telecommunication services while reducing those on tobacco consumption might be questionable. Increasing taxes on the former might have the adverse effect of making them unaffordable to the poor while decreasing tax on the latter could bring about health hazards. However, such concerns may not have strong theoretical and practical foundations for reasons pinpointed below.

If demand for tobacco is price inelastic, reducing taxes on its consumption may not lead to increased consumption of the good. Nevertheless the tax-induced fall in consumer price of the product would have a positive impact on the real income of households. As the commodity takes up a relatively larger share in the consumption basket of low income households, gains from its reduced price would also be proportionally higher for them. Moreover, educational and awareness creation programmes could be more effective in discouraging tobacco consumption than tampering with the price system. The experience in more developed countries attests to this view.

In order to address possible negative effects of taxing telecommunication services more, a multi-tier tax framework could be envisaged. This might apply differential rates in accordance with the type of service provided or the area located. With regard to sugar it is important to take note that not only levels of prices but availability could be a factor for the low level of its consumption by the poor.

V. CONCLUSIONS

In order to ensure better compliance from tax payers, the government should put in place an equitable tax system. Taxes, by affecting a country's income or wealth distribution, shape its economic well-being. It is, therefore, a useful exercise from policy perspective to investigate the distribution of tax burdens among different socio-economic groups.

The paper looked into provisions in the Ethiopian tax legislations which address equity concerns. It, specifically, considered the impact, on the distribution of tax burdens, of applying differential marginal statutory rates for the personal income tax and sales tax exemptions for food. However, the main focus of the study was to undertake a comparative analysis of selected individual taxes with respect to how equitable they are.

The paper has shown that the rate structure in the personal income taxes has resulted in a progressive tax since the marginal rates are overall above the average tax rates. It should be underlined that a rising marginal rates structure is not a sufficient condition for a direct tax to be progressive. The rates need also exceed the corresponding average tax rates. Similarly, exempting food from expenditure taxes has helped to make the taxes less regressive. More importantly, most of the gains accrued to the lowest income group.

The tax concentration curves and Lorenz curve for expenditures indicate that reforming the tax system in such a way as to raise collection from the personal income tax while reducing tax on food items could improve social welfare. This is not only because spending on food takes up the bulk of income of poor households but also their participation in formal labour markets is minimal.

The analysis on consumption of sugar, salt, tobacco, alcoholic beverages, as well as telecommunication services shows the direction tax reform on an equity platform should take. Accordingly, salt is found to be welfare-dominant over sugar and telecommunication services and hence discretionary tax measures that reduce tax on salt while compensating revenue loss with an increase on sugar and telecommunication services would be welfare improving. Lower income households also seem to bear unproportionally higher burden of taxes on tobacco and alcoholic beverages.

When everything is considered, there exists some potentials to reform taxes in Ethiopia on grounds of equity. Already introduced tax provisions have also produced certain equity gains. Furthermore, commodities differ in their impact on distribution of tax burdens which implies that it is possible to readjust the tax system in order to improve social welfare.

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APPENDIX

Household Cumulative Expenditure and Tax shares

No.	Expenditure	Income tax	Food	Alcoholic Beverages	Tobacco	Tele. services	Sugar	Salt
1	0.05	0.0004	0.04	0.03	0.04	0.02	0.004	0.03
2	0.08	0.0017	0.09	0.10	0.11	0.03	0.011	0.08
3	0.12	0.0042	0.15	0.13	0.20	0.04	0.033	0.13
4	0.17	0.0141	0.23	0.24	0.30	0.07	0.073	0.20
5	0.23	0.0361	0.32	0.32	0.49	0.11	0.137	0.29
6	0.30	0.0703	0.42	0.44	0.65	0.16	0.194	0.38
7	0.38	0.1231	0.56	0.59	0.73	0.23	0.272	0.49
8	0.48	0.2406	0.68	0.71	0.86	0.29	0.381	0.62
9	0.69	0.4897	0.82	0.83	0.94	0.45	0.597	0.79
10	0.99	0.9997	1.01	1.00	0.99	1.00	1.000	1.00

Source: Author's calculations