DISTRIBUTIVE EFFECTS OF GOVERNMENT EXPENDITURES AND TAXES:

A Case Study of Pakistan, 1979, 1986- 87, 1992- 93, 2001- 02

By

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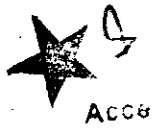

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ABSTRACT

This study analyzes the distributive effects of government expenditures and taxes in the urban-rural areas of Pakistan in 1979, 1986-87, 1992-93 and 2001-02. Government financial accounts seldom provide proper identification of the beneficiary or payer. Therefore, It has been tried to use the best-correlated data available to find out an appropriate, though rough, imputation. Such data are in various forms, like, expenditures of households on education and medical care, agriculture income of households, consumption pattern of taxed commodities and so on. In both urban-rural areas the values of average expenditures show decreasing behaviour through lowest to highest income group (pro-poor). However, urban average expenditure rates have remained more pro-poor than that of in rural areas in 1979, 1986- 87, 1992- 93 and 2001-02.

By the same token, the tax burden has been measured by the average tax rates. The patterns of tax incidence have shown that they are pro-rich in nature. However, behaviour of rural average tax rates has been proven more pro-rich than that of its urban counterpart in 1979, 1986- 87, 1992- 93 and 2001-02. Statistical test has shown that pre- and post fiscal incomes are significantly different in urban- rural areas at the 1 percent level in all four years. Moreover, it is found that there exist a positive relation between the extent of equality achieved through the government expenditures and taxes, and the extent of corresponding decrease in the poverty level in urban- rural areas in all four years.

The *zakah* and *ushr* system in Pakistan has been proven pro-poor in urban-rural areas in 1986-87, 1992-93 and 2001-02. In 1986- 87 *zakah* and *ushr* system was more pro- poor in urban areas than that of the rural areas. Whereas, in 1992- 93 and 2001-02 the effects of *zakah* and *ushr* on the distribution of income were larger in rural areas than that of the urban areas. A formal statistical test has shown that the differences between pre- fiscal and post- *zakah* and *ushr* distributions were found to be statistically significant at the 1 percent level in both urban and rural areas in each year.

Disaggregation has shown that the distributive affects of government expenditures, especially, education and health expenditures were smaller for rural areas than that of the urban areas. On the other hand, pro-rich behaviour in the tax structure of urban-rural areas, in general, is due to larger portion of indirect taxes relative to the direct taxes in the total tax collections. Moreover, regressivity in the rural tax structures in all four years have been attributed to the negligible amount of direct taxes paid by the high income groups and heavier burden of indirect taxes on the low income groups. Hence it has been suggested that policy makers should be conscious about the composition, quality and magnitude of government expenditures, especially, education and health expenditures allocated to urban-rural areas. While, the tax structure should have larger portion of direct taxes rather than indirect taxes to achieve the objective of fair distribution of income in urban- rural areas of Pakistan.

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CHAPTER 1

INTRODUCTION

1.1. Background

Fiscal policy plays stabilization, allocation and distribution role. The first function is of macro nature and discusses aggregate behaviour of the economic activities. The second function deals with the efficient resource allocation between private and social goods, which emerges as a consequence of market failure in order to provide social goods. Here efficiency works i.e. marginal benefits are equalized by marginal costs of providing different social goods. In other words, competitive forces come to act their role and thus possess microeconomic type of analysis.

The third function, which is basic to this study, in a theoretical sense, leads to the efficiency cost because it disturbs the Pareto efficiency condition. To have a deep understanding about the third function of budget policies, we bifurcate the government policies related to distribution of income into two main types. First type belongs to those policies which are of legislative nature for instance minimum wage law and so on. The second type concerns with the distribution of incomes by taxes (direct and indirect) and by various government expenditures. This second type of budget policies of the government will remain our main concern in this study.

Government budget like any other budget consists of revenues and expenditures. Government revenues come from tax revenues and non tax revenues. The former has larger share in the total revenues than that of the later. For example, in 2001- 02 tax revenues were Rs. 479,335 million while non- tax revenue were Rs. 146,000 million. However, the lager share of tax revenues in the total revenues dose not make the basis of their selection for studying their distributive effects but their selection is due to their structure and nature which affect the distribution of income pattern of a country. For example, income tax directly affects the incomes of the households and thus decreases their disposable income. Whereas, indirect taxes, like sales tax, fall on the consumption of households and thus indirectly reduce their incomes. On the other hand, distributive effects of government expenditures and transfers cause an increase in the incomes of the households, for example, construction of government hospital not only provide cheap medical treatment to the poor but also causes an increase in the employment level and thus the income level of the households.

This study examines the distributive effects of government expenditures and taxes in urban rural areas of Pakistan. To accomplish this task, we compute imputed amounts of government expenditures and taxes for different income groups in urban- rural areas in Pakistan. In this sense this study is indicative and technical, and requires a laborious effort in digging out the outcomes from the primary and secondary data for the different distributors of government expenditures and taxes in the years 1979, 1986- 87 and 1992-93 and 2001- 02.

Generally, studies on the size distribution of income can be classified into two main categories: normative and positive. The normative study is called as the study of

what should be, while, the positive study is defined as the study of what is. However, some studies may reflect characteristics of both categories. Studies containing positive or normative characteristics can be further divided in to two classes as explained by Reynolds and Smolensky (1977) in the following words.

> Works dominated by a search for positive knowledge can be further grouped into two sets: those which proceed from deductive economic theory and individual maximization and those which are basically statistical or econometric in conception. Similarly, it is convenient to group the normative work into two categories distinguished by the motives that led economists to their ethical concern: poverty and inequality. The poverty interest captures the concern with the material standard of living for people in the lower tail rather than with the distribution as a whole. The level of income of the poor is generally compared with some definition of a minimum level of market purchasing power. Interest in equality, by contrast, could be termed egalitarianism because many people identify a trend toward reduced dispersion with "equity."

From the above clarification one can easily differentiate, technically, between poverty and distribution studies as the former concentrate only on the lower income groups which are pointed out by some definition of a minimum level of income of the households, while, later concern with the distribution of a country as a whole. Moreover, the results of both types of studies may coincide, though not always, each other. In our study, we shall show in chapter 6 a positive relation between the extent of equality achieved through the public expenditures and taxes, and the extent of respective decrease in poverty level in urban- rural areas in 1979, 1986- 87, 1992- 93 and 2001- 02.

Moreover, among other studies on income distribution, this study falls among the technical studies that analyzes the distributive effects of all government expenditures and taxes at all levels (federal and provincial) within and across the urban- rural areas in Pakistan. It is of statistical nature and uses facts and figures from different data sources to find out and compare the impacts of budget policies on the distribution pattern in urban-rural areas in Pakistan. However, this study also contains normative elements in the sense that some policy measures are suggested to the government to achieve the objective of pro- poor distribution of income in the country.

1.2 Objectives and Hypotheses

The objective of this study is to carry out an indicative and empirical study rather than theoretical one to evaluate the imputed distributive effects of all actual government expenditures and taxes at all levels.[1] This study examine the change in the distribution of income due to government expenditure and taxes in urban-rural areas of Pakistan in 1979, 1986-87, 1992-93 and 2001- 02. Among major objectives of this study is to compare and quantify the effects of government expenditures and taxes on the distribution of income in urban- rural areas of Pakistan overtime. This study also analyzes the effects of Islamic tools of distribution, *zakah* and *ushr,* on the distribution of income in urban-rural areas of Pakistan in 1986-87, 1992-93 and 2001-02. Moreover, this research work intends to show the relationship between the extent of equality achieved after incorporating the effects of government expenditures and taxes in the pre- fiscal incomes of the urban- rural households, and the extent of corresponding decrease in poverty level in these areas in

[1] Also at all levels (federal and provincial)

1979, 1986- 87, 1992- 93 and 2001- 02. Furthermore, another objective having normative element is to suggest policy measures for the government on the basis of the results of this study. On the basis of above mentioned objectives following six working hypotheses are considered to carry out this research work.

1. Distributive effects of government expenditures are pro- poor in Pakistan.
2. Distributive effects of taxes are not pro- poor in Pakistan.
3. Distributive effects net- expenditures are pro- poor in Pakistan.
4. The *zakah* and *ushr* system is pro- poor in Pakistan.
5. Distributive effects of government expenditures, taxes, net- expenditures and *zakah* and *ushr* are more pro- poor in urban areas that of the rural areas in Pakistan.
6. The extent of equality achieved in post- fiscal era is positively related to the extent of corresponding decrease in poverty level.

1.3 Organization of the Study

In chapter 2, the literature related to distribution of income due to budget policies of the government on the case study of different countries is reviewed. Chapter 3 explains the methodology and data set. The scope and limitations of this study are also given at the end of this chapter. Empirical analysis of this study is carried out in chapter 4. In the first step total number of households, total values of net national product, government

expenditures and taxes are divided in to their urban-rural categories by using some suitable weights in the years 1979, 1986-87, 1992-93 and 2001- 02. In the second step urban-rural households, NNP, government expenditures and taxes are distributed along the income groups of urban-rural areas in four selected years by using incidence assumptions. Finally, average expenditures, average taxes and average net expenditures or average net benefits are calculated to know the progressivity and regressivity in the expenditures and taxes imputed to urban-rural areas of Pakistan. In chapter 5, the regression analyses are carried out for urban-rural areas in the four selected years to compare their tax, expenditure and net benefit functions. By these analyses we compare the regressivity and progressivity in government expenditures and taxes within and across these two areas, in 1979, 1986-87, 1992-93 and 2001- 02.

Gini ratio and Lorenz curve analyses are carried out in chapter 6. A formal statistical test is also executed to see the significant difference in the different sets of experiment in the years 1979, 1986-87, 1992-93 and 2001- 02. The impact of *zakah* and *ushr* system on the income distributions of urban-rural areas in 1986-87, 1992-93 and 2001- 02 is studied in chapter 7. This is done by repeating regression and Gini ratio analyses of chapters 5 and 6 respectively, with and without *zakah* and *ushr* system. A formal significance test is also carried out by forming different sets of experiment in the last section of this chapter. A disaggregated analysis of the expenditures and taxes is carried out in chapter 8. Moreover, some policy measures are also suggested to acquire the objective of more equal distribution of income in Pakistan. Finally, this study is summarized and concluded in chapter 9. Moreover, appendixes having different

theoretical concepts and data used in this study are also given for the readers. The references are listed at the end of this study.

CHAPTER 2

LITERATURE REVIEW

Review of the relevant literature is very important in any research programme. We review the literature on the distributive effects of public expenditures and taxes on the size distribution of income in two parts. In first part we review that literature which takes into account the case studies of different foreign countries. While, in second part we review those studies which analyze these effects in the case study of Pakistan.

2.1 A Review of Some Relevant Foreign Case Studies

In this section we review those studies, which have been carried out in the case study of different countries other than Pakistan. The most relevant studies that analyze the distributive effects of all government expenditures and taxes at all levels are of Reynolds and Smolensky (1977), Thepthana (1979) and Lambert (1989). However, some other studies which examine the distributive and redistributive effects of few government expenditures (services) and taxes like Snodgrass (1974), Foxley et al. (1979) and Kakwani (1986) will also be discussed in this section. We start reviewing literature with the later type of studies and try to end up this section with the studies which are most helpful to this research work. Kakwani (1986) worked on Australian data to analyze redistribution policies. He selected among government expenditures only the government cash transfers and the pensions, whereas, among taxes he selected personal income tax, property tax and sales tax to analyze their distributive effects. Moreover, he also studied the phenomenon of redistribution of income within and between socioeconomic and

demographic groups. He almost followed the standard incidence assumptions to distribute government expenditures and taxes across the income groups.

He found that government cash transfers were considerably more progressive than the taxes. However, the progressivity of these transfers is reduced when household income is adjusted in terms of per capita income. Looking at various categories of benefits, He observed that sickness and special benefits were the most progressive and pensions the least progressive. In case of taxes he found that the sharp progressivity of income tax shown in the individual tax schedules was not reflected in the actual taxes paid by the households. The income tax rates were not uniformly progressive over the entire income range. They were regressive at the bottom end of the income scale and highly progressive at the top end of the scale. When the progressiveness of taxes was measured with respect to per capita household income, the regressiveness at the bottom end of the income scale disappeared and the overall degree of progressiveness was increased.

In case of property taxes, he found that they were highly regressive and had adverse effect on the distribution of income. The general council rates appear to be more regressive than the water and sewerage rates. Moreover, the council rates for other dwellings were less regressive than the other two rates. The overall regressiveness of the water and council rates decreased slightly as income was adjusted in terms of per capita income. The land tax might have become even progressive as a result of this adjustment. In case of sales tax he estimated the degree of progressivity in case of more than 350 consumption items to provide foundation for developing an indirect-tax scheme. The author accomplished his work admirably. However, there are some points to be noted, for example, he considered the redistributive effects of few selected expenditures and taxes. Moreover, urban-rural comparison is also missing.

Snodgrass (1974) has examined the West Malaysian fiscal system and found regressivity in taxation of low-income groups and a highly unequal distribution of government services at independence. In 1958 fiscal system started redistributing income

in the right directions. The main increase in progressivity has come through expenditures rather than taxation. The progressivity in the tax structure increased at the high end while the regressivity persisted at the low-end. Inequalities in the distribution of public expenditures reduced considerably with the increase in the volume of transfer payments. He found a sharp increase in investment outlays aimed at low-income groups. Moreover, he also found that these changes are more evident in the racial tabulations than in the size-group or regional tabulations because the government had a well-developed criterion with political influence for redistribution of income along racial lines, while it lacked such a basis for redistribution among regions or from rich to poor. The advantages which low-income groups and states derived from the changes in fiscal system in 1958-68 were mainly a by-product of the programme to redistribute income to the Malays.

His attempt is, of course, a valuable addition to the economic literature. However, there are some observations which are needed to be discussed, for example, (1) He has not used suitable weights to distribute expenditure and taxes, especially, among different regions of the country. (2) He has attributed the effects of expenditures and taxes solely to the primary direct beneficiaries. (3) State and local revenues and self-financed expenditures have been excluded. In case of their presence the whole fiscal system may be slightly more progressive than the 80 to 85 percent of the results he has shown. (4) The analysis on urban-rural areas is missing.

Foxley et al. (1979) in his study explored that expenditures showed a progressive effect on income distribution, because poorer income classes got large proportion of expenditures relative to their incomes. The middle-income groups obtained benefits in almost an equal proportion relative to their incomes, whereas, families in the high income groups receive less benefit from public expenditures relative to their incomes. On the other hand, the tax system showed the trend almost proportional to the distribution of income by groups with the exception of the highest income group, whose contribution to the tax revenues was more than proportionate.

The net effect of government expenditure, taxation, and social security for the each income bracket was shown in this study under two alternatives. Alternative I allocated general government expenditures on the basis of original income distribution. In alternative II, these general expenditures are allocated according to the number of families per income classes. In both alternatives, there was a significant improvement in income distribution. This is particularly true with regard to the increase in the share accruing to the poorer families within the first two income classes and to the decrease in the share of total income enjoyed by the richer families. Although his study has provided lot of information about the Chilean fiscal structure, however, the comparison between urban-rural areas of Chile was ignored. They did not use suitable weighting system to distribute expenditure and taxes among different regions of the country. Moreover, they attributed the effects of expenditures and taxes largely to the primary direct beneficiaries.

Now, turning to the review of those studies which play very important role in conducting and completing this research work. One of them is the study of Reynolds and Smolensky (1977). They carried out their case study on the data of United States. They followed accounting approach rather than behavioral approach. Hence, they calculated imputed government expenditures and taxes for the different income groups by using different distributors under some incidence assumptions in 1950, 1961 and 1970. They found that the net effect of government upon the final distribution is substantial in a single year i.e. the distribution of income, which includes the benefits of government expenditures and the burdens of taxation, is significantly closer to equality than the distribution of factor or money income in each year.

However, the difference between the initial and final distributions arithmetically attributable to government in each year has not grown significantly from 1950 to1970 despite the rapid growth in government. It means that the distributive impact of each dollar spent by government or taxed by government has gone down but the overall distributive effect remained at least as large because of the much larger volume of spending and taxing of government. Dispersion in the distribution of factor income

increased slightly over the period. The difference was not statistically significant. Dispersion in the final distribution of income, which includes the benefit of government expenditures and the burdens of taxation, did not increase over the period and decreased slightly. However, differences in final dispersion were generally not statistically significant.

They also conducted disaggregated analysis of government expenditures and taxes and showed that the overall tax system had shifted from progressive to proportional or even to slightly regressive by 1970. The rapid rise in government transfer payments, especially, social security as well as other government spending, however, preserved or slightly increased the difference between initial and final distributions. Reynolds and Smolensky, undoubtedly, dealt with the topic of distribution of income by government fiscal actions with keen devotion and depth. Their results are good and impressive. However, they did not divide their analysis into urban-rural areas.

Another important work on the distribution of income by government is of Lambert (1989). He used the Reynolds and Smolensky data on United States and explored that (1) the progressivity of taxes and expenditures combined has increased at all levels of government over time. This is because the decreased progressivity of taxes over time is outweighed by the increased regressivity of expenditures. (2) In each of the three years, the progressivity of the net fiscal system was greater at the combined federal and state / local levels than at the federal level alone. (3) The regressive state and local taxes had relatively little effect on net state / local progressivity.

Of course, these findings are completely a function of the allocation procedures adopted by Reynolds and Smolensky (1977). Hence, urban-rural comparison is ignored. Moreover, since their study is one of budgetary outlay incidence, not benefit allocation, the trends noted do not obviously describe effects of government operation on people's economic position. However, he discusses the problem of ranking individuals in pre and post- fiscal era. Consequently he made distinction between post- fiscal Lorenz curve and post- fiscal concentration curve on the basis of ranking of the individuals.

Our thesis largely resembles to the work of Thepthana (1979) because he carried out his study on the data of Thailand and it is a fact the social and economic conditions of this country are very close to Pakistan. The main objective of the study was to estimate the impacts of the tax system and government expenditures on income distribution in Thailand in 1963, 1969, and 1973. In this connection, the impacts of taxes and government expenditures were examined under the three working hypotheses i.e. tax incidence was not favorable to the poor, government expenditures were favorable to the poor and net incidence was favorable to the poor in Thailand. They calculated imputed government expenditures and taxes by using different incidence assumptions, which mainly consist of the distributors like number of household, household income, household expenditure and household consumption in 1950, 1961 and 1970.

The hypotheses were tested by using regression analysis. The results of the tax burden functions indicate that the tax system in Thailand was regressive. The tax burdens in urban areas were relatively more regressive than the tax burdens in rural areas. The government expenditure functions were regressive both in urban and rural areas for all three years. However, the expenditure benefit functions in urban areas were relatively more regressive than the expenditure functions in rural areas.

However, in comparison, the values of coefficients, $\hat{b}_o$, and elasticity, $\hat{b}_1$[1], of government expenditure function in urban areas were greater than the coefficients, $\hat{b}_o$, and the expenditure elasticities in rural areas for all three years. Consequently the net budget incidence functions (expenditure schedule minus tax schedule) in urban areas have greater coefficients, $\hat{b}_o$, and greater elasticities than those in rural areas in all three years. The coefficients, $\hat{b}_o$ and the elasticity $\hat{b}_1$, of the net budget incidence functions in urban areas were found to be significantly different zero in all three years. In rural areas, they found that the coefficient, $\hat{b}_o$, and the elasticity, $\hat{b}_1$, of the net budget function in

[1] Estimated value of slope coefficient.

1963 were not significant in terms of the sampling error and probability level. However, the coefficients, b_0 and the elasticity b_1, of the net budget incidence functions in rural areas in 1969 and 1973 were found to be significantly different from zero.

Our work is closely related to the work of Thepthana (1979) also in the sense that he has made urban-rural division of Thailand in his analysis. However, there are some theoretical and analytical weaknesses in his work. For example, he used national income approach as an income base for judging distributive effects of government expenditures and taxes. But, he could not conceptually differentiate between the national income (NI) and the net national product (NNP). He quoted data on the national income of Thailand for different years from the yearbook of National Accounts Statistics (United Nations, 1976). The rational, which he gave for the choice of the data was for the NNP rather than national income. As he said:

> "However, since this study deals with the distribution of tax burden and expenditure benefits in a broad sense (i.e. nation as a whole), a broader income base which is consistent with taxes and government expenditures had to be chosen. This income base should include benefits from government expenditures, and the burdens of all taxes. That is, all government expenditures for the private sector and taxes should be included in the income base". [Thepthana, S. (1979), pp. 43]

It is clear from the above quotation that Thepthana, subconsciously wanted to use net national product approach as the income base for his analysis. But he treated the data on national income, as it was for net national product. Moreover, he has not used an explicit weighting system while dividing government expenditures and taxes between urban and rural areas. He, perhaps, simply distributed them on the basis of urban-rural populations. Moreover, the incidence assumptions used, especially incase of government expenditures are too naïve.

In a nutshell our study is different from the studies of Snodgrass (1974), Foxley et al. (1979) and Kakwani (1986) on the fundamental basis as all of these studies have

traced the distributive effects of few selected expenditures and taxes, and also have ignored the study of their incidence in urban-rural areas. On the other hand, our study examines the distributive impacts of all government expenditures and taxes at all levels in urban- rural areas of Pakistan. Moreover, our study has carried out the analysis for four years, namely, 1979, 1986- 87, 1992- 93 and 2001- 02. Whereas, above mentioned three studies have analyzed the distributive effects of public expenditures and taxes in a single year.

While, comparing this study with that of Reynolds and Smolensky (1977), Thepthana (1979) and Lambert (1989) it can be said that the studies of Reynolds and Smolensky (1977), and Lambert (1989) do not segregate their analysis into urban- rural areas unlike our study which shows explicitly this type of division. Moreover, our study has chosen four years i.e. 1979, 1986- 87, 1992-93 and 2001-02 to see the effects of fiscal parameters on the distribution of income. While, Reynolds and Smolensky (1977), and Lambert (1989) used the data of three years i.e. 1950, 1961 and 1970 in their analysis. As far as the study of Thepthana (1979) is concerned he has used national income as an income base while our study has used net national product as an income base. His weighting system for dividing government expenditures and taxes into urban- rural areas is unknown, whereas, our study adopted an explicit weighting system for the said purpose. Moreover, the incidence assumptions adopted by him, especially incase of government expenditures, are too naïve, while, our study has tried to adopt, more or less, accurate distributors for government expenditures and taxes. Furthermore, *zakah* and *ushr* incidence analysis of our study is not there in any of the above mentioned studies.

2.2 A Review of relevant studies in Case of Pakistan

We have not traced any attempt on the nature of this very topic in case of Pakistan except the study of Shirazi et al. (2001). However, some relevant studies can be seen.

Most of them explore the distributional and reditributional effects of taxes, while others examine these effects emerging from government expenditures. Moreover, these studies discuss limited scope and paradigm of expenditures and taxes, either on categorical ground or their effects are being traced regionally. In the following pages we shall review these studies carried out by Jeetun (1978), Alauddin et al (1981), Malik and Saqib (1985), and, Malik and Saqib (1989), Ghaus (1989), Shirazi (1996), Shirazi et al. (2001) and Shirazi et al. (2002). While, the work of Azfar (1972), an unpublished Ph.D. thesis, is not available to us.

The study of Jeetun (1978) explores that the taxation of final products is regressive whereas taxation of intermediate products is generally progressive. Taxation should therefore shift to the latter category of commodities if the aim is to provide relief to the poor. The degree of progressivity of the total tax system hinges to a large extent on the weight of direct taxes in total revenue; the larger their share, the stronger will be the degree of progression and the wider the disparity in the tax burden between the urban and rural sectors. The urban-rural comparison shows the fact that the urban sector bears a heavier burden than the rural sector even in the case of indirect taxes.

Direct taxes are the major redistributive device in spite of their low share in total taxes. However, excise duties remain more progressive than the selective sales tax levied at three different rates, the standard rate, lower than the standard rate and the enhanced rate. They infer that in spite the heavy reliance on indirect taxes the tax system can still be progressive if the tax rates discriminate against commodities consumed by higher income groups, particularly non-essential items and luxuries. Differences in consumption habits of the high-income classes make it easy to isolate these commodities and to apply different rates to them. Thus, a well-chosen indirect tax system can be made progressive.

He has found that the tax system is more effective in curbing inequalities in urban areas due to the greater weight of taxes and inclusion of income taxes in total taxes allocated to the urban sector. This observation has important policy implications, as, although the efficiency of the tax system as a mean of curbing inequalities is established,

it does not imply that raising more taxes in rural areas will also redistribute incomes from the rich to the poor to the same extent as in the urban areas. Neither will the introduction of the Agricultural Income Tax have a great impact on rural income distribution as the tax is of a smaller magnitude and the rates are not as progressive as the Personal Income Tax rates, although it is a better alternative than the present land revenue system. In the end, he admitted that his work is of partial nature in exploring of distributive effects of fiscal policy, as he said,

> "Our study has dealt with only one aspect of the wider problem, the distributive effects of fiscal policy and is, therefore, partial. The other side of the picture is the distribution of benefits which, taken together with the distribution of taxes, determine whether, in fact, there is a net burden or not. However, since our prime objective was to estimate the incidence of taxes we had to exclude the distribution of benefits which can be considered within a wider framework of budget incidence [Jeetun (1978), pp. 66]".

Alauddin et al. (1981) have examined that total taxes in urban areas are progressive in 1970-71 and 1971-72, whereas, rural taxes are regressive. As a result, the overall pattern of total tax for Pakistan is slightly progressive. Direct taxes were progressive for Pakistan as a whole especially in the urban areas. In urban areas, direct taxes are highly progressive, showing an increase in progressivity in the latter two years mainly due to increased urban incomes and greater share of urban direct taxes in the total taxes for the years 1970-71 and 1971-72. Whereas rural direct taxes show a change from progressivity in 1966-67 to regressivity in 1971-72.

The share of direct taxes, which are considered superior from the income distribution point of view, has declined over the years in Pakistan. The rural agricultural sector, which contributes almost 50 percent of the GNP and employs 70 percent of the total population, does not pay any direct taxes, while, urban population pays very low amounts of direct tax in absolute terms. Analysis of direct tax burdens in rural areas in their study, therefore, does not throw any meaningful light. However, the analysis has

been done only for comparing the results for rural areas with those of urban areas and their affect on the overall tax system.

The share of indirect taxes in both rural and urban sectors is greater and taxes are regressive in nature. Although elasticities are constant over the years in both the sectors, they are greater in the urban areas (i.e. less regressive) than the rural areas. When estimating the elasticities of indirect tax on individual items of consumption they found that commodities with relatively more inelastic demand are also relatively more regressive. But there seems to have been a slight improvement towards lesser regressivity in 1971-72.

Although indirect taxation is an elastic and dependable source of revenue, heavy reliance on taxation of goods, with relatively inelastic demand is not very desirable as it falls heavily on low-income groups. Thus, in rural areas where people have lower incomes compared to urban areas, and the inequality gap widens because the incomes of the rural rich indulging in conspicuous consumption, is not subject to tax. Hence, in rural areas, equity in the distribution of consumption rather than equity in the distribution of income is more important, this burden is more strongly felt as both direct and indirect taxes are regressive.

Malik et al. (1985) in their study have estimated incidence of the federal taxes for households in different income brackets. Most of the major direct and indirect taxes are covered, and taxes on the raw material and intermediate inputs have been allocated to final consumption through the input-output table. They have found that overall tax structure is, more or less, regressive. Households in the urban areas pay relatively more taxes, however, the incidence patterns of all the taxes combined are not very much different in the two areas. It is only in the top income brackets that we find relatively more consistent tax progressivity in the urban areas.

The direct taxes show some progressivity for the country as a whole. But the effective tax rates are quite low. Consequently, their progressivity is not much reflected in the incidence pattern of overall tax structure. The effective rates of the direct taxes in

the rural areas do not show any systematic pattern and their values are extremely low. On the other hand, those in the urban areas, though not quite high, exhibit progressivity. Import duties on the whole are regressive. The import duties on the raw material, intermediate products, machinery and also on necessities make them regressive.

Moreover, the overall tax system is regressive as it heavily depends on indirect taxes and these taxes are on items of common use, raw materials, intermediate inputs, and machinery. They suggested that, to make this tax system progressive more reliance should be placed on direct taxes. Moreover, taxes on the raw materials, intermediate inputs, and machinery should be avoided. Only those commodities of final use should be taxed which are consumed mainly by households in the upper income brackets.

In continuation of above study another study carried out by Malik et al. (1989) on the incidence of federal taxes on households belonging to different income brackets. They have shown that a major source of government revenue is commodity taxes, which are generally slightly regressive. The tax system is slightly progressive for the country as a whole. For urban areas, it is slightly progressive, and for rural areas, it is slightly regressive. The reason the tax system is slightly regressive in the rural areas is the absence of direct taxes there. The effective tax rates show that households in the urban areas pay relatively more taxes than their counterparts in the rural areas. However, the incidence patterns of all taxes combined for lower and middle-income groups are not much different in the two areas. It is only in the top income brackets that we find relatively more consistent tax progressively in the urban areas. They have found that, like Jeetun (1978), "Although the tax system of the country is progressive the degree of progressivity is too low and inadequate". They also have found that households in the urban areas are paying higher taxes than households in the rural areas. Their findings like Jeetun (1978), Alauddin et al. (1981) and Malik et al. (1985) show that the tax system is more progressive in the urban areas as compared to the rural areas. Direct taxes have been found highly progressive and indirect taxes as a whole have been found slightly regressive in all above mentioned studies.

Moreover, all above mentioned studies discuss the distributive effect of taxes only, on the other hand, Shirazi et al. (2002) have examined only the effects of government expenditures on the distribution of income in urban- rural areas of Pakistan. Their study uses the net national product (NNP) as income base. They also compare the incidence of government expenditures in urban- rural by calculating average expenditure rates along the income groups in these areas. The results show that, in general, the lowest income group shares the lowest level of absolute government expenditures in urban- rural areas and these expenditures increases as the households move from the low to high income groups. However, when they show the expenditure benefits as a percentage of incomes along the income groups the first income group gets the maximum amount of average expenditures and the following income groups up to top get benefits at a decreasing rate. They also have shown that urban households received more expenditure benefits than that of the rural households.

The results are interesting but some points are needed to be explained. Firstly, some of the weights used to divide government expenditures into urban- rural areas are not looking suitable, for example, weighting system used to divide health expenditures into urban- rural areas has taken into account only population weights and income weights. It would be better if amounts of medical care of urban- rural households have also been considered. Secondly, the incidence assumptions used for the allocation of government expenditures along the income groups are naïve. For example, public expenditures on interest have been allocated in proportion to the households' income in each income group. It would be better if these expenditures have been allocated in proportion to the deposits in the financial institution or the amount of interest received from these institutions by the households. Thirdly, the authors have taken total interest payment in 1992-93 and ignored the exclusion of interest on foreign debt from the analysis. Finally, some of the public expenditures are missing in the analysis, for example, development expenditures and expenditures on community services.

Another attempt on examining the incidence of public expenditures is of Ghaus (1989) in which she has also found out the net fiscal effects by incorporating the results on the incidence of major provincial and municipal taxes in Karachi by Ghaus and Pasha (1990). In her analysis on public expenditures, she proves that the incidence of provincial and municipal government service-related expenditure benefit is regressive (pro-poor) in Karachi. Among the most pro-poor provincial expenditures, as indicated by the magnitude of Suits index, are transport and primary education followed by medical care. Benefit distribution of college education and law and order, are however, biased in favour of upper income households.

The municipal government expenditures on primary education, public health and roads benefit the lower income households. On the other hand, the benefit incidence of water supply is significantly pro-rich. While discussing and incorporating the study of Ghaus and Pasha (1990) on the incidence of major provincial and municipal taxes in Karachi she concludes that under the most pro-rich assumption, incidence of both provincial and municipal taxes falls relatively on lower income households, more so in the case of latter. The overall incidence of provincial taxes, however, is shown to be progressive under the most progressive assumptions.

The incidence of net expenditure benefits (net of taxes) is clearly pro-poor in the case of provincial government, while for the municipal government an upper income bias is indicated. Her findings are interesting, however, her work is restricted to the case study of Karachi city only. Moreover, she mainly focuses in her analysis on the distribution of public expenditure across income group in Karachi. In this way tax burden analysis in the distribution of income has not been discussed explicitly. Furthermore, rural areas are ignored and hence the comparison between urban-rural areas is missing.

The only attempt that discusses the net fiscal effects on the distribution of income in urban- rural areas of Pakistan at all levels (federal and provincial) is of Shirazi et al. (2001). The study uses the net national product (NNP) as income base. The results show that, in general, the absolute government expenditures in urban have shown cyclical trend

from low to high income groups. However, when they show the expenditure benefits as a percentage of incomes along the income groups the trend in the average expenditures is strictly decreasing. Whereas, the amount of absolute taxes increases from low to high income groups . While, amount of average taxes decreases through low to high income groups. On the other hand, in rural areas the absolute amounts of government expenditures also show cyclical behaviour along income groups. Similarly, average expenditures show decreasing trend along the income groups in rural areas. While, absolute value of taxes show more or less cyclical behaviour along the income groups and average taxes show decreasing behaviour across the income group in rural areas. The net- fiscal incidence show decreasing trend from low to top income groups in both urban-rural areas.

Comparing the incidence of government expenditures and taxes in urban- rural areas they have shown that the households in the urban areas receive larger amount of net benefits than that of the rural areas in 1992- 93 . Their results are interesting and have lot of guidance for accomplishing this research work. However, some weaknesses, more or less, similar to the study in Shirazi et al. (2002) are noted here. Firstly, some of the weights used to divide government expenditures and taxes into urban- rural areas are not looking so attractive, for example, weighting system used to divide health expenditures into urban- rural areas has taken into account only population weights and income weights. It would be better if amounts of medical care of urban- rural households have also been considered. Moreover, some of the indirect taxes like taxes on natural gas may be divided between urban- rural areas by taking into account differential in the urban-rural expenditures on natural gas.

Secondly, the incidence assumptions used for the allocation of government expenditures and taxes along the income groups are naïve. For example, public expenditures on interest have been distributed according to the households' income in each income group. It would be better if these expenditures have been distributed in proportion to the deposits in the financial institution or the amount of interest received

from these institutions by the households. Similarly, incidence assumptions for some of the indirect taxes, like, taxes on vehicle, petroleum and natural gas can be made more sophisticated by locating direct victims of these taxes. For example, amount of vehicle tax can be distributed among the households belonging to different income groups in urban- rural areas on the basis of vehicles owned by them. Thirdly, the authors have taken again total interest payment in 1992-93 and could not pay attention on the exclusion of interest on foreign debt from the analysis. Finally, they have skipped some of the government expenditures and taxes from the analysis, for example, development expenditures, expenditures on community services, taxes on natural gas and vehicle tax.

This study also examines the distributive effect of *zakah* and *ushr* in urban-rural areas of Pakistan in this connection we review the study of Shirazi (1996) on the scope and limitations of the *zakah* and *ushr* system in Pakistan. The results show that the lowest income decile received 94.3 percent of the total *zakah* and *ushr* disbursements. 16.8 percent in the urban areas and 77.5 percent in the rural areas of Pakistan. The second lowest income decile received only 2.7 percent of the total *zakah* and *ushr* distribution, 0.4 percent in the urban areas and 2.3 percent in the rural areas of Pakistan during the same period. The third and fourth deciles received even less than one percent in these areas. While, the fifth income decile received 1.3 percent, 1.2 percent in the rural areas and 0.1 percent in the urban areas. Hence, the major share went to the rural households, i.e. 82.5 percent of the total *zakah* and *ushr* was distributed among the rural households and only 17.5 percent among households of urban areas of Pakistan.

As regard to the proportion of households receiving *zakah* and *ushr* in the income deciles, 18.1 percent of the total households in the lowest income decile have been benefited by *zakah* and *ushr*. Among them, 16.5 percent have been benefited in urban areas and 18.5 percent in rural areas. Out of total households in second income decile, 3.6 percent overall, 3.7 percent in the urban areas and 3.6 percent in the rural areas have been benefited from *zakah* and *ushr*. While, the percentage of the households in the third up to fifth deciles, who received *zakah* and *ushr*, varies between 1.5 and 1.8 in overall and

between 0.4 percent to 1.7 in urban and 1.8 percent to 2.0 percent in the rural areas of Pakistan. However, the total households that benefited in all the income deciles were 2.7 percent on overall basis, 1.4 percent in the urban areas and 3.2 percent in the rural areas of Pakistan in 1990-91.

As far as the collection of *zakah* and *ushr* by disposable income deciles is concerned, the richest income deciles contributed only 32.9 percent of the total *zakah* and *ushr* collection, 16.5 percent by the urban and 16.3 percent by the rural areas. The contribution of ninth income decile is comparatively much smaller. It was 13.6 percent for overall Pakistan, 5.8 percent for the urban areas and 7.8 percent for rural areas. The income deciles from fifth to eighth contribute from 7.6 percent to 10.8 percent in overall Pakistan. It appears that the contribution of the rich households to *zakah* and *ushr* is small which means that they are either not paying *zakah* and *ushr* at all or are not paying according to prescribed rates.

Comparing total *zakah* and *ushr* collection and disbursement, the collection of *zakah* and *ushr* is much higher as compared to the amount received by the poor. The author has divided the income groups into four parts or income deciles. He has taken the data of 1990-91 and explored the *zakah* and *ushr* incidence in the urban-rural of Pakistan. In our analysis eleven or twelve income groups are used which, of course, help to get relatively more accurate measures of inequality. Moreover, our study also takes care of formal significance tests for *zakah- ushr* analysis.

In a nutshell, our work is different from the all above-mentioned studies in the following respects. An explicit weight system has been introduced to distribute income base, government expenditures and taxes between urban-rural areas. The *zakah* and *ushr* incidence analysis for the years 1986-87, 1992-93 and 2001-02 in our work shows a, somewhat, different paradigm in income distribution studies. Comparing our work with the works carried out by Jeetun (1978), Alauddin et al (1981), Malik and Saqib (1985), and, Malik and Saqib (1989) it is evident that there is fundamental difference between these studies and that of our study as all of these studies essentially cover the distributive

effects of taxes only. On the other hand, our study not only seek to explain distributive effects of both government expenditures and taxes separately but also shows their net effects on the distribution of income.

Although, Ghaus (1989) has shown the net fiscal effects but she found them by incorporating the results of another study on the tax incidence carried out by Ghaus and Pasha (1990) Hence, her work of essentially covers the incidence of expenditures only. Moreover these expenditures and taxes are few in number and defined on municipal level only . Our work, on the other hand, takes into account the impacts of all government expenditures and taxes at all levels. Moreover, the work of Ghaus (1989) explores the incidence of public expenditures in Karachi city only, while, this study comprises countrywide analysis on the incidence of public expenditures and taxes in both urban-rural areas.

Shirazi et al. (2001) have not included all government expenditures and taxes in their analysis. While, this work takes into account the incidence of all government expenditures and taxes. They have not subtracted the amount of interest on foreign debt from the total interest payment by the government, whereas, this study has done this job. Moreover, some of their incidence assumption and weights are naïve, while, this study has taken up more sophisticated incidence assumption and weights. Finally, *zakah* and *ushr* incidence analysis carried out by Shirazi (1996) is only for 1990-91, while, this work covers, more or less, same analysis with different tools for the years 1986-87 and 1992-93 and 2001-02.

CHAPTER 3

METHODOLOGY AND DATA SET

3.1 Methods Used in This Study

This research work comes under the distribution of income studies. Here, we explore the distributive effects of government expenditures and taxes on the size distribution in urban-rural areas of Pakistan in 1979, 1986-87, 1992-93 and 2001-02. Moreover, this work falls among the technical studies and uses a more comprehensive definition of pre- fiscal incomes and then adds to it net fiscal incidence that includes the benefits and burdens of government at all levels to give rise post- fiscal incomes. The analysis of this study requires different relevant statistical facts and figures to find out the impacts of budget policies on the distribution of income in urban-rural areas in Pakistan.

Moreover, to examine the incidence of government expenditures and taxes there are generally two approaches. First is the "money flow approach" that takes into account the direct recipients (givers) of government expenditures (taxes) without considering the final beneficiaries (victim) of the government expenditures (taxes). Second is the "benefit/ burden approach" which concentrates on the final beneficiaries (victim) of the government expenditures (taxes). This study, generally, takes care of benefit / burden approach more than that of money flow approach at least in case of government expenditures.[1]

[1] See appendix A: A theoretical background of the methodology.

In this analysis, we follow the practice, more or less, of a line of studies by Reynolds and Smolensky (1977) and Thepthana (1979), Lambert (1989), Shirazi et al. (2001) and Shirazi et al. (2002). Economic literature is rich in the case studies of government expenditure and tax incidence as elaborated in chapter 2. However, in case of Pakistan the study of Shirazi et al. (2001) found to be more relevant study to this research work Some other relevant attempts could also be found, like. Jeetun (1978) analyses the tax incidence in 1972-73 by using tax collections instead of nominal tax rates and addresses the problem of tax evasion. However his method of treating the taxes on raw materials and intermediate inputs is a bit arbitrary.[2]

Alauddin et al. (1981) deals with the incidence of some of the federal taxes in 1966-67 and also from 1968-69 to 1971-72. This study does not deal with import duties, which are an important source of federal government tax revenue. He mostly used standard incidence assumptions. In addition, they have used nominal rates of excise duties and sales taxes on the items of final consumption to compute the tax paid by different households. Malik et al. (1985) used actual tax collections for each commodity separately. However he included all indirect taxes except export duties. Moreover, corporate income tax has not been included in the analysis. He adopted standard incidence assumptions to allocate different taxes among households that indirect taxes are shifted forward to the consumers and direct taxes stay with the legal tax payers. Taxes allocated to different income groups are divided by the personal incomes of the households in those income groups to get effective tax rates.

Malik et al. (1989) also used actual tax collections for each commodity and did not include export duties in their analysis. However, they include incidence of corporate profit tax. To allocate indirect taxes among households they have followed the standard incidence assumption like full shifting of commodity taxes to the consumers. Whereas, for income tax they have assumed that it is not shifted and stays with the legal tax payers.

[2] See Malik et al. (1989).

They have further assumed that households in the lowest five income groups did not pay any income tax. Total income tax collected in 1978-79 was distributed among the remaining income groups according to the distribution of the direct taxes given in the survey. For corporate profit they have followed the standard case. They have also got effective tax rates by dividing taxes allocated to different income groups with the personal incomes of the households in their respective income groups.

Ghaus (1989) has analyzed the incidence of provincial and municipal expenditures in Karachi in a partial equilibrium framework concentrating on current expenditures only. Benefit approach has been used instead of money flow approach and accounting approach has been used instead of behavioral approach. She has estimated the incidence of main provincial and municipal expenditures by dividing them into two categories (a) pure public goods (b) private goods. The benefits from pure public goods have been allocated by assuming a value of income elasticity of marginal utility of income of 1.5. The benefits from major provincial and municipal expenditures on private goods city. She has found out the net fiscal effects by incorporating in her study the results of another work on provincial and municipal tax incidence in Karachi carried out by Ghaus and Pasha (1990). Shirazi et al. (2001) analyzed the redistributive effects fiscal policy by examining the benefits and burdens of government expenditures and taxes at all levels (federal and provincial) and also showing their net effects. Shirazi et al. (2002) by forming some incidence assumptions for public expenditures and using net national product (NNP) as income base examined the effects of government expenditures at all levels on the distribution of income along the income groups in urban- rural areas of Pakistan.

Most of the above mentioned studies in case of Pakistan explore the distributional and reditributional effects of taxes only except the study of Ghaus (1989) and Shirazi et al. (2001). After all, these studies discuss limited scope and paradigm of expenditures and taxes, either on categorical ground or their effects are being traced regionally. On the

other hand, our work measures income inequality over time, which includes the benefits and burdens of all government expenditures and taxes at all levels (federal and provincial). To accomplish this task, we form some suitable incidence assumptions for expenditures and taxes by using the best correlated data available to give an appropriate, though rough, imputation. Such data are in various forms, like, consumption pattern of taxed commodities, different types of expenditures of households along their income ranges, percentage distribution of households along the income groups in urban-rural areas and so on.

Moreover, it is not much reliable to explore the aggregate redistributive effects of government in a given year by assigning benefits and burdens to the income groups in the conventional way. We, therefore, trace the changes in the size distribution of income in 1979, 1986-87, 1992-93 and 2001-02. In this way, we can cope with the biases in the data, as the biases, if there, are in the same direction in the four selected years. Moreover, biases are likely to be of similar magnitude within the range of distributive change in Pakistan during relatively short time intervals. To pursue this objective we estimate the distribution of final output using comparable incidence assumptions for each year but with the new amounts of income, taxes and expenditures. To construct a post-fiscal distribution of income in any year, Reynolds and Smolensky (1977) have used the following procedure that involves three main steps.

1. Constructing an income base or pre-fiscal distribution of income.
2. Adding government expenditures by income group to the pre-fiscal distribution of income.
3. Subtracting taxes by income group from the pre-fiscal distribution of income.

All procedure can be compactly given in matrix form as under.

$$\mathbf{f} = \mathbf{p} + \mathbf{gB} - \mathbf{hT} \qquad (3.1)$$

In expanded form:

$$|f_1 \dots f_k| = |p_1 \dots p_k| + |g_1 \dots g_m| \begin{vmatrix} b_{12} & b_{22} & \dots & b_{1k} \\ b_{21} & b_{22} & \dots & b_{2k} \\ & & \cdot & \\ & & \cdot & \\ & & \cdot & \\ b_{m1} & b_{m2} & \dots & b_{mk} \end{vmatrix} - |h_1 \dots h_n| \begin{vmatrix} t_{11} & t_{12} & \dots & t_{1k} \\ t_{21} & t_{22} & \dots & t_{2k} \\ & & \cdot & \\ & & \cdot & \\ & & \cdot & \\ t_{n1} & t_{n2} & & \dots t_{nk} \end{vmatrix}$$

where

f = the post-fiscal or final income vector, order $1 \times k$. An element, f_i, denotes the amount of income in income interval i, $i = 1,\dots,k$.

p = the primary or initial income vector, order $1 \times k$.

g = a vector of government expenditures by category, order $1 \times m$.

B = a matrix of percentage distributors for government expenditures, order $m \times k$.

h = a vector of government tax receipts by category, order $1 \times n$.

T = a matrix of percentage distributors for government taxes, order $n \times k$.

Reynolds and Smolensky (1977), and Lambert (1989) have not seggeregated their analysis into urban-rural areas. However, Thepthana (1979), Shirazi et al. (2001) and Shirazi et al. (2002) has done their analyses by taking into account urban-rural areas, but

have has not explicitly mentioned the weighting system to divide government expenditures and taxes in urban-rural areas. We, on the other hand, have divided our analysis into urban-rural counterparts by using an explicit weighting system. To accomplish this task we have distributed the income base, net national product (NNP), government expenditures and taxes in the four selected years into their urban-rural counterparts by using different suitable weights. Different weights used in this connection are given below.[3]

α_i	=	Population weight (urban)	=	PW_U
α_j	=	Population weight (rural)	=	PW_R
η_i	=	Income weight (urban)	=	IW_U
η_j	=	Income weight (rural)	=	IW_R
$Ł_i$	=	Literacy weight (urban)	=	LW_U
$Ł_j$	=	Literacy weight (rural)	=	LW_R
λ_i	=	Density weight (urban)	=	DW_U
λ_j	=	Density weight (rural)	=	DW_R
δ_i	=	Food weight (urban)	=	FW_U
δ_j	=	Food weight (rural)	=	FW_R
$ß_i$	=	Consumption weight (urban)	=	CW_U
$ß_j$	=	Consumption weight (urban)	=	CW_U
γ_i	=	Expenditure weight (urban)	=	EW_U
γ_j	=	Expenditure weight (urban)	=	EW_R
$ǐ_i$	=	Medical care weight (urban)	=	MC_U
$ǐ_j$	=	Medical care weight (rural)	=	MC_R
ϵ_i	=	Education expenditure weight (urban)	=	EE_U

[3] For detailed knowledge about weight system, see Appendix B.

ϵ_j	=	Education expenditure weight (rural)	=	EE_R
$Đ_i$	=	Volume of deposit weight (urban)	=	VW_U
$Đ_j$	=	Volume of deposit weight (rural)	=	VW_R
$Æ_i$	=	Agriculture income weight (urban)	=	AI_U
$Æ_j$	=	Agriculture income weight (rural)	=	AI_R
$Ŧ_i$	=	Transport and Traveling weight (urban)	=	TW_U
$Ŧ_j$	=	Transport and Traveling weight (rural)	=	TW_R
$Ģ_i$	=	Gas weight (urban)	=	GW_U
$Ģ_j$	=	Gas weight (rural)	=	GW_R
ω_i	=	Vehicle weight (urban)	=	WW_U
ω_j	=	Vehicle weight (rural)	=	WW_R

Weighting System for Net National Product (NNP)

In HIESs of four selected years percentage distributions of average monthly income of the households by income groups of urban-rural areas have been given. But these distributions of incomes by income groups have been developed through a questionnaire based household income and expenditure survey. On the other hand, net national product that is a net value of goods and services produced in a year is calculated through different accounting methods. This study chooses the net national product (NNP) as the income base or the pre- fiscal income distribution in urban- rural areas in Pakistan.[4] To divide net national product between urban-rural areas we take into account income weight — calculated from the information given in the HIESs of the four years about the average monthly income of the all income groups in the urban and rural areas, and population weight — calculated from information about urban-rural populations given in Economic Surveys of the relevant years. Net national products (NNPs) in the four

[4] See appendix A: Hunting a suitable pre- fiscal definition of income.

selected years have been divided between urban-rural areas by using following expressions.

$$\text{NNP (urban)} = [\alpha_i \eta_i / \alpha_i \eta_i + \alpha_j \eta_j] \text{ NNP}$$

$$\text{NNP (rural)} = [\alpha_j \eta_j / \alpha_i \eta_i + \alpha_j \eta_j] \text{ NNP}$$

Weighting System for Expenditures

Government financial accounts seldom provide the data on expenditures and taxes by dividing them into their urban-rural categories. To cope with this problem, we have introduced a suitable weight system to divide government expenditures and taxes into their urban-rural counterparts. Here we present formulas or expressions to divide government expenditures into their urban-rural categories.

Government expenditures on education have been distributed between urban-rural areas in each year by taking into account their literacy rate, education expenditure and population differences. The choice of the literacy rate and population differences in urban-rural areas is self-explanatory, however, expenditures of the household on education demands some explanation. Those families or households who spend as much as on the education of their children and adults can also get same level of benefits from the government expenditures on education. As a household that is willing to educate their members up to university level would be getting more benefits from government expenditures on education than that of the household, which is willing to educate their members up to, say, primary level. We can get shares of urban-rural areas in the total education expenditures of the government in four years by the following expressions.

$$\text{Government expenditures on education (urban)} = [\alpha_i Ł_i \epsilon_i / \alpha_i Ł_i \epsilon_i + \alpha_j Ł_j \epsilon_j] \, TG^{Ed}$$

$$\text{Government expenditures on education (rural)} = [\alpha_j Ł_j \epsilon_j / \alpha_i Ł_i \epsilon_i + \alpha_j Ł_j \epsilon_j] \, TG^{Ed}$$

Where, TG^{Ed} = Total government expenditures on education

Health expenditures have been divided into their urban-rural categories by considering differences in their population weights, levels of medical care and density weights[5]. Level of expenditures on medical care by the household generally represents its level of benefits from the government expenditures on health by the same reasoning given above in case of household expenditures on education. To calculate urban-rural population densities, data on urban-rural population and areas is required. Data on urban-rural population in all four years is available in different data sources but the urban-rural wise data is not available to us. Because the most reliable source of data in this regard is the Survey of Pakistan, which only tells us about the areas of some big and famous cities. Obviously, this information is not sufficient to compare urban-rural areas. To cope with this problem, we have used the data on members per household in urban and rural areas given in HIESs of the four years. The formulas to distribute health expenditures into their urban-rural counterparts are given as under.

$$\text{Government expenditure on health (urban)} = [\alpha_i \lambda_i \ddot{\text{и}}_i / \alpha_i \lambda_i \ddot{\text{и}}_i + \alpha_j \lambda_j \ddot{\text{и}}_j] \, TG^H$$

$$\text{Government expenditure on health (rural)} = [\alpha_j \lambda_j \ddot{\text{и}}_j / \alpha_i \lambda_i \ddot{\text{и}}_i + \alpha_j \lambda_j \ddot{\text{и}}_j] \, TG^H$$

Where TG^H = Total government expenditures on health.

Defense expenditures have been divided between urban-rural areas keeping in view their population weights and income weights in each year. As government expenditures on defense apparently fall on the employees of armed forces, but indirectly

[5] Population Density = Population / Area

each member of the society enjoys benefits from government expenditure on defense in terms of his / her security of life and wealth. It is assumed that wealthy people enjoy more benefits from defense expenditures than the poor fellows. As the former feel more secure themselves in terms of both their wealth and lives. The expressions to divide government expenditures on defense are given below.

$$\text{Government expenditure on defense (urban)} = [\alpha_i \eta_i / \alpha_i \eta_i + \alpha_j \eta_j] \, TG^D$$

$$\text{Government expenditure on defense (rural)} = [\alpha_j \eta_j / \alpha_i \eta_i + \alpha_j \eta_j] \, TG^D$$

Where TG^D = Total government expenditures on defense

To distribute agriculture expenditures between urban-rural areas we take into account differences in their population weights, agriculture income weights and food weights in the four selected years. In this way the influence of population shares, agriculture incomes and the availability of agriculture food for the households belonging to urban-rural areas have been incorporated in the weighting system. The expressions to obtain shares of government agriculture expenditures for urban-rural areas are given as under.

$$\text{Government expenditures on agriculture (urban)} = [\alpha_i \delta_i Æ_i / \alpha_i \delta_i Æ_i + \alpha_j \delta_j Æ_j] \, TG^{Ag}$$

$$\text{Government expenditures on agriculture (rural)} = [\alpha_j \delta_j Æ_j / \alpha_i \delta_i Æ_i + \alpha_j \delta_j Æ_j] \, TG^{Ag}$$

Where TG^{Ag} = Total government expenditures on agriculture

Interest expenditures have been divided into their urban-rural counterparts by using their differences in population, income and volume of deposits (interest earned), generally, in government based financial institutions in each year. Income differences of

urban-rural areas are used due to the fact that households who receive the interest payment may transmit these benefits to other individuals in the society through their investment and employing activities. Hence it is assumed that the interest expenditures of the government may be divided between urban-rural areas also taking into account proportion to their incomes. The formulas to distribute interest expenditures into their urban-rural counterparts are given below.

$$\text{Government expenditure on interest (urban)} = [\alpha_i \eta_i Ð_i / \alpha_i \eta_i Ð_i + \alpha_j \eta_j Ð_j] \, TG^I$$

$$\text{Government expenditure on interest (rural)} = [\alpha_j \eta_j Ð_j / \alpha_i \eta_i Ð_i + \alpha_j \eta_j Ð_j] \, TG^I$$

Where TG^I = Total expenditures on interest.

To distribute government expenditures on general administration, we have used income weights and population weights of urban-rural areas in the four selected years. The use of above-mentioned two weights in the division of general administration expenditures into their urban-rural counterparts indicates that shares of urban-rural areas in the total general administration expenditures are affected not only by their population shares but also by the average income of their households. The formulas to divide government expenditures on general administration into their urban-rural counterparts are given as under.

$$\text{Government expenditure on general administration (urban)} = [\alpha_i \eta_i / \alpha_i \eta_i + \alpha_j \eta_j] \, TG^{GA}$$

$$\text{Government expenditure on general administration (rural)} = [\alpha_j \eta_j / \alpha_i \eta_i + \alpha_j \eta_j] \, TG^{GA}$$

Where TG^{GA} = Total expenditures on general administration.

Development expenditures, expenditures on social and community services other than education and health, and all other miscellaneous expenditures have been divided between urban and rural areas by considering their population and income weights. The

current subsidies have been divided according to the criteria used for the division of agriculture expenditures between urban- rural areas because most of the current subsidies are given in agriculture sector. While, development subsidies have been treated similar to the development expenditures during their division into urban –rural categories.

Weighting System for Taxes

The amounts of direct taxes, like income tax and property tax, have been distributed between urban-rural areas keeping in view their income and property tax shares of all groups in urban- rural areas in all four years (see Appendix B). Whereas, to divide total sales tax and excise duty (indirect taxes) between urban-rural areas we take into consideration the population weights and the consumption weights of these areas in the four selected years. The use of both types of weights is self-explanatory. As the burden of indirect taxes according to the standard incidence assumption falls on the consumption of the households living in urban-rural areas. The formulas to distribute total amount of sales tax and excise duty into their urban-rural counterparts are given below[6].

$$\text{Sales tax and Excise duty (urban)} = [\alpha_i \beta_i / \alpha_i \beta_i + \alpha_j \beta_j] \, TT^{SE}$$

$$\text{Sales tax and Excise duty (urban)} = [\alpha_j \beta_j / \alpha_i \beta_i + \alpha_j \beta_j] \, TT^{SE}$$

Where TT^{SE} = Total amount of sales tax and excise duty

Total import duty in four years has been divided between urban-rural areas by taking into account their population weights and expenditure weights. As the expenditure of a household contains also imported items, hence through comparison of average

[6] Indirect taxes other than import and export duties, taxes on natural gas, taxes on petroleum and taxes on vehicles are also distributed into their urban-rural counterparts according to these formulas.

monthly expenditure per household in urban-rural areas one can roughly guess their shares in the total import duty. Moreover, population weights of urban-rural areas are also necessary to divide total import duty burden between these areas. Following expressions are used to divide total import duty burden between urban and rural areas in the four selected years.

$$\text{Import duty (urban)} = [\alpha_i \gamma_i / \alpha_i \gamma_i + \alpha_j \gamma_j] \, TT^M$$

$$\text{Import duty (rural)} = [\alpha_j \gamma_j / \alpha_i \gamma_i + \alpha_j \gamma_j] \, TT^M$$

Where TT^M = Total import duty burden

To distribute total export duty between urban-rural areas of Pakistan in four years, we have taken into account population weights and income weights of these areas. In other words, it is assumed that the burden of export duty falls in proportion to the urban-rural population and also in proportion to the incomes of all groups in urban-rural areas. As heavy export duty may discourage the households to export exportable commodities, which as a result leads to a fall in their average incomes as a whole through decrease in domestic investment. The formulas used to distribute total export duty burden between urban-rural areas are given as under.

$$\text{Export duty (urban)} = [\alpha_i \eta_i / \alpha_i \eta_i + \alpha_j \eta_j] \, TT^X$$

$$\text{Export duty (rural)} = [\alpha_j \eta_j / \alpha_i \eta_i + \alpha_j \eta_j] \, TT^X$$

Where TT^X = Total export duty burden.

To distribute taxes on natural gas into their urban-rural counterparts, differences of the population and the expenditures of households on natural gas in urban- rural areas

are taken from HIESs. Amounts of tax collected on the natural gas are taken from Economic Surveys. Urban-rural shares in the total taxes on the natural gas are then calculated by the following expressions.

$$\text{Tax on natural Gas (urban)} = [\alpha_i \text{Ç}_i / \alpha_i \text{Ç}_i + \alpha_j \text{Ç}_j] \, TT^{Gas}$$

$$\text{Tax on Natural Gas (rural)} = [\alpha_j \text{Ç}_j / \alpha_i \text{Ç}_i + \alpha_j \text{Ç}_j] \, TT^{Gas}$$

Where TT^{Gas} = Total Tax on Natural Gas.

To distribute taxes on petroleum between urban-rural areas, differences of the population and expenditures on transport and traveling between urban-rural areas are taken from HIESs. Total amount collected in a particular year by taxing petroleum is taken from Economic Survey. Urban-rural shares in the total taxes on the petroleum are then calculated by following expressions.

$$\text{Tax on Petroleum (urban)} = [\alpha_i \text{Ŧ}_i / \alpha_i \text{Ŧ}_i + \alpha_j \text{Ŧ}_j \,] \, TT^{Pet}$$

$$\text{Tax on Petroleum (rural)} = [\alpha_j \text{Ŧ}_j / \alpha_i \text{Ŧ}_i + \alpha_j \text{Ŧ}_j] \, TT^{Pet}$$

Where TT^{Pet} = Total Tax on Petroleum.

To distribute total taxes on vehicles in a certain year into their urban-rural categories, differences in the population and the expenditures on vehicles (durables) between urban-rural areas are taken from HIES. Total amount of tax levied on vehicles in a year is taken from Economic Survey. Urban-rural shares in the total taxes on the vehicles are then calculated by following expressions.

$$\text{Tax on Vehicles (urban)} = [\alpha_i \omega_i / \alpha_i \omega_i + \alpha_j \omega_j] \, TT^{Veh}$$

$$\text{Tax on Vehicles (rural)} = [\alpha_j \omega_j / \alpha_i \omega_i + \alpha_j \omega_j] \, TT^{Veh}$$

Where TT^{Veh} = Total Tax on Vehicles.

Average Expenditures and Tax Rates

Among the case studies of Pakistan, Malik et al. (1985) and Malik et al. (1989) have used effective tax rates to check the progressivity in the tax structure. Shirazi et al. (2001) and Shirazi et al. (2002) have used effective or average expenditure and tax rates in their analysis. Ghaus (1989), on the other hand, has not used effective rates in her analysis. We have incorporated in our analysis the concepts of effective or average rates for expenditures and taxes to examine the regressivity and progressivity, respectively, in their structure. The pro- poor ratios from average expenditures and taxes have also been calculated in each year to see the degree of pro- poor nature in government expenditures and taxes in urban- rural areas. The expressions for average expenditures and taxes are as under.

$$E_i = (e_i / Y_i) \, 100$$

$$Ti = (t_i / Y_i) \, 100$$

Where

E_i = Percentage of average government expenditures accruing to ith income group.

e_i = Government expenditures received by the households of ith income group.

Y_i = Income received by the households of ith income group.

T_i = Percentage of average taxes borne by ith income group.

t_i = Taxes paid by the households of ith income group.

Regression Analysis

All the above-mentioned studies in case of Pakistan have not used regression analysis in their work. We have done regression analyses with expenditure per household and tax per household as dependent variables, while using income per household as independent variable for them. In this way, we have checked the progressivity or regressivity in the expenditure and tax functions in all four years. Moreover, a comparison between urban-rural areas has been established by comparing relative progressivity and regressivity in expenditure and tax functions of urban-rural areas in the four selected years.

Lorenz curve and Gini coefficient Analyses

This study has worked out Lorenz curve and Gini coefficient analyses by using pre- and post-fiscal distributions of incomes for the urban-rural areas in all four years. The following equation has been used to calculate Gini and concentration coefficients[7] of urban-rural areas in the four selected years.

$$G = C = 1 - \sum_{1}^{k} (h_{i+1} - h_i)(y_i + y_{i+1})$$ [8]

Where

G = Gini ratio

C = Concentration ratio

h_i = Cumulative per unit number of households in the ith income group.

[7] See section 3.5.
[8] Miller (1963), quoted in Thepthana (1979).

y_i = Cumulative per unit share of income of the ith income group.

The Lorenz and concentration[9] curves have been drawn by using percentage cumulative distributions of households and incomes in the pre- and post-fiscal era respectively.

Significance Tests

A formal statistical test called Chow test for differences in income distributions within urban-rural areas and across the urban-rural areas in the same year or across the alternative years has been carried out. The purpose of this test is to show that if structural relationships have been changed the Gini- ratios and or the concentration ratios may differ significantly. The procedure for executing this test has been explained in chapter 6.

Statistical Packages Used

This study requires many statistical techniques and packages for its completion. Some of the well-known statistical packages are EViews 3.1, SPSS 10, Microsoft Excel and COBOL language. The functioning of the first three is well known and does not require further explanation. However, in passing, it is worth mentioning that SPSS is, generally, very helpful in sorting out the different distributors in the four selected years from the micro data provided by HIESs[10]. The EViews is more helpful in conducting

[9] See section 3.4.
[10] Household Income Expenditure Survey 1979 and 1986-87. Household Integrated Economic Survey 1992-93 and 2001-02.

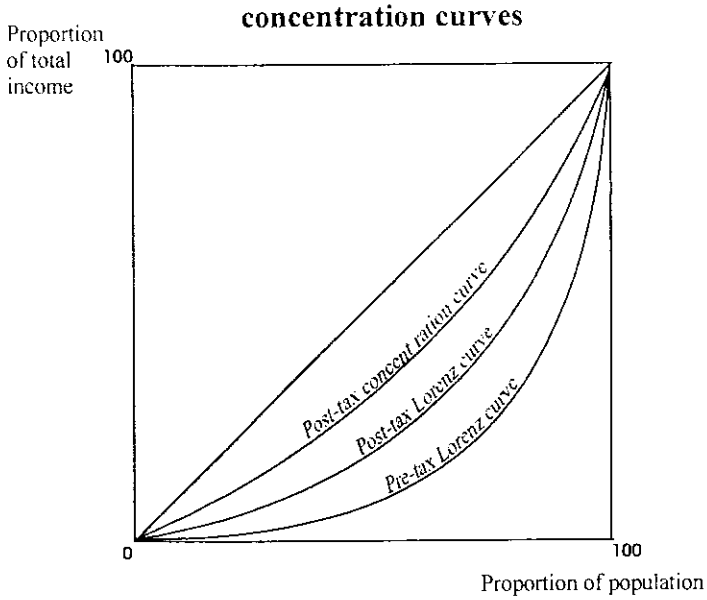
statistical significance tests. Whereas Excel is largely used in the process of computation and graphics. As far as COBOL language is concerned, it is a computer language and the data on households' incomes and expenditures is kept and processed in this language by the data processing center of federal bureau of statistics before 1990-91. One can get required secondary data directly from the micro data by using COBOL language instead of molding it into the shape, which is fit for the functioning of SPSS.

3.2 Lorenz and Concentration Curves

In this section we distinguish between two overlapping concepts, namely, post-fiscal Lorenz curve and post- fiscal concentration curve. Suppose that a progressive tax aiming at a better distribution of income is imposed. If we plot both pre-tax and post-tax income shares against quintiles of pre-tax households. A new curve will emerge that will not be post-tax Lorenz curve but, instead, it will be post-tax concentration curve as shown in figure 3.1. While, Lorenz curve for post-tax income recipients in general lies below, and never above, the concentration curve for post-tax income recipients. This is due to re-ranking phenomenon. Which occurs due to progressive income tax and the consideration of non-income characteristics. This is similar to say that when income shares of say 'P' are plotted against the number of households of say 'Q' the resultant curve will be concentration curve for 'P' with respect to 'Q'.[11]

[11] Lambert (1989).

Figure 3.1
The Income Tax: Lorenz and concentration curves



We have seen that re-ranking in post tax income distribution due to, say, progressive income tax, gives rise a new curve called concentration curve. If we calculate trapezoidal Gini coefficient from this concentration curve, a new coefficient will arise corresponding to the concentration curve. This coefficient will not be called post- tax Gini coefficient but it will be named as post- tax concentration coefficient. Because this new coefficient is calculated from the concentration curve, which shows the relationship between pre-tax household percentage and their percentage post– tax shares.

Another application of Lorenz curve is that it can be used as a criterion for ranking income distribution. But the ranking provided by it is only partial. Partial in the sense that, when the Lorenz curve of one distribution is strictly inside the another distribution, it can be said confidently that the first distribution is more equal than the second one. However, when two Lorenz curves intersect, neither distribution can be concluded to be more equal than other. Nevertheless, this partial ranking may not be considered as a draw back of Lorenz curve. As Sen. (1973) criticized complete ranking by saying that "the concept of inequality has different facets which may point in different directions and sometimes a total ranking can not expected to emerge". The concept of

inequality is, therefore, essentially a question of partial ranking and the Lorenz curve is consistent with such a notion of inequality.[12]

3.3 The Data Set

The data used in this research work is mainly consists of Household Income and Expenditure Surveys (HIESs) for the calendar year 1979 (January – December) and for the fiscal year 1986-87 [July (1986) – June (1987)]. The Household Integrated Economic survey (HIES) again for the fiscal years 1992-93 [July (1992) – June 1993)] and 2001-02 [July (2001) – June 2002)] .[13] The Household Income Expenditure Survey (HIES) was initiated by the Central Statistical Office [now Federal Bureau of Statistics (FBS)] from July 1963. The surveys have been conducted on national basis in both urban and rural areas of Pakistan. The reports of the surveys for the years 1966-67 to 1971-72 were published, while, it remained suspended from 1972-73 to 1977-78. In 1979 (January–December) survey was restarted on national basis with enlarged sample size providing results for the provinces with urban-rural breakdown but could not continue in subsequent years. Again it was started as a regular programme of FBS in 1984-85 to 1987-88. This survey has not been conducted in the years 1988-89 and 1989-90. However, from 1990-91 almost same survey has been started to conduct with the name Household Integrated Economic Survey (HIES).

The aim of HIES is to provide data on household income and expenditure, ascertain the pattern and level of consumption, variations in expenditure, household saving, investment and liabilities by different income groups and by urban-rural areas. As far as its geographical coverage and scope is concerned, the universe in HIES comprise all rural and urban areas of Pakistan defined as such in the 1972 and 1981 Population

[12] Kakwani (1986).
[13] The discussion in this section heavily depends upon the reports of HIESs for the years 1979, 1986-87 and 1992-93.

Census, with the exception of Federally Administered Tribal Areas (FATA). Special Areas of Peshawar and D.I. Khan Divisions, Military restricted areas and districts of Malakand, Kohistan and Chitral (Protected Area) in N. W. F. P. were covered in the surveys. Households located in institutions like hotels, hospitals, boarding houses, etc. were covered in the scope of the survey whereas those which entirely depended for their living on charity, engaged in immoral or illegal pursuits, were excluded from its scope. Data were colleted from the respondents by direct interview. A 24, 28, 39 and 41 Pages schedule covering detailed items of household income and expenditure was used for HIESs of 1979, 1986-87, 1992-93 and 2001-02 respectively.

Federal Bureau of Statistics has developed its own sampling frame for urban areas. Each city / town has been divided into a number of enumeration blocks. Each enumeration block is based on 200 to 250 households on the average with well-defined boundaries and maps. The list of enumeration blocks as updated through Census Establishments conducted during 1988 and the list of villages / mouzas / dehs published by Population Census Organization as a result of 1972 and 1981 Population Census have been taken as sampling frame for selection of primary sampling units (PSUs) from urban and rural domains respectively.

In the survey of 1979 the self representing cities included all cities having population 400 thousands and above, while in the surveys of 1986-87 and 1992-93 the cities having population of 5 lac and above have been considered as self-representing cities. For example Karachi, Lahore, Gujranwala, Faisalabad, Rawalpindi, Multan, Hyderabad, Peshawar and Quetta Being Provincial capital have specially been considered as self-representing city. Each of these cities constitutes a separate stratum, which has been further sub-stratified according to low, middle, high income groups based on the information collected in respect of each enumeration block at the time of demarcation / updating of urban area sampling frame. After excluding population of self-representing cities from the respective division, the remaining urban population in each division of the

Punjab, Sindh NWFP and Baluchistan provinces has been grouped together to form another stratum. Moreover, after excluding urban population of each district in Punjab, Sindh and NWFP Provinces, the remaining population constitutes rural domain. Each district of rural domain has been considered a stratum except in Baluchistan province where each division constitutes a stratum.

Enumeration blocks in urban domain and mouzas / dehs / villages in rural domain have been taken as primary sampling units (PSUs). In urban domain, sample PSUs from each ultimate stratum / sub-stratum have been selected with probability proportionate to number of households. In the rural domain, the sample PSUs from each ultimate stratum have been selected with probability proportionate the population counted in 1981 census. Households within sample PSUs have been taken as secondary sampling units (SSUs). A specified number of households i.e. 12 from each sample (PSU) of self-representing cities (SRC) have been selected with equal probability systematically using sampling interval with a random start. Similarly, 16 from each sample (PSU) from rural areas have been selected for enumerations.

A Stratified two stage sample design has been adopted for the survey. Considering the variability of the characteristics for which estimates are to be prepared, population distribution and field resources available, a sample of 22575, 17183 and 14,976 and 15432 households for the surveys of 1979, 1986-87, 1992-93 and 2001-02 respectively was considered appropriate to provide reliable estimates of main characteristics at national level. The secondary sampling units (SSUs) has been drawn from 1400, 1401, 1056 and 1163 primary sampling units (PSUs) in the surveys of 1979, 1986-87, 1992-93 and 2001-02 respectively. Out of which 608, 648, 480 and 498 are urban and 792, 753, 576 and 664 are rural, respectively, for the surveys of 1979, 1986-87 1992-93 and 2001-02. The sample PSUs have been selected in four replicates of 350 PSUs each in the HIESs of 1979 and 1986-87 and 264 PSUs each in the HIES of 1992-93 and 2001-02. One sub-sample has been enumerated in each quarter. The sample PSUs

have been allocated to the four provinces in proportion to their population according to 1972 Population Census in case of HIES in 1979 and 1981 Population Census in case of HIESs in 1986-87 and 1992-93. Whereas, in case of HIES in 2001-02 the sample PSUs have been allocated to the four provinces in proportion to their population according to 1998 Population Census.

Other Sources of data

Some other sources of data used in this research work are the Monthly Statistical Bulletin, December 1992, and Pakistan Statistical Year-Book, 1980, 1990, by the Federal Bureau of Statistics (FBS). Agriculture Statistics of Pakistan, 1995-96 and 2003-04 by the Ministry of Food, Agriculture and Livestock Economic Wing Islamabad. Zakat and Ushr System in Pakistan, 1994 and 2001-02, by the Central Zakat Administration, Ministry of Finance. Economic Surveys and Statistical Supplements Economic Surveys of various years by the Finance Division.

3.4 Scope and Limitations of this Study

This study traces the effects of fiscal policy on the distribution of income in a technical way and does not require a counterfactual of hypothetical nature.[14] This study examines the effects of all government expenditures and taxes at all levels (federal and provincial) and explores the changes in the size distributions of income overtime rather than tracing their impact of in a single year in urban- rural areas of Pakistan. Moreover, we get final imputed distribution of income by forming same type of incidence assumptions for urban and rural areas but taking a new amount of expenditures and taxes in each year. Consequently, the biases in data, if any, are in the same direction and of similar magnitude in each year for urban- rural areas. Hence, this study at least provides

[14] See Appendix A: Alternative definitions of income redistribution.

an unbiased estimate of the changes in post- fiscal incomes in urban- rural areas overtime by canceling out exaggerated distributive effects across the three years and across the two areas (urban- rural).

As far as. choice of the four years for studying government effects on the distribution of income is concerned. it is admitted that yearly data since independence of Pakistan on the final distribution of income would undoubtedly be desirable to discern a comprehensive picture of the distribution problem. However, we have contended with four years due to two reasons, first. it is very expensive to collect and analyze reliable data for more than these four years. The data required to satisfy the needs of equation 3.1 is difficult to find out. Moreover, analyzing such data is an additional tedious and regular job. Therefore, this study takes care of four years, as these numbers are sufficient to cope with the difficulties of handling equation 3.1. The reason for not choosing years beyond these four years is that when this study was in progress no latest Household Integrated Expenditure Survey (HIES) was available except for the year 2001-02. Hence, we had to restrict this study up to that latest available and concerning data.

Sometimes, a difference appears in two sources of data due to the fact that one source represents the calendar year while other represents the fiscal year. For example, in 1979 Household Income and Expenditure Surveys (HIES) provide the data for the calendar year as mentioned in the preceding discussion. While, the data required for this study in Economic Survey is for the fiscal year (1979- 80). To cope with this problem we assume that the consumption pattern during the calendar year has remained the same as during fiscal year. This assumption is quite harmless, as consumption patterns do not change rapidly.

Moreover, during sorting out data on the collection and distribution of *zakah and ushr* along income group of urban- rural areas from the micro data provided by Federal Bureau of Statistics (FBS) we used 17172 households instead of 17183 total household in the survey of 1979. Whereas, in 1986- 87 we used 14966 out of total 14976 households in

the survey to get percentage collection and disbursement of *zakah* and *ushr* along the income groups of urban- rural areas. This exclusion of 11 and 10 households from the sample data of 1979 and 1986-87, respectively, is due to unusual behaviour of these households in the *zakah* and *ushr* data in the above mentioned two years.

Generally, empirical works are based on an important area of economic theory. For example, the demand for money equation, the investment function and the fixed or floating exchange rate paradigms. However, works on the size distribution of income may not have these theoretical and behavioural bases. Reynolds and Smolenskey (1977) substantiate the above mentioned phenomenon as under:

> "However, size distribution of income is distantly related to the human capital model, and to a conjecture by Kuznets (1955), and that is about all. Since the moments of the size distribution are neither dependent nor independent variables in any significant analytical model, it seems reasonable to look elsewhere for the motivating energy."

Nevertheless, overtime and area wise comparisons of the final incomes in this study may try to dilute the intensity of clashes with economic theory. These clashes, of course, would be more severe in case of studying distributive effects of government expenditures and taxes within a single area and in a single year.

CHAPTER 4

EMPIRICAL ANALYSIS

In the preceding chapter we have discussed the methodology and some useful techniques for studying the distribution of income problem along with the data set. After being armed with the essential concepts and analytical tools, we now turn to the practical aspects of judging the pattern of income distribution in a country by using statistical facts and figures. In this connection, Dalton and Brady nicely explained the importance of empirical work in the field of distribution.[1]

> "Whether inequality actually increasing or diminishing in a particular community during a particular period of time is, of course, a statistical question, which may be answered independently of general argument regarding economic cause and effect, provided, first the relevant income statistics are known, and second, that measure of inequality is agreed upon and applied to these statistics. But, in fact, the relevant statistics are in most cases very imperfectly known and the difficulty of agreeing upon a measure of inequality is much greater than is commonly realized. [Hugh Dalton; Brady (1951), pp. 351-52]"

To proceed systematically towards statistical field of analysis one has to comprehend on the steps and procedure explained in chapter 3. The first step during the analysis of this study is to divide values of net national product (NNP), government expenditures and taxes into their urban-rural categories by using different weights and formulas given in chapter 3 in all four years. The second step is to distribute number of households and the values of net national products, government expenditures and taxes

for urban- rural areas along the income groups of these areas. The last step is to calculate average expenditures, average taxes and average net expenditures or average net benefits and examine their pro-poor or pro-rich nature.

4.1 Division of Households, NNP, Expenditures and Taxes between Urban- Rural Areas of Pakistan

This study is designed to measure and compare budget incidence between urban-rural areas. In this connection, the number of households in urban-rural areas can be calculated from the knowledge of urban-rural populations and average members per household. In this way, population in each of the four selected years can be represented in terms of number of households. Survey data on average members per household living in urban and rural an area is available in HIESs of the four years.

Table 4.1

Calculation of urban-rural households from urban-rural population

Year	1979	1986-87	1992-93	2001-02
Urban Population	21.61 (m)	28.50 (m)	38.06 (m)[2]	47.44 (m)
AM / HH.[3]	6.4	6.79	6.66	6.87
HH.[4] (Urban)	3.38 (m)	4.20 (m)	5.72 (m)	6.91 (m)
Rural Population	56.25 (m)	72.20 (m)	82.77 (m)	98.52 (m)
AM / HH.	6.0	6.32	6.30	7.00
HH. (Rural)	9.38 (m)	11.42 (m)	13.14 (m)	14.07 (m)

Sources: HIESs of 1979, 1986-87, 1992-93 and 2001-02. Various issues of Economic survey.

The data on total population and its division into urban-rural counterparts can be taken from Economic Surveys of different years. One can calculate easily, the number of households by dividing urban and rural population given in table 4.1 with their respective

[1] Quoted in Reynolds and Smolensky (1977).
[2] Million
[3] Average members per household.
[4] Households.

average members per household in the four selected years. Number of urban-rural households in the fourth and seventh rows has been calculated, respectively, after dividing row 2 by row 3 and row 5 by row 6.

Neither the net national product nor the tax and the government expenditure data have been separated for urban-rural areas by any of the data sources. Therefore, it is necessary to get the imputed shares of net national product, government expenditures and taxes for the urban and rural areas to carry on the analysis in this study. For this, we have introduced different weights in chapter 3 to get shares of urban-rural areas for the above-mentioned items. We have already agreed upon that net national product (NNP) can better serve as an income base in this study. The values of total NNP are divided into their urban-rural counterparts in the years 1979, 1986-87, 1992-93 and 2001-02 by using data on net national products available in Pakistan Statistical Yearbook or in Monthly Statistical Bulletin for these years.

In this way, total net national products have been divided into NNP (urban) and NNP (rural) by the equivalence scale method in all four years. Thus, the pre- fiscal income shares of urban and rural households in net national product have been calculated by using population weight and income weights of the urban-rural areas.[5] It is quite obvious that urban-rural wise data on government expenditures is not available in any of the data sources. Therefore, equivalence scale method has been used to divide government expenditures into expenditure (urban) and expenditure (rural). Similarly, urban-rural wise data on taxes is also not available therefore we have divided taxes between urban-rural areas by assigning different weights to these areas to get tax (urban) and tax (rural). These weights are given in table 4.2.

[5] Population weight has been computed by population differential between urban and rural households in Pakistan and the income weight has been calculated by the differential between average monthly income of urban and rural household as given in HIESs for the years 1979, 1986-87 1992-93 and 2001-02.

Table 4.2

Different weights to distribute income base, Government expenditures and taxes between urban-rural areas.

Year	Urban				Rural			
	1979	1986-87	1992-93	2001-02	1979	1986-87	1992-93	2001-02
Income Base								
NNP weight	0.390	0.380	0.430	0.494	0.610	0.620	0.570	0.506
Government Expenditures								
Current subsidies	0.280	0.330	0.330	0.450	0.720	0.670	0.670	0.550
Development subsidies	0.390	0.380	0.430	0.494	0.610	0.620	0.570	0.506
Education	0.730	0.800	0.770	0.790	0.270	0.20	0.230	0.210
Health	0.240	0.330	0.310	0.370	0.760	0.670	0.690	0.630
Community services	0.390	0.380	0.430	0.494	0.610	0.620	0.570	0.506
Defense	0.390	0.380	0.430	0.494	0.610	0.620	0.570	0.506
General administration	0.386	0.378	0.429	0.490	0.614	0.622	0.571	0.510
Agriculture	0.280	0.330	0.330	0.450	0.720	0.670	0.670	0.550
Development	0.390	0.380	0.430	0.494	0.610	0.620	0.570	0.506
Interest	0.430	0.450	0.550	0.719	0.570	0.550	0.450	0.281
All Others	0.390	0.380	0.430	0.494	0.610	0.620	0.570	0.506
Government Taxes								
Income and corporate tax	1.000	0.980	0.955	0.720	0.000	0.020	0.045	0.280
Property tax	1.000	0.920	0.927	0.640	0.000	0.080	0.073	0.360
Sales tax and excise duty	0.370	0.370	0.403	0.520	0.630	0.630	0.597	0.480
Import duty	0.368	0.372	0.400	0.430	0.632	0.628	0.600	0.570
Export duty	0.390	0.380	0.429	0.494	0.610	0.620	0.571	0.506
Tax on natural gas	–	0.900	0.970	0.900	–	0.100	0.030	0.100
Tax on petroleum	–	0.410	0.560	0.469	–	0.590	0.440	0.531
Vehicle tax	0.490	0.400	0.510	0.570	0.510	0.600	0.490	0.430
All other indirect taxes	0.370	0.370	0.403	0.520	0.630	0.630	0.597	0.480

Source: See Appendix B.

4.2 Distribution of Households and NNP (Income Base) along the Income Groups in Urban-Rural Areas.

After dividing number of households, net national product, government expenditures between urban and rural areas, we now turn to the problem of distributing

households and net national product (NNP) among the income groups of urban-rural areas. To distribute number of households among different income brackets in urban-rural areas, the percentage distributions of households among income groups of urban-rural areas have been used in all four years[6]. To distribute NNP (urban) and NNP (rural) among their respective income groups, a percentage distribution of income given in HIESs has been used.[7] These distributions of NNP along the income groups of urban-rural areas are the income base or pre-fiscal distribution of income in studying the incidence of government expenditures and taxes in this research work.

4.3 Distribution of Government Expenditures and Taxes across the Income Groups in Urban- Rural Areas of Pakistan

We now turn to the most difficult part of this research work. In sections 4.3.1 and 4.3.2 some suitable incidence assumptions about the choice of the distributors to distribute government expenditures and taxes along the income groups in urban-rural areas of Pakistan are presented along with the causes of their selection.

4.3.1 Distribution of Government Expenditures by Income Brackets in Urban-Rural Areas

To distribute government expenditures along the income groups of urban- rural areas, the data on relevant distributors in HIESs[8] have been used. Theoretically, to distribute government expenditures by income brackets we generally use two concepts, the decision incidence and the social incidence.[9] Decision incidence refers to the apparent

[6] HIESs of the four selected years.
[7] Ibid.
[8] See Appendix C.
[9] See Appendix A.

points where government expenditures fall, whereas, the social incidence refers to the final resting-place of the benefits from government expenditures.

For instance, government expenditures on defense, by decision incidence, fall on employees of armed forces, but under social incidence paradigm, each member of the society enjoys benefits from government expenditure on defense, in terms of his / her security of life and wealth. Similarly, expenditures on general administration due to decision incidence largely fall on employees working in different relevant departments but due to social incidence these expenditures also provide benefits to the other members of society in term of organization and other different facilities Thus, it is justifiable to distribute some of the government expenditures among different income classes in the society according to their number of households or their incomes or both.

In table 4.3, the incidence assumptions are given to distribute government expenditures among different income groups in urban- rural areas of Pakistan. However, these incidence assumptions are somewhat different from other authors like Reynolds and Smolensky (1977), and Lambert (1989) who have worked on United States data. This divergence is due to difference in the type of data available, nature of government expenditures and their structure of economies. Therefore we adopted those assumptions, which are consistent with the data available and different economic and social aspects in Pakistan. To rationalize the choice of the above benchmark incidence assumptions we shall discuss them turn-by-turn.

First of all take the case of the incidence assumption adopted for the distribution of government expenditures on education among different income groups living in urban-rural societies. The education expenditures have been distributed according to expenditures of urban-rural households on education. In the assumption we have implicitly convinced by the notion that rate of enjoying benefits from government expenditures on education is directly proportional to the rate of spending of households on education. In the framework of social set-up in Pakistan, the poorer people cannot or do not educate their children, rather they put them in some quick money earning labour or

profession, like, daily wage labour, conductor, waiter in a restaurant etc. This happened mostly due to weak financial position of parent and sometimes due to unwillingness of children to go through long and tedious process of education.

Table 4.3

Incidence Assumptions for Government Expenditures

Type	Distributor by Income Class
Education	Expenditures on Education
Health	Expenditures on Medical Care
Other Social and Community Services	Number of Households
Defense	½ on Number of Households
	½ on Household Income
General Administration	¾ on Number of Households
	¼ on Household Income
Agriculture	Agriculture Income
Interest	Volume of Deposits
Development Expenditures	Number of Households
Current Subsidies	Distributor of Agriculture Expenditures
Development Subsidies	Distributor of Development Expenditures
All Others	Distributors other than Education, Health and Interest

Those, who are, poor and have some basic needs to get along, also dare to educate their children only up to primary school or at the most, up to secondary school education. The major reason for not educating beyond secondary school is the weak financial position of the poor families to support their children. Whereas in case of middle class people, they try to educate their children mostly up to bachelor level and sometime up to university level. This is due to the fact that there are very few universities and

professional colleges in Pakistan, which are situated in some big cities. Hence, most of the middle class families cannot bear the heavy expenses of boarding and fees of these big educational institutions. However, rich and richer families can easily afford to educate their children in universities and other professional institutions.

Turning to the analysis of incidence assumption used to distribute health expenditures, we distributed these government expenditures according to the expenditures of the households residing in different income brackets of urban rural areas on medical care. As far as incidence assumption for defense expenditures is concerned, the "decision incidence" falls on the employees of the armed forces and other institutions related to defense matters. But due to the "social incidence" all the members of the society enjoy government expenditures on defense in terms of their safety of lives and wealth. As the poor have, generally, no wealth hence they get benefit from government expenditures on defense, mostly, in terms of safety of their lives. While, on the other hand, rich and richer being the owners of wealth also get safety of their wealth from the defense expenditures in addition to their safety of lives. Thus, we are accurate in distributing defense expenditures of government among different income classes, half on the basis of their incomes and half on their number of households.

In case of general administration expenditure, the social incidence cannot be clearly shown. Therefore, these expenditures are arbitrarily distributed; one half by the number of households and one half by the household income. Whereas, in case of agriculture expenditures of the government, the "decision incidence" paradigm exhibits the expenditure on the employees of agriculture department and the other development expenditures. The social incidence translates the expenditures on agriculture into overall increase in society's welfare. It is also argued that the bigger agriculturists often enjoy more from the government expenditures due to their approach and links with the government servants. Moreover, due to having more information about different government programmes and also due to their well-organized agriculture system, they generally get more benefits than the poor.

Government expenditures on agriculture among different groups of society have been distributed among the different income groups in urban-rural areas on basis of their agriculture incomes. Development expenditures fall on the households according to their number in each income group. This is due to the supposition that each member of the classes from poorer to richer enjoys the benefits of the development expenditures by the government, almost equally via increase in the investment and employment, which ultimately transmit these benefits to all individuals in the society. Similarly, government expenditures on community services other than education and health have been distributed among different income groups in urban-rural areas their number of households. As almost all members of the society enjoy government expenditures on social and community services in one way or other.

Benefits of the current subsidies are distributed along the income groups according to the distributor for agriculture expenditures of the government (i.e. agriculture incomes). Because, most of the current subsidies are specified for the agriculture sector. Whereas, benefits of development subsidies have been distributed among income groups according to the distributor of development expenditures (i.e. number of households) due to their pro-poor nature. Government expenditures on interest fall directly on household who receive the interest payment. Hence it is assumed that the interest expenditures of the government should be allocated in proportion to volume of deposits (interest earned) of the households in the government based financial institutions. All other miscellaneous expenditures have been distributed keeping in view all distributors other than for education, health and interest expenditures. As distributors for education, health and interest expenditures are more specifically defined for each of the above mentioned expenditure category. Although, distributor for agriculture expenditures also is of specific nature, yet, we count it in general category due to the fact that Pakistan is an agriculture country.

4.3.2 Distribution of Taxes by Income Brackets in Urban-Rural Areas

Like in case of government expenditures, some suitable incidence assumptions about the distributors[10] have also been adopted to distribute tax burden among different income groups in urban- rural areas of Pakistan. These incidence assumptions are given below in table 4.4. Theoretically, the taxes on income cannot be shifted at least in the short run. However, there are different views on shifting or not shifting the corporate income tax. We assume that corporate income tax is not shiftable and fall fully on statutory taxpayer. Therefore, the burden of income and corporate taxes has been distributed among different income groups according to the proportion of their expenditures on the payment of these taxes.

Table 4.4

Incidence Assumptions for Taxes

Type	Distributor by Income Class
Income and Corporate Tax	Income Tax
Property Tax	Property Tax
Sales Tax and Excise Duty	Consumption
Import Duties	Household Expenditures
Export Duties	Household Income
Taxes on Petroleum	Expenditures on Transport and Traveling
Taxes on Natural Gas	Expenditures on Natural Gas
Taxes on Vehicles	Vehicles Owned
Other Indirect Taxes	Consumption

Similarly burden of the property tax has been distributed among different classes according to the payment of this tax by the property owners. Sales tax and excise duty

[10] See Appendix D.

are assumed to fall on the consumption of households according to the standard incidence assumption for indirect taxes. Import duties have been distributed according to household expenditure because it is assumed that they have the characteristics of indirect taxes and may be shifted to the consumer in by raising the price level. Moreover, we distributed import duties according to total expenditures of the households rather than their consumption level as former can cover range of imported items more than the later.[11] Whereas, export duties have been distributed with respect to household incomes belong to different income groups. Pakistan is an agricultural country. Most of its residents earn their living in agriculture. Export duty on any exportable item makes its domestic price under valued. For example, if export duty on an agriculture product, say, cotton is abolished then in short run it would benefit to those who purchase cotton, like, exporters and middlemen but in long- run farmers who produce cotton also get benefit in the form of its higher price. This chain of benefits extends to the other farmers and workers and certainly to all other sectors of the economy through enhancement in consumption and employment, and thus the overall income level. Therefore, in this study export duty has been distributed along the income group of urban- rural areas according to their respective incomes level.[12] Taxes on natural gas fall on the households according to their consumption for natural gas. Burden of taxes on petroleum has been distributed along the income groups according to their expenditures on transport and traveling. Whereas, burden of taxes on vehicles falls on the different income groups according to the proportion of their number of vehicles owned. Burden of all other indirect taxes has been distributed in proportion to consumption of the different income groups.

[11] See Thepthana (1979).
[12] Ibid.

4.4 Fiscal Incidence in Urban– Rural Areas of Pakistan

Let us move to the main results of this study. To elaborate these results, we follow a well known technique of showing the fiscal incidence along the income groups in the form of ratios of taxes and expenditures to incomes along the income classes in urban-rural areas and then taking the pro- poor ratio of 40 percent low to 20 percent top income groups to assess the overall distribution of income pattern within and across the income groups in urban- rural areas.

4.4.1 Determination of Average Expenditures and Taxes

It is useful technique to represent government expenditures and taxes imputed to each income class relative to the income received by that class. For this, average expenditures and taxes are calculated by the following formulas.

$$E_i = (e_i / Y_i)\ 100$$

$$Ti = (t_i / Y_i)\ 100$$

Where

E_i = Percentage of average government expenditures accruing to ith income group.

e_i = Government expenditures received by the households of ith income group.

Y_i = Income received by the households of ith income group.

T_i = Percentage of average taxes borne by ith income group.

t_i = Taxes paid by the households of ith income group.

By using above formulas one can easily calculate the percentage of average expenditures and taxes for different income classes in urban-rural areas in each year. If

average expenditures or average taxes increases through lower to higher income groups then both expenditures and taxes are defined as progressive. Thus, progressive expenditures favour higher income groups, while progressive taxes favour lower income groups. On the other hand, the regressivity in expenditures or taxes is defined as the decreasing behaviour of average expenditures or average taxes through lower to higher income groups. Hence, regressive expenditures favour lower income groups, while regressive taxes favour higher income groups. As these terms create confusions, therefore in this study the progressive taxes and regressive expenditures or benefits are substituted by the term "pro-poor" while regressive taxes and progressive expenditures are substituted by the term "pro-rich".

4.4.2 Fiscal Incidence in Urban Areas of Pakistan

The results of fiscal incidence in urban areas for the years 1979, 1986-87, 1992-93 and 2001-02 have shown by tables 4.5, 4.6, 4.7 and 4.8 respectively. In table 4.5 the results of fiscal incidence in urban areas of Pakistan are given for the year 1979. A bird's eye view on this table and rest of the other two tables brings for us some quite interesting findings. For example, third column in table 4.5 shows the absolute or actual values of expenditures paid by each income group in the urban areas of Pakistan. The values of expenditures across income groups, at first, increase up to seventh income group and then decrease onward until eleventh income group and finally the value increases again in the twelfth (the last) income group. On the other hand, when these values of expenditures are presented as a percentage of incomes of different income groups in column 5 of table 4.5, they show decreasing behaviour until eighth income group and there from increase up to eleventh income group and then again decreases in the last income group.

Still more interesting results can be seen in columns 4 and 6 of table 4.5. In column 4, the actual or absolute values of taxes across the income groups of urban areas

are given. These values show increasing behaviour up to seventh income group and then decreasing behaviour from eighth to tenth income group. Again these values increase up to last income group. This means that government taxes present cyclical behaviour across the income groups in the urban areas of Pakistan in 1979. But, however, when taxes are presented as a percentage of income in column 6 of table 4.5, we meet there with some very interesting and paradoxical values of taxes along income groups having, more or less, U-shaped pattern. We can come across with the more or less similar considerations while comparing columns 3 and 5 for expenditures and columns 4 and 6 for taxes in table 4.6 and column 6 for average taxes in table 4.7. But, column 3 for actual expenditures shows their cyclical behaviour, column 5 for average expenditures shows strictly decreasing behaviour and column 4 for actual taxes shows strictly increasing behaviour in table 4.7. However, column 7 for net expenditures shows strictly decreasing behaviour along the income group in tables 4.5, 4.6 and 4.7. In table 4.8 the actual expenditure column 3 shows cyclical behaviour up to seventh income group then decreasing behaviour from eighth to eleventh income group and the value increases in the last income group. While, column 4 for actual taxes shows more or less increasing behaviour along the income group. Column 5 for average expenditures in table 4.8 shows strictly decreasing behaviour from bottom to top income group, while, column 6 for average taxes shows U- shaped pattern. However, column 7 for net expenditures in table 4.8 shows almost decreasing behaviour along the income group.

Let us discern expenditures and taxes as a percentage of income in a different paradigm. The largest value of average expenditures has been found in the lowest income group in 2001-02 (616.92). The second largest ratio is again in the lowest income group in the year 1992-93 (602.08). While, the smallest value of average expenditures is for the highest income group in 1979 (10.86). The second smallest ratio is found to be in the highest income group in 1992-93 (14.98). On the whole, the average expenditures have, more or less, negative relation with respect to the income of households belonging to the different income classes of urban areas in all four selected years.

Table 4.5

Expenditures and taxes as a percentage of income of the income groups (urban – 1979)

No	1	2	3	4	5	6	7
0	Income Groups	Incomes (Y_i) Rs. million	Expenditures (e_i) Rs. million	Taxes (t_i) Rs. million	$Ei=(e_i/Y_i)100$	$T_i=(t_i/Y_i)100$	$E_i - T_i$
1	Up to 300	248.13	559.00	46.78	225.28	18.85	206.43
2	301 - 400	909.80	857.09	136.84	94.21	15.04	79.17
3	401 - 500	2067.74	1198.57	290.38	57.97	14.04	43.92
4	501 - 600	2894.83	1405.75	402.50	48.56	13.90	34.66
5	601 - 800	7473.85	2766.84	1016.52	37.02	13.60	23.42
6	801 - 1000	8849.92	2760.86	1188.98	31.20	13.43	17.76
7	1001 - 1500	16872.74	3969.67	2207.57	23.53	13.08	10.44
8	1501 - 2000	10586.82	2215.93	1551.77	20.93	14.66	6.27
9	2001 - 2500	6772.18	1509.45	1268.07	22.29	18.72	3.56
10	2501 - 3000	4300.89	1029.36	991.14	23.93	23.05	0.89
11	3001 - 3500	3473.80	985.81	1327.29	28.38	38.21	-9.83
12	3501 and above	18278.80	1985.19	5275.37	10.86	28.86	-18.00

Table 4.6

Expenditures and taxes as a percentage of income of the income groups (urban – 1986-87)

No	1	2	3	4	5	6	7
0	Income Groups	Incomes(Y_i) Rs. million	Expenditures (e_i) Rs. million	Taxes (t_i) Rs. million	$Ei=(e_i/Y_i)100$	$T_i=(ti/Y_i)100$	$E_i - T_i$
1	Up to 600	431.48	1440.16	116.10	333.77	26.91	306.86
2	601 – 700	509.94	998.36	235.92	195.78	46.27	149.51
3	701 – 800	764.91	1266.49	234.26	165.57	30.63	134.95
4	801 – 1000	3706.87	2643.06	652.75	71.30	17.61	53.69
5	1001 – 1500	18240.18	7777.62	2784.14	42.64	15.26	27.38
6	1501 – 2000	25457.80	8718.43	3856.92	34.25	15.15	19.10
7	2001 – 2500	22437.38	7170.48	3526.09	31.96	15.72	16.24
8	2501 – 3000	19083.54	5949.88	3091.09	31.18	16.20	14.98
9	3001 – 3500	15023.63	5191.53	2630.19	34.56	17.51	17.05
10	3501 – 4000	13278.06	4707.13	2969.83	35.45	22.37	13.08
11	4001 – 4500	10708.80	4453.48	3015.36	41.59	28.16	13.43
12	4501 and above	66488.41	11728.79	16397.34	17.64	24.66	-7.02

Table 4.7

Expenditures and taxes as a percentage of income of the income groups (urban – 1992-93)

No	1	2	3	4	5	6	7
0	Income Groups	Incomes (Y_i) Rs. million	Expenditures(e_i) Rs. million	Taxes (t_i) Rs. million	$E_i=(e_i\ Y_i)\ 100$	$T_i=(ti\ Y_i)\ 100$	$E_i - T_i$
1	Up to 1000	1733.18	10435.10	1094.90	602.08	63.17	538.90
2	1001 - 1500	5893.54	18298.22	1324.35	311.54	22.55	288.99
3	1501 - 2000	16417.03	10658.50	2819.21	64.92	17.17	47.75
4	2001 - 2500	25082.92	12838.38	3830.78	51.18	15.27	35.91
5	2501 - 3000	26761.66	12051.50	3930.73	45.18	14.74	30.45
6	3001 - 3500	30619.45	11834.54	4752.33	38.65	15.52	23.13
7	3501 – 4000	30763.88	11713.78	5723.09	38.08	18.60	19.47
8	4001 – 5000	54787.63	17283.76	9736.83	31.55	17.77	13.77
9	5001 – 6000	44581.15	13529.22	10254.26	30.35	23.00	7.35
10	6001 – 7000	40055.63	11172.23	11536.40	27.89	28.80	-0.91
11	7001 and above	204851.80	30682.02	42921.49	14.98	20.95	-5.97

Table 4.8

Expenditures and taxes as a percentage of income of the income groups (urban – 2001-02)

No.	1	2	3	4	5	6	7
0	Income Groups	Incomes (Y_i) Rs. million	Expenditures (e_i) Rs. million	Taxes (t_i) Rs. million	$Ei=(e_i/Y_i)100$	$T_i=(t_i/Y_i)100$	$E_i - T_i$
1	1- 1000	3109.99	19186.2	2783.0	616.92	89.48	527.43
2	1001- 1500	3411.73	14828.8	1075.5	434.64	31.52	403.12
3	1501- 2000	11009.23	34643.4	2571.6	314.68	23.36	291.32
4	2001- 3000	52844.30	40196.6	8579.4	76.07	16.24	59.83
5	3001- 4000	100083.90	30014.7	13549.2	29.99	13.54	16.45
6	4001- 5000	126906.38	30503.0	16293.6	24.04	12.84	11.20
7	5001- 6500	184154.37	44491.1	22719.1	24.16	12.34	11.82
8	6501- 8000	164537.92	36732.9	22787.5	22.32	13.85	8.48
9	8001- 9500	118099.00	32869.4	19209.1	27.83	16.27	11.57
10	9501- 11000	125705.37	25367.2	22351.3	20.18	17.78	2.40
11	11001- 12500	104487.59	22883.6	26273.5	21.90	25.15	-3.24
12	12501- above	568476.53	109558.0	119052.4	19.27	20.94	-1.67

On the other hand, the largest average tax burden is in the lowest income class in 2001-02 (89.48). The second largest tax burden is in the second lowest income group in. 1992-93 (63.17). While the lowest percentage average tax is in the middle income group in 2001-02 (12.34). The second lowest percentage average tax is also in the middle-income group in 1979 (13.08). The overall average tax burden[13] seems to have a U-shaped pattern with a high ratio in the lowest income class, smaller in the middle classes, a high ratio again in the high-income class and tends to be somewhat smaller in the highest income class. At the end, we can say that government expenditures have exhibited pro-poor behaviour while taxes have shown pro- rich nature in urban areas of Pakistan, in all four selected years.

According to nature of this work, we are mainly interested in observing net effects of government expenditures and taxes. For this, we discern last columns of the tables 4.5, 4.6, 4.7 and 4.8 where the values of net benefits[14] are given for each income group of urban areas. In all tables mentioned above, the last column proves the pro-poor nature of the net expenditures accruing to the income groups of urban areas. As net expenditures accruing to the low income groups are unambiguously greater than that accruing to the high income groups of urban areas, in all four selected years.

Until now, we have shown the different natures of expenditures, taxes and net benefits along the income groups in urban areas by examining their values. Let us adopt a technical method to compare the degree of pro-poor nature in the expenditures, taxes and net benefits across the four selected years. A well-known method to know the chemistry of size distribution of income is the "Measure of Inequality", which is the ratio of the incomes received by bottom 40 percent to top 20 percent of the population.[15] By using this technique of measuring inequality we can know the pro-poor nature of the average

[13] In case of average tax rates i.e when the taxes are represented as a percentage of income.
[14] We are using the terms average net expenditure and average net benefits synonymously.
[14]See Todaro, M. P. 1997: pp. 140– 141.

expenditures, taxes and net benefits accruing to different income groups in the society. Hence we name this ratio as pro-poor ratio as it shows the degree of pro-poor nature in the average expenditures, taxes and net expenditures. In table 4.9, different pro-poor ratios have been given for the average expenditures, taxes and net benefits of the urban areas in the four selected years.

Table 4.9

Different values of pro- poor ratios for average expenditures, taxes and net benefits (urban areas) 1979, 1986-87, 1992-93 and 2001-02

Fiscal Items	1979	1986-87	1992-93	2001-02
Average expenditures	10.9	12.9	24.0	35.03
Average taxes	0.92	2.30	2.40	3.48
Average net benefits	9.98	10.6	21.6	31.55

As we have taken the ratio of approximately bottom 40 percent to top 20 percent of the households belonging to different income groups, therefore, the degree of pro-poor nature will be greater if the value of this ratio is greater for average expenditures and average net benefits and vice-versa. Where as in case of average taxes, smaller the value of pro-poor ratio the greater will be the degree of pro-poor nature and vice-versa. Keeping in mind above mentioned criteria for measuring the pro-poor nature in the average expenditures, taxes and net expenditures; we can interpret easily the pro-poor ratios given in table 4.9. The values of pro-poor ratios for expenditures in urban areas are 10.9, 12.9, 24.0 and 35.03 respectively, in the years 1979, 1986-87, 1992-93 and 2001-02. Hence, in 1992-93 the expenditures have shown more pro-poor behaviour than the rest of two selected years. And in 1992-93 the expenditures exhibited more pro-poor behaviour than in 1986-87. Similarly, in 1986-87 the expenditures have remained more pro-poor than in 1979.

Turning to the comparisons of pro-poor nature in the urban average taxes, we can say that pro-poor nature is decreasing overtime. As the values of pro-poor ratios for

average taxes are 0.92, 2.3 and 2.4 and 3.48 in the years 1979, 1986-87, 1992-93 and 2001-02 respectively. Meanwhile, pro-poor nature in the average net benefits is also increasing overtime, as they have values 9.98, 10.6, 21.16 and 31.55 of the pro-poor ratios in 1979, 1986-87, 1992-93 and 2001-02 respectively.

4.4.3 Fiscal Incidence in Rural Areas of Pakistan

The results of fiscal incidence in rural areas for the years 1979, 1986-87, 1992-93 and 2001-02 have been shown in tables 4.10, 4.11, 4.12 and 4.13, respectively. In these tables, just like in case of urban areas, some interesting findings can be seen by comparing columns 3 and 5 for expenditures and columns 4 and 6 for taxes. Let us consider table 4.10 first, in column 3 actual or absolute values of expenditures across the income groups of rural areas have been given. These values show increasing behaviour up to fifth income group and after that show, more or less, decreasing behaviour along the income groups. While, average expenditures in column 5 continuously decrease up to eighth income group and then show, more or less, cyclical behaviour along the remaining income groups. Which indicates that government expenditures present almost pro-poor behaviour in the rural areas of Pakistan in 1979.

Similarly, actual values of taxes in column 4 increases up to fifth income group and thereafter show cyclical behaviour along the income groups. On the other hand, average taxes show more or less decreasing behaviour along the income group which means that they are pro-rich in nature. However, the net benefits in column 7 show almost strictly decreasing behaviour along the income groups. This indicates that the net effect of government fiscal policy in rural areas of Pakistan in 1979 is pro-poor. Almost similar behaviour of actual expenditures and taxes, average expenditures and taxes, and net benefits can be seen in tables 4.11 and 4.12. However, in table 4.13 actual expenditures and taxes show, more or less, cyclical behaviour in column 3 and 4.

Table 4.10

Expenditures and taxes as a percentage of income of the income groups (rural – 1979)

No	1	2	3	4	5	6	7
0	Income Groups	Incomes (Y_i) Rs. million	Expenditures (e_i) Rs. million	Taxes (t_i) Rs. million	$E_i=(e_i/Y_i)100$	$T_i=(ti/Y_i)100$	$E_i - T_i$
1	Up to 300	1991.56	1359.33	314.97	68.25	15.82	52.44
2	301 - 400	5045.28	2242.83	766.41	44.45	15.19	29.26
3	401 - 500	8895.62	3105.76	1266.37	34.91	14.24	20.68
4	501 - 600	12214.89	3631.63	1711.36	29.73	14.01	15.72
5	601 - 800	24960.85	5731.86	3401.16	22.96	13.63	9.34
6	801 - 1000	20579.43	4524.37	2735.81	21.98	13.29	8.69
7	1001 - 1500	27881.81	4657.16	3525.70	16.70	12.65	4.06
8	1501 - 2000	11551.03	1917.47	1412.18	16.60	12.23	4.37
9	2001 - 2500	6107.44	1174.51	690.67	19.23	11.31	7.92
10	2501 - 3000	2522.64	784.01	365.59	31.08	14.49	16.59
11	3001 - 3500	1991.56	560.44	305.36	28.14	15.33	12.81
12	3501 and above	9028.39	1321.11	1013.23	14.63	11.22	3.41

Table 4.11

Expenditures and taxes as a percentage of income of the income groups (rural – 1986-87)

No	1	2	3	4	5	6	7
0	Income Groups	Incomes (Y_i) Rs. million	Expenditures (e_i) Rs. million	Taxes (t_i) Rs. million	$E_i= (e_i/Y_i)100$	$T_i = (t_i/Y_i)100$	$E_i - T_i$
1	Up to 600	3466.17	2815.90	700.45	81.24	20.21	61.03
2	601 – 700	3498.27	2391.03	662.59	68.35	18.94	49.41
3	701 – 800	5616.49	3149.12	941.10	56.07	16.76	39.31
4	801 – 1000	18036.94	7037.68	2853.13	39.02	15.82	23.20
5	1001 – 1500	68617.40	19345.67	10152.92	28.19	14.80	13.40
6	1501 – 2000	46605.62	14775.73	9211.17	22.87	14.26	8.61
7	2001 – 2500	44771.41	9234.61	6144.05	20.63	13.72	6.90
8	2501 – 3000	29815.51	6069.18	3885.42	20.36	13.03	7.32
9	3001 – 3500	20700.76	4665.87	2619.09	22.54	12.65	9.89
10	3501 – 4000	13960.98	3512.51	1413.33	25.16	10.12	15.04
11	4001 – 4500	8248.21	3606.38	764.45	43.72	9.27	34.46
12	4501and above	39604.24	6379.90	4069.26	16.11	10.27	5.83

Table 4.12

Expenditures and taxes as a percentage of income of the income groups (rural – 1992-93)

No	1	2	3	4	5	6	7
0	Income Groups	Incomes (Y_i) Rs. million	Expenditures (e_i) Rs. million	Taxes (t_i) Rs.million	$E_i = (e_i/Y_i)\ 100$	$T_i=(t_i/Y_i)\ 100$	$E_i - T_i$
1	Up to 1000	9436.18	11689.21	2875.84	123.88	30.48	93.40
2	1001 – 1500	34663.52	17000.42	6180.41	49.04	17.83	31.21
3	1501 – 2000	68877.71	24643.93	10957.21	35.78	15.91	19.87
4	2001 – 2500	75361.07	21720.30	10775.53	28.82	14.30	14.52
5	2501 – 3000	63164.64	16699.35	8442.51	26.44	13.37	13.07
6	3001 – 3500	60019.25	14763.25	7963.90	24.60	13.27	11.33
7	3501 – 4000	44870.01	11162.18	5245.97	24.88	11.69	13.19
8	4001 – 5000	75168.49	16658.17	9123.26	22.16	12.14	10.02
9	5001 – 6000	45768.69	13149.89	4890.75	28.73	10.69	18.05
10	6001 – 7000	29399.80	9377.51	2242.10	31.90	7.63	24.27
11	7001 – and above	135187.74	18491.52	11769.17	13.68	8.71	4.97

Table 4.13

Expenditures and taxes as a percentage of income of the income groups (rural – 2001-02)

No.	1	2	3	4	5	6	7
0	Income Groups	Incomes (Y_i) Rs. million	Expenditures (e_i) Rs. million	Taxes (t_i) Rs. million	$E_i=(e_i/Y_i)100$	$T_i=(ti/Y_i)100$	$E_i - T_i$
1	1- 1000	40062.91	37703.3	31512.5	94.11	78.66	15.45
2	1001- 1500	36954.58	16034.7	8526.7	43.39	23.07	20.32
3	1501- 2000	63202.70	17790.3	9761.7	28.15	15.45	12.70
4	2001- 3000	185809.03	35291.9	19743.1	18.99	10.63	8.37
5	3001- 4000	199278.46	29534.3	22349.8	14.82	11.22	3.61
6	4001- 5000	188917.36	38377.4	17619.5	20.31	9.33	10.99
7	5001- 6500	211021.04	35091.0	17056.6	16.63	8.08	8.55
8	6501- 8000	150235.93	21610.7	10308.3	14.38	6.86	7.52
9	8001- 9500	113972.08	20494.0	9278.3	17.98	8.14	9.84
10	9501- 11000	89450.82	14563.8	11400.5	16.28	12.74	3.54
11	11001- 12500	64584.18	19178.0	9448.5	29.69	14.63	15.06
12	12501- above	257300.61	38655.7	35084.4	15.02	13.64	1.39

Now let us discern the expenditures and taxes as a percentage of income given in columns 5 and 6 of the tables 4.10, 4.11, 4.12 and 4.13 from another angle. The largest average expenditures have been found in the lowest income class in 1992-93 (123.88). The second largest average expenditures are in the lowest income class in 2001-02 (94.11). While, the smallest value of average expenditures is found in the highest income group in 1992-93 (13.68). The second smallest value of average expenditures is found in the highest income group in 1979 (14.63). The over all trend in the expenditure benefits with respect to the income of households belonging to different income classes in the three selected years, has been found to be almost negative.

On the other hand, the largest average tax burden has been found in the lowest income class in 2001-02 (78.66). The second largest percentage average tax is in the lowest income class in 1992-93, (30.48) While, the smallest tax burden is borne by the second highest income class in 1992-93 (7.63). The second smallest tax burden has been found to be in the seventh income group in 2001-02 (8.08). The overall trend in the average tax rates in all four selected years indicates that they are almost negatively related with the incomes of the different income groups in the rural areas. We can say that government expenditures have exhibited pro-poor behaviour while taxes have shown pro-rich nature in the rural areas of Pakistan, in all four selected years.

Let us follow, again, a technical method to compare the degree of pro-poor nature in the average expenditures, taxes and net benefits across four selected years. In table 4.14, different pro-poor ratios are given for the average expenditures, taxes and net benefits of the rural areas in the four selected years. The values of pro-poor ratios for expenditures are 4.15, 4.09, 5.21and 4.13, respectively, in the years 1979, 1986-87, 1992-93 and 2001-02. Recall that the degree of pro-poor nature will be greater if the value of pro-poor ratio is greater for average expenditures and net benefits, and smaller for average taxes. Hence, in 1992-93, the expenditures have shown more pro- poor

behaviour than the rest of three selected years. Similarly, in 1979, the expenditures have remained more pro-poor than in 1986-87 and 2001-02.

Table 4.14

Different values of pro- poor ratios for average expenditures, taxes and net benefits (rural areas) 1979, 1986-87, 1992-93 and 2001-02

Fiscal Items	1979	1986-87	1992-93	2001-02
Average expenditures	4.15	4.09	5.21	4.13
Average taxes	2.23	3.67	4.81	4.52
Average net benefits	1.92	0.42	0.40	-0.39

Turning to the comparisons of pro-poor nature in the rural average taxes, the values of pro-poor ratios for average taxes are 2.23, 3.67, 4.81 and 4.52 in the years 1979, 1986-87 and 1992 respectively. Hence, average taxes have shown more pro-poor nature in 1979 than in 1986-87, 1992-93 and 2001-02, and have shown more pro-poor nature in 1986-87 and 1992-93 than in 2001-02. On the other hand, pro-poor nature in the average net benefits have decreasing trend across the selected years, as they have values 1.92, 0.42, 0.40 and -0.39 of the pro-poor ratios in 1979, 1986-87, 1992-93 and 2001-02 respectively.

4.4.4 Urban versus Rural Fiscal Incidence in Pakistan

In sections 4.4.2 and 4.4.3 we have examined fiscal incidence in urban and rural areas separately. Here, in this section we shall compare fiscal incidence in urban- rural areas in the four selected years. The values of the pro-poor ratios given in tables 4.9 and 4.14 have been reproduced in table 4.15.

Table 4.15

Different values of pro- poor ratios for average expenditures, taxes and net benefits (urban-rural) 1979, 1986-87, 1992-93 and 2001-02

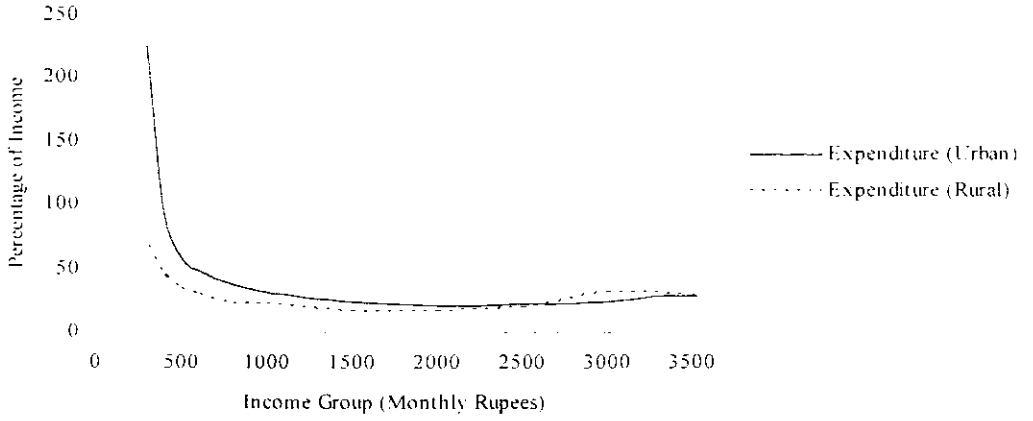
Fiscal Items	1979	1986-87	1992-93	2001-02
Average expenditures (urban)	10.9	12.9	24.0	35.03
Average expenditures (rural)	4.15	4.09	5.21	4.13
Average taxes (urban)	0.92	2.30	2.40	3.48
Average taxes (rural)	2.23	3.67	4.81	4.52
Average net benefits (urban)	9.98	10.6	21.6	31.55
Average net benefits (rural)	1.92	0.42	0.40	-0.39

Let us start with the comparison of average expenditures in urban-rural areas. In rows 2 and 3 of table 4.15 the values of pro-poor ratios have been given for average expenditures of urban and rural areas respectively, in four selected years. It is evident that average expenditures in urban areas have remained more pro-poor than that of in rural areas in all four years. Recall that the degree of pro-poor nature will be greater if the value of pro-poor ratio is greater for average expenditures and average net benefits, and smaller for average taxes.

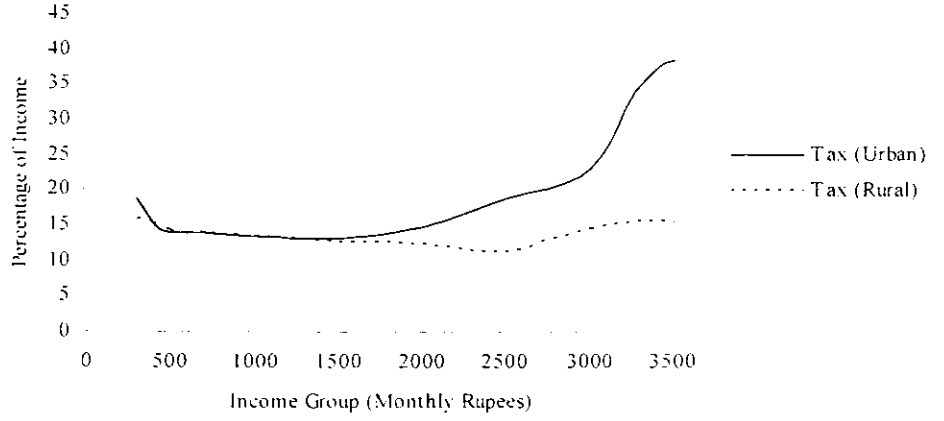
Now, by focusing our attention on rows 4 and 5 in table 4.15, we can say that urban average taxes have remained more pro-poor through the four selected years than their counterpart rural average taxes. Because, in row 4 all pro-poor ratios of urban average taxes have smaller values than the values of these ratios in row 5 for rural average taxes, in the three selected years. Whereas, the comparison between urban-rural average net benefits in table 4.15 shows that urban average net benefits are more pro-poor than rural average net benefits. Because urban net benefits show greater value over time than that of their rural counterpart. The above-mentioned analysis for average expenditures and taxes during fiscal incidence in urban-rural areas has been translated in the figures 4.1, 4.2, 4.3 and 4.4 for the years 1979, 1986-87, 1992-93 and 2001-02, respectively. In these figures, monthly income groups are taken on horizontal axis and expenditures or taxes as a percentage of income are taken on vertical axis.

Figure 4.1: Expenditure, tax and net expenditure as a percentage of income (1979).

(A)



(B)



(C)

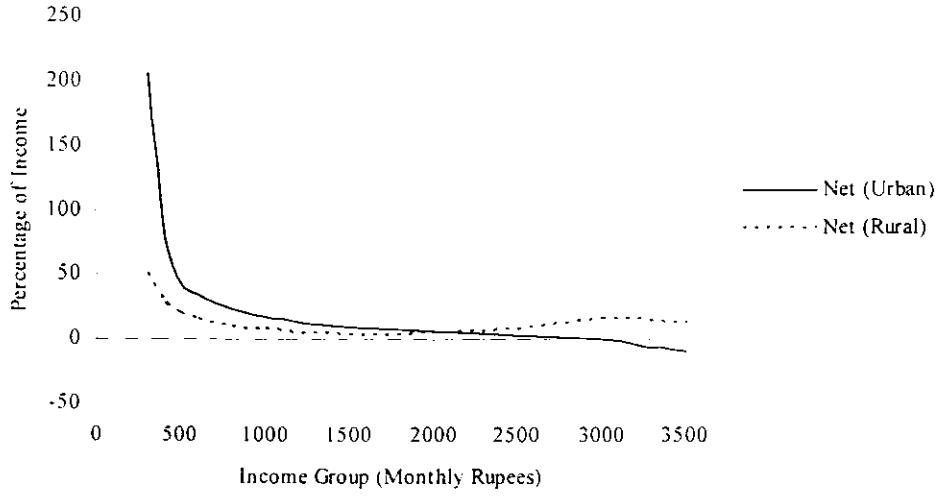
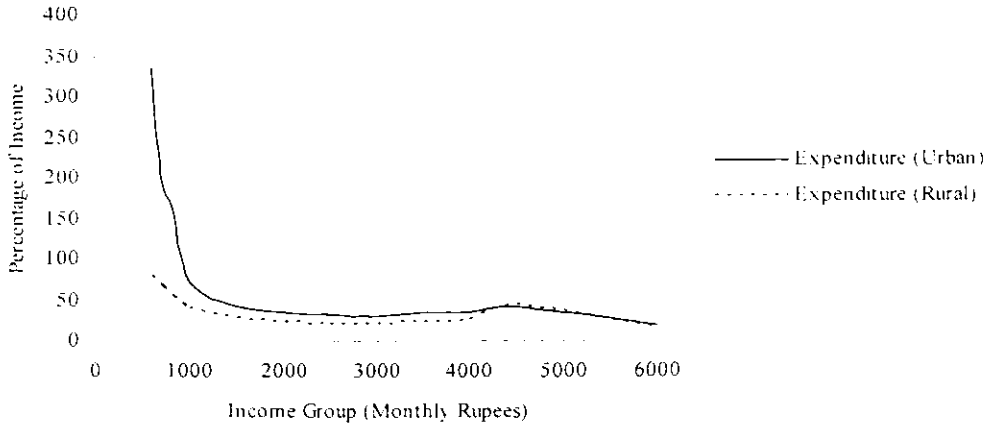


Figure 4.2: Expenditure, tax and net expenditure as a percentage of income (1986- 87).

(A)



(B)

(C)

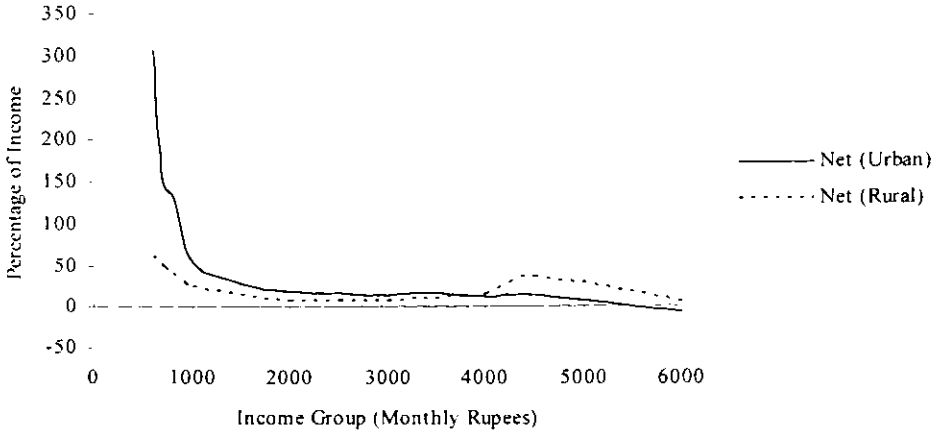
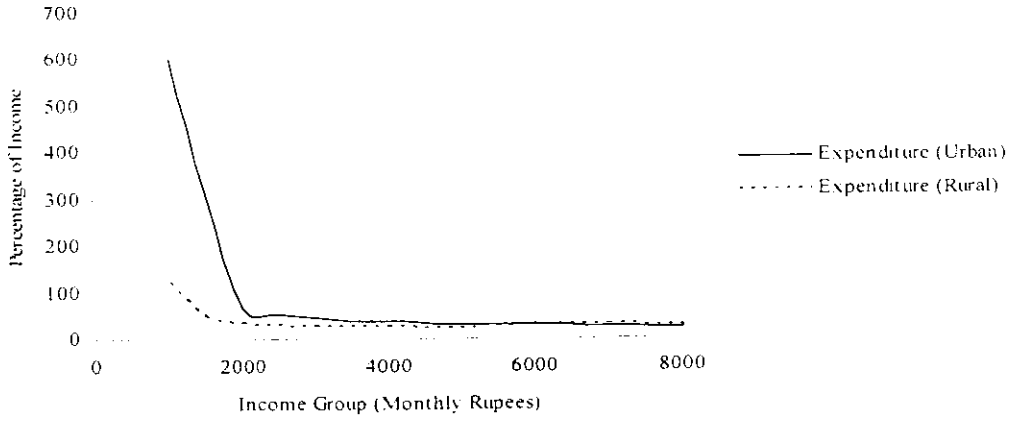
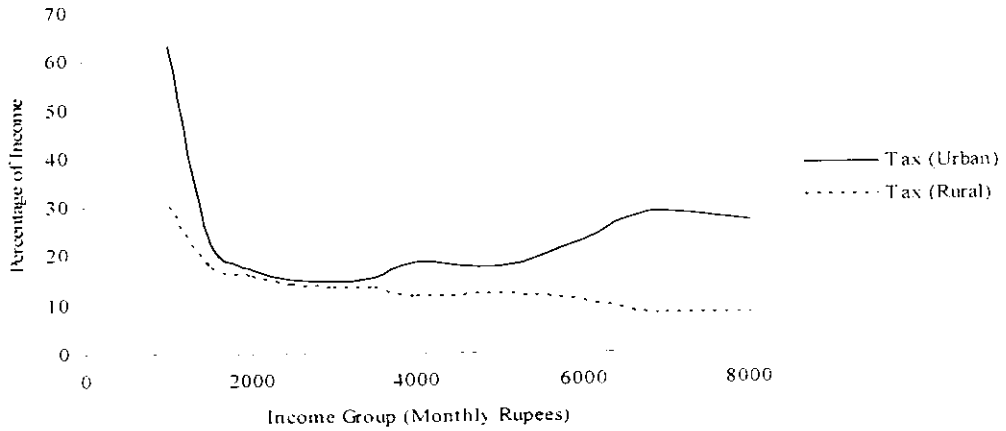


Figure 4.3: Expenditure, tax and net expenditure as a percentage of income (1992- 93).

(A)



(B)



(C)

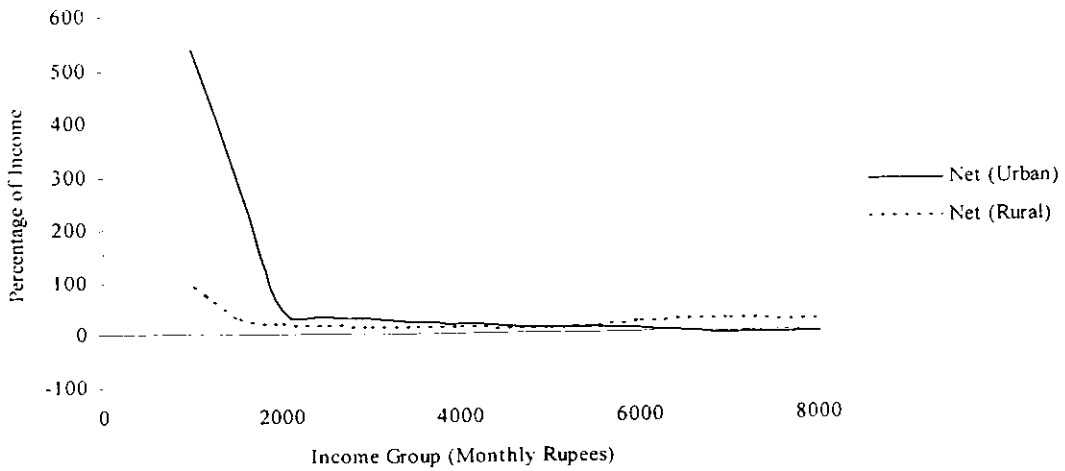
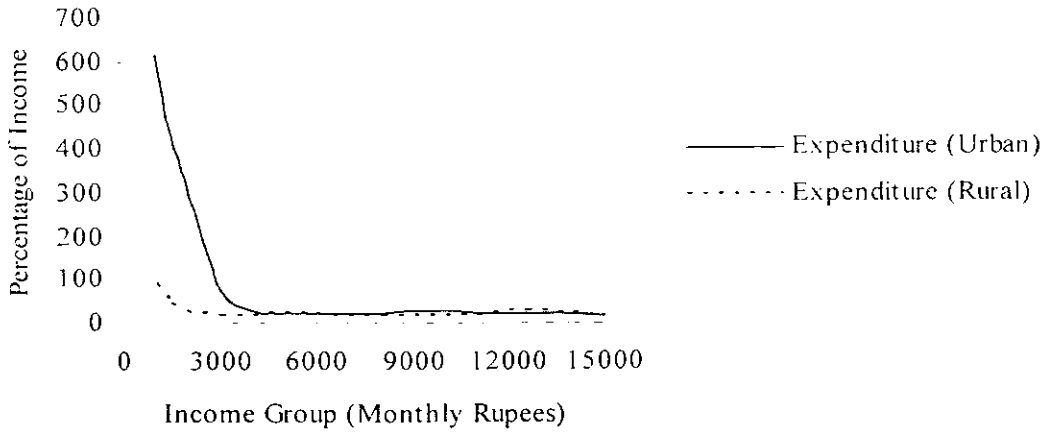
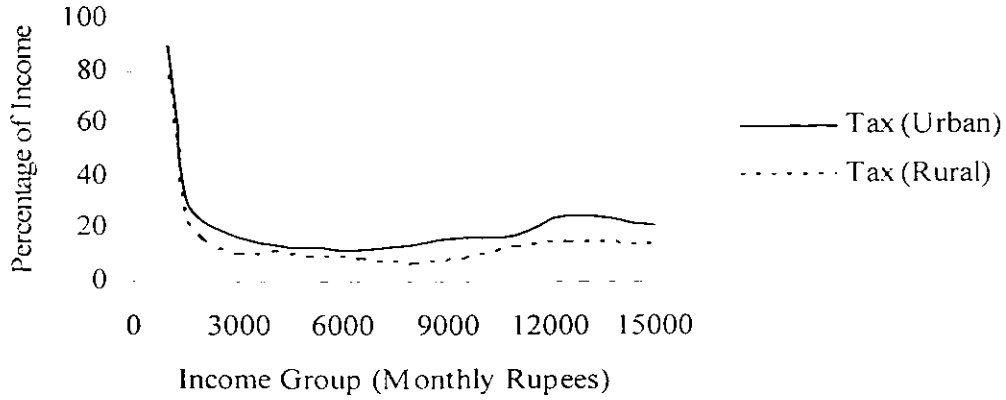


Figure 4.4: Expenditure, tax and net expenditure as a percentage of income (2001-02).

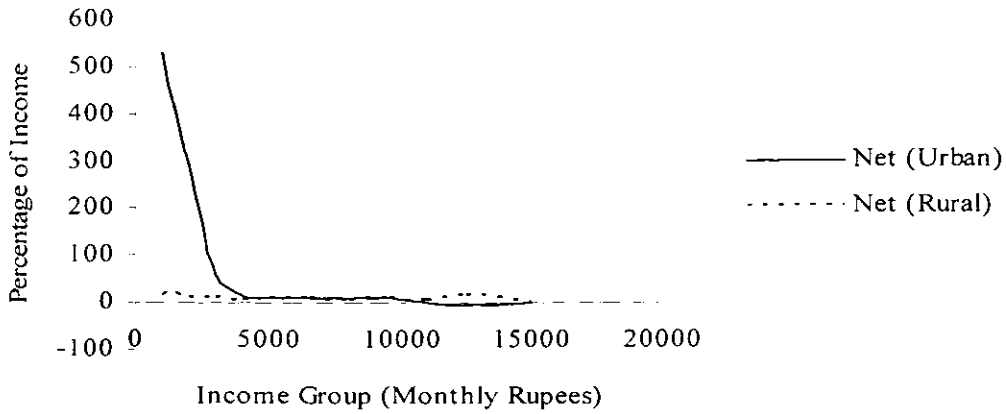
(A)



(B)



(C)



CHAPTER 5

REGRESSION ANALYSIS

Comparing the effects of budget policies on the distribution of income in urban-rural areas of Pakistan requires several analytical and graphical techniques. To compare the expenditure, tax and net benefit functions within and across the urban-rural areas in 1979, 1986-87, 1992-93 and 2001-02, the regression analysis in this chapter is carried out. While, the Gini co-efficient and Lorenz curve analyses will be presented in the next chapter to compare the pre- and post-fiscal distributions of income in the three selected years. At first, some terminological and conceptual issues must be addressed. As it has already been mentioned that benefits and taxes are defined as progressive when the ratio of benefits received or the taxes paid to income rises as income rises. In this way, progressive benefits favour high-income groups while progressive taxes favor lower income groups. As this terminology sometime create confusion, therefore, it is better to substitute the term pro-rich for progressive benefits and regressive taxes and the term "pro-poor" for regressive benefits and progressive taxes.

Due to linear expenditure and tax functions, marginal benefit and burden are constant and the decision about the progressivity, regressivity or neutrality of a function, depends mainly upon the intercept of the function. The average expenditure and tax will rise, stay constant, or decline with income if and only if the intercept is negative, zero, or positive.[1] The intercepts are the estimated rupees' worth of gain or loss at zero income

[1] See Reynolds and Smolensky (1977)

and the slope coefficients are the paisas' worth of change in either taxes or expenditures per rupee increase in income.

To ensure that the regression lines intersect the true means, the observations are weighted by the frequency distribution of households. Hence, expenditures per households, taxes per household and net benefit per households have been regressed by the income per household, giving the weighted, ordinary least square regressions with rupees gained (or lost) as the dependent variable and mean income per income class as the independent variable for each year.[2] The first set of comparisons constitutes the results of the regressions for the urban areas in 1979, 1986-87, 1992-93 and 2001-02. The second set consists of the comparisons carried out for the rural areas in the above-mentioned four selected years. Lastly, a comparison among the regressions of urban-rural areas will be carried out for each selected year.

5.1 Regressions for Urban Areas

Before starting the explanation of linear regression analysis for urban areas, it is useful to note general considerations about the slope coefficients and intercept terms. Generally, larger slope coefficient of expenditure function shows greater pro-rich or lesser pro-poor nature of the function and vice-versa. Whereas, larger expenditure intercept shows greater pro-poor nature of the government expenditures and vice versa. On the other hand, larger the tax slope coefficient, the greater will be pro-poor nature in the tax function and vice versa. Whereas, larger the tax intercept term, the lesser will be the pro-poor nature in the tax function and vice versa.

Finally, larger slope coefficient of net benefit function shows greater pro-poor nature in it and vice versa. Similarly, larger net benefit intercept shows greater pro-poor nature in the net benefit function and vice versa. The regression results for urban areas

[2] For the regressions of 1979, 1986-87 and 2001-02 number of observations, n = 12 and for 1992-93, n = 11.

are shown in table 5.1. In this table, the results of expenditure per household, tax per household and net benefit or net expenditures per household as a function of income per household have been given.[3]

5.1.1 Expenditure Functions

The slope of expenditure function has decreased from 0.09 in 1979 to 0.06 in 1986-87, which shows 33 percent decrease in expenditure slope between 1979 and 1986-87. Similarly, from 1986-87 to 1992-93 the slope has decreased from 0.06 to 0.04 i.e. again 33 percent decrease in slope between these years. Whereas, in 2001-02 expenditure slope coefficient has increased to 0.10 (150 percent).

As increase in expenditure slope is considered to be pro-rich and the rise in its intercept is pro-poor, therefore, 33 percent decrease in slope coefficient from 1979 to 1986-87 accompanied by again 33 percent decrease in slope from 1986-87 to 1992-93, shows that the over all trend of government expenditure slope was pro-poor between 1979 and 1992-93. Whereas, from 1992-93 to 2001-02, 150 percent increase in expenditure slope has shown the pro- rich nature of the government expenditures. On the other hand, rise in the expenditure intercept from Rs. 5385 to Rs. 16249 (202 percent) was pro-poor, between the years 1979 and 1986-87. Between the years 1986-87 and 1992-93, this rise in expenditure intercept was only 16.3 percent i.e. from Rs. 16249 to Rs. 18897. Between 1992-93 and 2001-02 expenditure intercept increases to 89.8 percent from 18897 to 35867. As increase in expenditure intercept is relatively more beneficial for the household at the low end of the distribution, therefore, an increase in intercept shows more pro-poor nature than that of the slope coefficient. Moreover, in the above mentioned case, changes in intercept overtime are larger than that in the slope coefficient

[3] With the incidence assumptions and no adjustment for inflation.

except between 1986-87 and 1992-93. Hence, it is evident that overall trend in the three selected years was pro- poor but in a diminishing fashion.

5.1.2 Tax Functions

Let us turn to the interpretation of tax functions in the four selected years. Between the years 1979 and 1986-87, the slope coefficient has decreased from 0.31 to 0.25, pro-rich, (19 percent). And, between 1986-87 to 1992-93, the slope coefficient further becomes lower to 0.21, pro-rich, (16 percent). The change in the tax slope coefficient from the year 1992-93 to 2001-02 was zero percent. Overall trend in the slope of tax function was pro-rich but with diminishing rate. Whereas the intercept of tax function has risen from -2245 in 1979 to -1016 in 1986-87 (pro rich). And from 1986-87 to 1992-93, it has increased from -1016 to -318 (pro rich). In 2001-02 it has got the value equal to -3610. In percentage terms, between 1979 and 1986-87, increase in intercept is 55 percent (pro-rich), while between 1986-87 and 1992-93 it has increased by 69 percent. And between 1992-93 and 2001-02 it has decreased to 91 percent. Hence, overall trend in the intercept of tax function, in the four selected years, is pro-rich.

5.1.3 Net Benefit Functions

Turning to the net benefit regressions, the households faced negative slope that flattens overtime (pro-rich). For example, net benefit slope decreases (in absolute number) from 0.22 in 1979 to 0.19 in 1986-87 and from 0.19 in 1986-87 to 0.17 in 1992-93. while, in 2001-02 it decreases to 0.11. In percentage term, between 1979 and 1986-87 the slope coefficient has decreased 14 percent. While, between 1986-87 and 1992-93 it has decreased by 10.5 percent and between 1992-93 and 2001-02 has decreased by 35 percent . Whereas, the net benefit intercept has increased from 7631 in 1979 to 17265 in

1986-87, which shows 126 percent increase between these years. Between the years 1986-87 and 1992-93, it has increased from 17265 to 19215, which shows a 11.3 percent increase in the intercept between these years. While, between 1992-93 and 2001-02 it has increased from 19215 to 39477 (105 percent)

The net slope coefficient changed in the favour of rich because between 1979 and 1986-87 a decrease in the expenditure slope (pro-poor) was slightly more than offset by a pro-rich decrease in the tax slope coefficient. Similarly, between 1986-87 and 1992-93 a pro-poor decrease in the expenditure slope was slightly more than offset by a pro-rich decrease in the tax slope and made the net benefit slope coefficient relatively pro-rich. While, between 1992-93 and 2001-02 a considerable pro-rich increase in expenditure slope together with the unchanged tax slope coefficient made the net slope coefficient relatively more poor.

The tax functions lie closer than do the expenditure functions. In table 5.2 largest difference among slopes is between the largest coefficient 0.31 in 1979 and the larger coefficient 0.25 in 1986-87 (19 percent) and the smallest difference is between the larger slope coefficient 0.25 in 1986-87 and the smaller slope coefficients 0.21 in 1992-93 and 2001-02 (16 percent). Whereas the largest difference among the intercepts is between the smallest intercept (-3610) in 2001-02 and the largest intercept (-318) in 1992-93 (91 percent). And the smallest difference is between the smaller intercept (-2245) in 1979 and the larger intercept (-1016) in 1986-87 (55 percent).

On the other hand the expenditure functions lie farther than do the tax functions. In table 5.2 the smallest difference among slopes is between the slope coefficient (0.09) in 1979 and the slope coefficient (0.06) in 1986-87. In percentage term, it is 33 percent, which is greater than the largest difference among the slope coefficients of tax functions i.e. 19 percent. Whereas, larger difference among expenditure slopes is between the smallest slope coefficient in 1992-93 (0.04) and the largest slope coefficient (0.10) in 2001-02 i.e. 150 percent, which is far greater than the largest difference among the slope coefficients of tax functions (19 percent).

Turning to the explanation of the differences among the intercepts of tax and expenditure functions it is evident in table 5.2 that largest shift in the intercepts of the expenditure function is between 1979 and 1986-87 (202 percent). While the largest difference among the intercepts of tax function is only 57 percent.

The above discussion may be helpful in interpreting the percentage change in the net benefit functions over time. It is evident that percentage change in expenditure and tax functions would not simply sum up to give net benefit functions in percentage term but there are other factors such as differences among these functions and the sign of the intercept and slope. For example, in our this case of urban areas, all tax intercepts are negative which is equivalent to say the government is giving subsidy to the zero income households. These negative intercepts have enhanced the values of net benefit intercepts for each selected year. Similarly, if the tax slope coefficient were negative the value of net benefit slopes would have been greater than their values shown in table 5.1.

In brief, the net effect of the changes in taxes and expenditures in the three selected years can be explained as under. Households faced expenditure schedule flattening up to 1992-93 and then become sharply steeper in 2001-02 and a tax schedule flattening over time. The rising income generated larger revenues and expenditure by the government .The benefits of these expenditures accrued to low income groups as well as the high income groups in the distribution, but any shift in the distributive pattern of expenditure and tax are difficult to detect accurately with linear regressions. For example, average expenditures received in the lowest income group grew by 174 percent from 1979 to 2001-02. Whereas, during the same period, average expenditures received in the highest income group grew by 77.4 percent.

On the other hand, average taxes paid in the lowest income group rose by 375 percent, between 1979 and 2001-02, while they decreased by 27 percent in the highest income group during the same period. Meanwhile, the net benefits increased from 1979 to 2001-02 by 156 percent in the lowest income group. Whereas, they increased by 91 percent in the highest income group from 1979 to 2001-02.

Table 5.1

Expenditure and tax regressions for urban areas in 1979, 1986-87, 1992-93 and 2001- 02

Dependent Variable	Intercept				Slope				R^2			
	1979	1986-87	1992-93	2001-02	1979	1986-87	1992-93	2001-02	1979	1986-87	1992-93	2001-02
Exp. / hh	5385	16249	18897	35867	0.09	0.06	0.04	0.10	0.54	0.08	0.09	0.44
Tax / hh	-2245	-1016	-318	-3610	0.31	0.25	0.21	0.21	0.94	0.93	0.97	0.95
Net Ben. / hh	7631	17265	19215	39477	-0.22	-0.19	-0.17	-0.11	0.93	0.62	0.69	0.55

Table 5.2

Percentage change comparison, 1979 – 1986-87, 1986-87 – 1992-93 and 1992- 93– 2001-02 (urban areas)

Dependent Variable	Intercept			Slope		
	1979 – 1986-87 (Percent change)	1986-87 – 1992-93 (Percent change)	1992-93–2001-02 (Percent change)	1979 – 1986-87 (Percent change)	1986-87 – 1992-93 (Percent change)	1992-93–2001-02 (Percent change)
Exp. / hh	202	16.3	89.8	33	33	150
Tax / hh	55	69	91	19	16	0.0
Net Ben. / hh	126	11.3	105	14	10.5	35

5.2 Regressions for Rural Areas

The regression results for rural areas are shown in table. 5.3. Similar to the case of urban areas, the expenditure per household and the tax per household are represented as a function of income per household with the same incidence assumptions and no adjustment for inflation.

5.2.1 Expenditure Functions

The slope of expenditure function has increased from 0.16 in 1979 to 0.17 in 1986-87, which shows 6 percent increase in expenditure slope between 1979 and 1986-87. Whereas, from 1986-87 to 1992-93 the slope has decreased form 0.17 to 0.12. This shows 29 percent decrease in expenditure slope coefficient between these years. While, in 2001-02 it decreases slightly to 0.11 (8.3 percent).

As increase in expenditure slope is known to be pro-rich and increase in its intercept is pro-poor. That is why 6 percent increase in expenditure slope coefficient from 1979 to 1986-87 is pro-rich accompanied by 29 and 8.3 percent decreases in slope coefficient from 1986-87 to 1992-93 and 1992-93 and 2001-02, respectively, which shows pro-poor nature with high decreasing rate. The overall trend of government expenditure slope coefficient was almost pro-poor from 1979 to 2001-02. On the other hand, rise in the expenditure intercept from 1845 to 4114 (123 percent) was pro-poor, between the years 1979 and 1986-87. Between the years 1986-87 and 1992-93, this increase in expenditure intercept was 115 percent. While, between 1992-93 and 2001-02 it increased 43.5 percent. The overall trend in the four selected years was pro-poor but had decreasing trend overtime.

5.2.2 Tax Functions

In table 5.3, between the years 1979 and 1986-87 tax slope coefficient has decreased 25 percent from 0.12 to 0.09 (pro-rich). Similarly from 1986-87 to 1992-93, tax slope coefficient has further decreased form 0.09 to 0.07 (pro-rich) i.e. by 22 percent. But in 2001-02 it has increased to 0.10 (43 percent). The overall trend in the slope of the tax function has remained pro-rich. On the other hand, the intercept of tax function has risen from 344 in 1979 to 1100 in 1986-87 (pro-rich). It has increased to 2590 in 1992-93 and then to 2834 in 2001-02 (more pro-rich). In percentage term, between 1979 and 1986-87, increase in the tax intercept was 220 percent (pro-rich) and between 1986-87 and 1992-93 it has risen by 135 percent (pro-rich). While, between 1992-93 and 2001-02 it has increased by 9.4 percent. Therefore, overall trend in the intercept of tax function in the four selected years is pro-rich but with decreasing rate.

5.2.3 Net Benefit Functions

Let us turn to the explanation of net benefit regressions. The households faced positive net benefit slope, which is qualitatively pro-rich in contrast to negative net benefit slope having qualitatively pro-poor nature in urban areas. This shows that positive relationship between net benefits and household incomes has made the benefit slope coefficient completely pro-rich i.e. as income increase along the net benefit regression line net benefit also increases and vice versa. The intensity of pro-rich nature of positive slope would be known by its value. However, quantitatively, larger the slope of positive net benefit function the greater will be pro-rich or lesser will be pro-poor nature in it and vice versa. Whereas, larger its intercept term the greater will be pro-poor nature and vice versa. Now, between 1979 and 1986-87 the net benefit slope has increased by 100 percent i.e. form 0.04 to 0.08, which indicates that slope coefficient has changed

relatively in the favour of rich. From 1986-87 to 1992-93 value of the net benefit slope coefficient decreased by 38 percent (less pro-rich or relatively pro-poor). It has further decreased to 0.01 in 2001-02 (80 percent). On the other hand, net benefit intercept rose from 1501 to 3014 between 1979 and 1986-87, which shows 101 percent increase in the net benefit intercept between these years (pro-poor). And from 1986-87 to1992-93, it has increased up to 6272, which shows 108 percent increase in the net benefit intercept between these years (pro-poor). While, in 2001-02 it has increased to 9882 (58 percent) which shows less pro-poor behaviour of net benefit function in this year. However, to understand clearly the changes in the net benefit functions a detailed chemistry of expenditure and tax functions is needed, which is discussed in the following pages.

In contrast to regressions of urban areas, tax functions in the rural regression analysis have positive intercepts and lie farther than do the expenditure functions. In table 5.4, the percentage change in expenditure slope coefficient during 1979 and 1986-87 is only 6 percent, while the percentage change in tax slope coefficient during these years has considerably lager value i.e. 25 percent. Although, the percentage change between 1986-87 and 1992-93 is greater for expenditure slope than that for the tax slope, but difference between these changes is very small. Again, between 1992-93 and 2001-02 percent change for taxes is considerably lager than that of the expenditure slope which generally indicates pro-rich behaviour of expenditure and tax functions in 2001-02.

Comparing intercepts of expenditure and tax functions except those in 2001-02, the difference between intercept of expenditure functions between 1979 and 1986-87 is 123 percent. The counterpart largest difference (220 percent) among the intercepts of tax functions is greater than that of expenditure functions between the same years. While, the percentage difference between the intercepts of tax functions in the years 1986-87 and 1992-93 is also greater than that of the expenditure function (135 versus 115).

As percentage difference comparison about the slope coefficients of expenditure and tax functions is not so self-explanatory, therefore, to examine that whether the tax functions lie farther than do the expenditure functions we concentrate on the comparison

of intercept term of expenditure and tax functions. The comparison between intercept terms of expenditure and tax functions in the above paragraph shows that the tax functions lie farther than do the expenditure functions. At first moment it would seem that greater differences in the intercept of tax functions than that of the expenditure functions ensure that tax function has more influence on the output of net benefits. However, this kind of inference is complicated. Comparing the absolute values of intercepts may guide us to know their relative pro-rich or pro-poor nature.

Recall that larger expenditure intercept is considered to be pro-poor, while larger tax intercept is considered to be pro-rich. Larger expenditure intercept means, households at zero income level are enjoying more benefits from the government expenditure, while larger tax intercept means, households at zero income level, are paying more taxes. In table 5.3 intercept term of expenditure function in 1979 is 1845 and it is 436 percent more than the tax intercept (344). In 1986-97 the intercept term of the expenditure function, 4114, is again greater than the intercept of the tax function (1100) by 274 percent. In 1992-93 expenditure intercept is greater than the tax intercept by 242 percent. While, in 2001-02 expenditure intercept is 349 percent larger than that of the tax intercept.

From the above comparison it is evident that expenditure intercepts which advocate the poor i.e. increase in intercept leads to increase in the welfare of poor and vice-versa (positive relation), were always remain greater than that of tax intercepts in all four selected years. Recall that increase in the tax intercept is favourable to rich. Hence relatively greater intercept of expenditure function than that of tax function in all four years have given, more or less, pro-poor net benefit intercepts at one point of time.

Keeping in view above mentioned behaviour of expenditure and tax function, the net benefit function can be explained as follows. In 1979, the expenditure slope coefficient is 0.16 and the tax slope coefficient is 0.12. As expenditure slope coefficient is larger than that of tax function, therefore, net benefit slope (expenditure slope-tax slope) is positive (0.04). This shows positive relationship between net benefits and the

income of households i.e. as incomes of the households increase the net benefits accruing to them also increase (qualitatively pro-rich relationship). Same is the case with net benefit slope coefficients in 1986-87, 1992-93 and 2001-02 (see table 5.3).

Whereas, expenditure intercept in 1979 is 1845 (pro-poor) and the tax intercept is 344 (pro-rich). While the net benefit intercept, which is the out come of the difference between expenditure and tax intercepts, has lesser value (1501) and showing less pro-poor nature than that of the urban areas, whose tax intercept has negative values in the same year. Similarly, in 1986-87, 1992-93 and 2001-02 the net benefit intercepts have shown less pro-poor nature than that could be attained if the tax intercepts were negative.

In a nutshell, the net effect of the changes in expenditure and taxes in the four chosen years can be explained in this way: household faced relatively steeper expenditure schedule (flattening overtime). While they faced relatively flatter tax schedule also flattening up to 1992-93 and then suddenly become steeper in 2001-02. Net benefits remained pro-poor in 1979, 1986-87, 1992-93 and their pro-poor nature increased overtime almost steadily. However, in 2001-02 the pro-poor nature in net benefits decreased considerably relative to past three selected years as it can be shown by low percentage difference (58 percent) between the intercepts in 1992-93 and 2001-02. In general, the benefits and taxes accrued to the low end as well as the high end of the distribution, but the changes in the distribution of expenditures and taxes are difficult to locate exactly with linear regressions. To understand the change in the distribution pattern of expenditures and taxes one may also examine the change in the average expenditure and taxes accruing to highest and lowest income groups in the distribution of rural areas.

Table 5.3

Expenditure and tax regressions for rural areas in 1979, 1986-87, 1992-93 and 2001- 02

Dependent Variable	Intercept				Slope				R^2			
	1979	1986-87	1992-93	2001-02	1979	1986-87	1992-93	2001-02	1979	1986-87	1992-93	2001-02
Exp. / hh	1845	4114	8862	12716	0.16	0.17	0.12	0.11	0.78	0.57	0.59	0.79
Tax / hh	344	1100	2590	2834	0.12	0.09	0.07	0.10	0.97	0.97	0.95	0.68
Net Ben. / hh	1501	3014	6272	9882	0.04	0.08	0.05	0.01	0.28	0.19	0.16	0.02

Table 5.4

Percentage change comparison, 1979 – 1986-87, 1986-87 – 1992-93 and 1992- 93– 2001-02 (rural areas)

Dependent Variable	Intercept			Slope		
	1979 – 1986-87 (Percent change)	1986-87 – 1992-93 (Percent change)	1992-93–2001-02 (Percent change)	1979 – 1986-87 (Percent change)	1986-87 – 1992-93 (Percent change)	1992-93–2001-02 (Percent change)
Exp. / hh	123	115	43.5	6	29	8.3
Tax / hh	220	135	9.4	25	22	43
Net Ben. / hh	101	108	58	100	38	80

5.3 Urban versus Rural Regressions

The results of urban and rural regressions are given below in table 5.5. These results will be discussed under three headings: (1) expenditure function (2) tax function (3) net benefit function.

5.3.1 Expenditure Functions

The above results have been reproduced from tables 5.1 and 5.3 for urban and rural areas respectively. In table 5.5 the expenditure slope coefficients in urban areas are lesser than the expenditure slope coefficients in rural areas. In 1979 expenditure slope in urban areas is 0.09, while, in rural areas it is equal to 0.16. Whereas, in 1986-87 urban expenditure slope coefficient has become 0.06, while, rural expenditure slope coefficient has acquired the value 0.17, larger than its urban counterpart. In 1992-93, the expenditure slope coefficient of urban areas has got the value equal to 0.04 and the expenditure slope coefficient in rural areas possesses larger value, 0.12, than its urban counterpart. Similarly, in 2001-02 expenditure slope in urban areas is 0.10, while, in rural areas it is equal to 0.11. In other words, slope coefficients in urban areas are lesser (more pro-poor) than the slope coefficient in rural areas in 1979, 1986-87, 1992-93 and 2001-02 by 78 percent, 183 percent, 200 percent and 10 percent respectively.

Turning to the explanation of intercepts of urban-rural expenditure functions, in table 5.5, urban expenditure function has intercept equal to 5385 in 1979. While, in the same year expenditure intercept for rural areas is 1845. The percentage difference between them is 192 percent. As an intercept is the estimated rupees worth of gain or loss at zero income. As both urban and rural expenditure intercepts are positive therefore they

can be defined as the estimated rupees worth of gain at zero income. From the above discussion one can easily infer that larger the expenditure intercept greater will be the benefits accruing to the lower income groups and vice versa. Hence, in 1979 urban expenditure intercept was more pro-poor than that of the rural intercept.

Expenditure intercept in1986-87 for urban areas is greater than the expenditure intercept in rural areas in 1986-87. The value of expenditure intercept in urban areas is 16249 and the value of expenditure intercept in rural areas is 4114. Note that the former is greater than the later by 295 percent, which is greater than the percentage difference between the expenditure intercepts of urban-rural areas in 1979. In 1992-93 expenditure intercept of urban areas is 18897 and that of rural areas is 8862. The percentage difference between these two intercepts is 113 percent. Hence the expenditure intercept of urban areas is larger than the expenditure intercept of rural areas by 113 percent. Similarly, in 2001-02 urban expenditure intercept is 35867 and that of rural areas is 12716, the percentage difference between them is 182.

Discerning the percentage differences among expenditure slopes and intercepts of urban-rural areas in table 5.6, one can interpret the results as fallows. In the years 1979, 1986-87, 1992-93 and 2001-02 urban expenditure slope coefficients were larger than that of their counterpart rural areas by 78 percent, 183 percent, 200 and 10 percent respectively. It shows that the behaviour of urban expenditure slope coefficients were more pro-poor than that of the rural areas in all above mentioned years. Similarly, in table 5.6 urban expenditure intercepts were more pro-poor than that of the rural areas, as they are larger than their rural counterpart in all above mentioned years.

In summary, as expenditure slope coefficients and intercept terms of urban areas showed more pro-poor nature than that of the rural areas, therefore, government expenditures had more pro-poor effects in urban areas than that of the rural areas in 1979, 1986-87, 1992-93 and 2001-02.

5.3.2 Tax Functions

Once again discerning table 5.5, all tax slope coefficients in urban areas are larger than their counterparts in rural areas. In 1979, tax slope coefficient in urban areas is 0.31, while in rural areas it is equal to 0.12. Whereas in 1986-87 this urban tax slope coefficient has got the value 0.25, while the rural tax slope coefficient is equal to 0.09. In 1992-93 urban tax slope coefficient has value 0.21 and its counterpart rural coefficient is equal to 0.07. Similarly, in 2001-02 urban tax slope coefficient has the value 0.21, while the rural tax slope coefficient is equal to 0.10 In 1979, the difference between tax slope coefficient in urban areas and that of its counterpart rural areas is 158 percent, whereas, in 1986-87 this difference is equal to 178 percent. While, in 1992-93 and 2001-02 this difference becomes equal to 200 and 110 percent respectively.

It means that in 1979 the tax slope coefficient in urban areas is more pro-poor than the tax slope coefficient in rural areas by 158 percent. Because, larger the slope coefficient larger the contribution of higher income groups in the tax revenue and vice versa. With similar reasoning, in 1986-87 urban tax slope coefficient is more pro-poor than that of its counterpart rural areas by 178 percent. In 1992-93 urban tax slope coefficient is again more pro-poor by 200 percent than the tax slope coefficient in rural areas Finally, in 2001-02 urban tax slope coefficient is more pro-poor by 110 percent than the tax slope coefficient in rural areas as shown in table 5.7. From the above comparison among slope coefficients of urban-rural areas, it is evident that tax slope coefficient of urban areas are more pro-poor than the tax slope coefficient of rural areas. But, however, one cannot decide about the relative regressivity, progressivity and neutrality of the tax functions by looking at their slope coefficients only.

As it has already been mentioned, with a linear tax function, marginal rate is constant, and whether a function is regressive, progressive, or neutral depends only upon the intercept of the function. In our comparisons, average income increased over time,

which implies that the degree of progression in the tax structure would decline overtime if the intercept and slopes of the functions remained stable. The higher income becomes, the closer we approach proportional tax function, ceteris paribus. However, our analysis consists of comparisons among tax functions of urban-rural areas and not only single one. To compare relative progressivity, regressivity or neutrality among the tax functions of urban-rural areas, the differences in the slope coefficients may also be given due importance.

Turning again to a single tax function, the average tax will rise (progressive tax function), stay constant (proportional tax function), or decline (regressive tax function) with income if and only if the intercept is negative zero, or positive. In table 5.5, we can see that all tax functions in urban areas have negative intercepts, overtime. Hence, it is clear that all tax functions in urban areas are progressive (pro-poor), in an absolute sense. On the other hand, in an absolute term, all tax functions in rural areas are regressive (pro-rich), due to their positive intercepts.

Turning to the examination of relative progression or regression of urban-rural tax intercepts for each year individually and through the four selected years, we can see that in table 5.5, tax intercept of urban areas has the value – 2245 in 1979, whereas, in the same year, tax intercept of rural areas has the value equal to 344. The percentage difference between these two intercepts is 753 percent. Which is equivalent to say that tax intercept of urban areas is 753 percent more progressive (pro-poor) than the rural tax intercept in the year 1979. Similarly, in 1986-87, tax intercept in urban areas is equal to – 1016, while this intercept in the rural areas is equal to 1100. The percentage difference between them is 208 percent. In other words, the tax intercept in urban areas is more progressive (pro-poor) than that of its counterpart rural areas by 208 percent. In 1992-93, the tax intercept of urban areas is equal to -318 and in the same year, the rural tax intercept is 2590. In percentage term, the difference between these two types of intercepts is 914 percent. Therefore, tax intercept for urban households is far more progressive (more pro-poor) than the rural tax intercept by 914 percent. Finally, in 2001-02, the tax

intercept of urban areas is equal to -3610 and in the same year, the rural tax intercept is 2834. In percentage term, the difference between these two types of intercepts is 179 percent. Therefore, tax intercept for urban households is far more progressive (more pro-poor) than the rural tax intercept by 179 percent.

From the table 5.7, the overtime trend in the differences of urban-rural intercepts is cyclical one. In summary, all tax slope coefficients in urban areas are more pro-poor than the tax slope coefficients in rural areas. Also, tax intercepts of urban areas are more pro-poor than the intercepts of the urban areas, in all four selected years. Therefore, all tax functions in the urban areas are more progressive (pro-poor) than the tax functions representing the rural areas in all four selected years.

5.3.3 Net Benefit Functions

Recall that, larger the intercept of a net benefit function, larger the net benefits accruing to the lower income groups and vice versa. Also, larger the negative slope coefficient of a net benefit function greater the power of its pro-poor nature. Note that, sign of net slope coefficient is of prime importance. As far as, slope of the net benefit function is negative, it is qualitatively[1] pro-poor, irrespective of its quantitative feature. The value of negative net benefit slope (in absolute term) would give us degree of pro-poor nature while value of positive net benefit slope would tell us its degree of pro-rich nature.

Now we compare the net benefit functions of urban-rural areas in the four selected years. From the table 5.5, we see that in 1979, urban net benefit slope is – 0.22 while, in the same year, rural net benefit slope is 0.04. Qualitatively, urban net benefit slope has pro-poor nature due to its negative sign and rural net benefit slope has pro-rich nature due to its positive sign. Hence urban net benefit slope is more pro-poor than the

[1] Qualitatively means by functional relationship with incomes of the income groups.

rural net benefit slope. Similar outcomes can be seen by urban-rural slope coefficient comparisons in 1986-87, 1992-93 and 2001-02.

Now let us turn to the examination of urban-rural net benefit intercepts. We can see from table 5.5, in 1979 urban net benefit intercept is equal to 7631, whereas, in the same year, rural net benefit intercept is equal to only 1501. It means that urban net benefit intercept is larger than the rural net benefit intercept by 408 percent. In other words, urban net benefit intercept is more pro-poor than the rural net benefit intercept by 408 percent. While, in 1986-87, urban net benefit intercept is 17265 and its counterpart rural net benefit intercept is 3014. In percentage term, urban net benefit intercept is 473 percent larger (more pro-poor) than its counterpart rural net benefit intercept. In 1992-93, net benefit intercept in urban areas is equal to 19215 and the rural net benefit intercept is only 6272. Hence, urban net benefit intercept is 206 percent larger (more pro-poor) than that of its counterpart in rural areas. Finally, In 2001-02, net benefit intercept in urban areas is equal to 39477 and the rural net benefit intercept is 9882. Hence, urban net benefit intercept is 300 percent larger (more pro-poor) than that of its counterpart in rural areas.

In summary, in all four selected years, urban net benefit slope coefficients are more pro-poor than their counterpart rural net slope coefficients. And, the urban net benefit intercepts are more pro-poor than the rural net benefit intercepts, in the all four years. Therefore, urban net benefit functions are more pro-poor than the rural net benefit functions in 1979, 1986-87, 1992-93 and 2001-02. Moreover, pro-poor nature in urban net benefit functions relative to their rural counterparts almost increases with increasing rate overtime.

Table 5.5

Expenditure and tax regressions for urban-rural areas in 1979, 1986-87, 1992-93 and 2001- 02

Dependent Variable	Intercept				Slope				R^2			
	1979	1986-87	1992-93	2001-02	1979	1986-87	1992-93	2001-02	1979	1986-87	1992-93	2001-02
URBAN												
Exp. / hh	5385	16249	18897	35867	0.09	0.06	0.04	0.10	0.54	0.08	0.09	0.44
Tax / hh	-2245	-1016	-318	-3610	0.31	0.25	0.21	0.21	0.94	0.93	0.97	0.95
Net Ben. / hh	7631	17265	19215	39477	-0.22	-0.19	-0.17	-0.11	0.93	0.62	0.69	0.55
RURAL												
Exp. / hh	1845	4114	8862	12716	0.16	0.17	0.12	0.11	0.78	0.57	0.59	0.79
Tax / hh	344	1100	2590	2834	0.12	0.09	0.07	0.10	0.97	0.97	0.95	0.68
Net Ben. / hh	1501	3014	6272	9882	0.04	0.08	0.05	0.01	0.28	0.19	0.16	0.02

Table 5.6

Expenditure - percentage difference comparisons, (urban-rural areas)

Year	Urban-Rural Percentage Difference			
	1979	1986-87	1992-93	2001-02
Expenditure Slope	78	183	200	10
Expenditure Intercept	192	295	113	182

Table 5.7

Tax – percentage difference comparisons, (urban-rural areas)

Year	Urban-Rural Percentage Difference			
	1979	1986-87	1992-93	2001-02
Tax Slope	158	178	200	110
Tax Intercept	753	208	914	179

Table 5.8

Net Benefit – percentage difference comparisons, (urban-rural areas)

Year	Urban-Rural Percentage Difference			
	1979	1986-87	1992-93	2001-02
Net Benefit Slope	650	338	440	1200
Net Benefit Intercept	408	473	206	300

CHAPTER 6

PRE AND POST FISCAL INCIDENCE: LORENZ CURVES AND GINI RATIOS

In this chapter, the initial distributions of income will be compared to the distributions of income after budget incidence. The Gini coefficients are presented along with the Lorenz curves for comparisons within and across the urban-rural areas in 1979, 1986-87, 1992-93 and 2001-02. These comparisons reduce some of the risk of a single measure of dispersion, which may be producing misleading results. This may happen in case of great variation in the pattern of dispersions of income. For instance, two Lorenz curves may cross each other, in spite of the fact; they are produced from a single Gini coefficient. In these kinds of situations careful interpretation is required, especially when differences between Gini coefficients are very small, thereby, making the Gini ratios sensitive to distributive changes. However, use of Gini ratio is not free from objections. Some economists say that the Gini ratio is relatively sensitive to inequality within the middle-income range. After all, there is no single summary statistic, which is superior to its other counterparts in each and every respect. Therefore, we use Gini ratio as a summary statistics because its scope and limitations are familiar and it is very well known and ever popular among the economists.

Our purpose is to estimate accurately Gini coefficients for grouped data through trapezoidal approximation and OLS method However, these summary statistics are not error free because their values are sensitive to the pattern of distribution in the low, middle and high-income groups. Moreover, the observed range of variation within a

country is small compared to sampling errors; the estimation technique deserves attention as an additional source of error[1]. However, our purpose is to compare the distributions of income between urban and rural areas in Pakistan overtime. That is why, errors in computation of Gini ratios, either due to small number of intervals or due to some other similar factors would remain on both sides (urban and rural) and also in the analysis each year. Therefore, we can safely compare our results to reach on some suitable and convincing conclusions.

6.1 Pre- and Post- Fiscal Incidence in Urban Areas

The Gini and concentration ratios[2] in urban areas for pre-and post fiscal incidence respectively are given in table 6.1. It is evident from table 6.1 that the concentration ratios for post-fiscal distributions are smaller than the Gini ratios of pre-fiscal distributions in all four selected years. For example, in 1979 pre-fiscal Gini ratio is 0.4005, while post-fiscal concentration ratio for the same year is equal to 0.3116. In percentage term, there is a decrease of 22 percent in the pre-fiscal Gini ratio after the fiscal incidence has been realized. Hence, due to the effects of government expenditures and taxes, distribution of income has become more favourable for the low income groups. Similarly, in 1986-87, pre-fiscal Gini ratio is equal to 0.3565, while, it has reduced to 0.2831 after distributing government expenditures and taxes to the different income groups in the urban areas. However, this time the reduction in the Gini coefficient[3] is 21 percent as can be seen in the last row of table 6.1. In 1992-93, pre fiscal Gini ratio is 0.3835, while post fiscal concentration ratio is equal to 0.2555, which is 33 percent lesser than its counterpart Gini ratio. Finally, the pre- fiscal Gini- ratio in 2001-02 is 0.3892 and post- fiscal

[1] Reynolds and Smolensky (1977)
[2] We are using mathematically same concepts for different distributions of income i.e. Gini ratio for pre-fiscal distribution of income, while concentration ratio for post-fiscal distribution of income due to the problem of reranking of the households in the post-fiscal era, as discussed in chapter 3.
[3] Sometimes we may use the concepts of Gini and concentration ratios synonymously.

concentration ratio is 0.2995. The percentage decrease in Gini ratio is 23 percent. These results can be compared with the poverty level given by head count ratios in the four selected years.[4] Remember that larger the head count ratio the greater will be the level of poverty and vice versa. In 1979, 1986-87, 1992-93 and 2001-02 the head count ratios for urban areas are 25.94, 14.99, 17.71 and 22.67 respectively.

Table 6.1

Gini and concentration coefficients (urban), 1979, 1986-87, 1992-93 and 2001-02

Year	1979	1986-87	1992-93	2001-02
Pre-fiscal Gini ratio	0.4005	0.3565	0.3835	0.3892
Post-fiscal concentration ratio	0.3116	0.2831	0.2555	0.2995
Percentage decrease in Gini ratio	22	21	33	23

It can be concluded that the disparity between initial distribution of income and the post fiscal distribution was largest in 1992-93, larger in 2001-02, smaller in 1979 and smallest in 1986-87. This disparity may be interpreted to mean that the distributive impacts of government budget incidence in urban areas were largest in 1992-93, larger in 2001-02 and almost equal in 1979 and 1986-87.The Lorenz and concentration curves which show, respectively, before and after fiscal incidence in urban areas are depicted in figures 6.1, 6.3, 6.5 and 6.7 at the end of this chapter. From these figures we can conclude that the shapes and their positions are quite consistent with the Gini and concentration ratios for urban areas in all four years.

6.2 Pre- and Post- Fiscal Incidence in Rural Areas

In table 6.2, the results of Gini and concentration ratios in rural areas are given for the four selected years. Looking at table 6.2, in 1979, the Gini ratio is 0.3195 in pre-fiscal

[4] Economic Survey, 2001-02 and 2002-03.

era, while its counterpart concentration ratio (in post fiscal era) is 0.2870. The percentage decrease in Gini ratio is 10.2 percent. Which is the largest percentage decrease in Gini ratio, due to fiscal action of government in all four years. Whereas, in 1986-87 the Gini coefficient of pre-fiscal incidence is 0.3121. While, in the same year, post fiscal concentration ratio becomes equal to 0.2859, which shows 8.4 percent decrease in rural Gini ratio in 1986-87. In 1992-93 the value of pre-fiscal Gini ratio is 0.3646 and that of concentration ratio is 0.3309 in post fiscal era. The percentage decrease in Gini ratio is 9.2 percent, which is the second largest percentage decrease in Gini ratio in all four selected years. Finally, in 2001-02 the pre- fiscal Gini- ratio is 0.4816, while, post- fiscal concentration ratio is 0.4726. Now, the decrease in the Gini- ratio is only 1.9 percent. These results for rural areas can also be compared with the poverty level given by head count ratios in the four selected years.[5] Recall that larger the head count ratio the greater will be the level of poverty and vice versa. In 1979, 1986-87, 1992-93 and 2001-02 the head count ratios for urban areas are 32.51, 18.32, 23.91 and 38.99 respectively, which are, more or less consistent with the amounts of decrease in Gini ratios in the four selected years.

Table 6.2

Gini and concentration coefficients (rural), 1979, 1986-87, 1992-93 and 2001-02

Year	1979	1986-87	1992-93	2001-02
Pre-fiscal Gini ratio	0.3195	0.3121	0.3646	0.4816
Post-fiscal concentration ratio	0.2870	0.2859	0.3309	0.4726
Percentage decrease in Gini ratio	10.2	8.4	9.2	1.9

In summary, the difference between initial distribution of income and the post fiscal distribution was largest in 1979, larger in 1992-93, smaller in 1986-87 and smallest in 2001-02. This disparity may be interpreted to mean that the distributive impacts of government budget incidence in rural areas were largest in 1979, larger in 1992-93,

[5] Ibid.

smaller in 1986-87 and smallest in 2001-02. The Lorenz and concentration curves for before and after fiscal incidence in rural areas, respectively, are depicted in figures 6.2, 6.4, 6.6 and 6.8 at end of this chapter. By discerning these figures it can be said that the shapes and the positions of Lorenz and concentration curves are quite consistent with the Gini and its counterpart concentration ratios for rural areas in all four selected years.

6.3 Urban versus Rural — Pre- and Post- Fiscal Incidence

Table 6.3 shows pre- and post-fiscal Gini and concentration ratios and their comparisons for urban-rural areas, in the four selected years. Comparison of the pre-fiscal Gini ratios of urban-rural areas in these years tells us that all urban pre-fiscal Gini ratios are larger than that of its counterpart rural areas except in 2001-02. In other words, pre-fiscal income distributions in rural areas (having relatively smaller Gini ratios) are more equal than that of their counterpart urban areas in the first three selected years (compare rows 1 and 3). However, concentration ratios of urban areas produced by post-fiscal experiment are smaller than that of their counterpart rural areas in all years except 1979 (see rows 2 and 4 in table 6.3). It means that due to government activity the distributions of income in urban areas have become more equal than that of the rural areas.

Let us explain these facts from another angle, in table 6.3 pre-fiscal Gini ratio in 1979 is 0.4005, while post-fiscal concentration ratio having smaller value in the same year is equal to 0.3116. Hence, percentage decreases in urban Gini ratio due to fiscal action of the government is 22 percent. In 1986-87 pre-fiscal urban Gini ratio is 0.3565 and post-fiscal urban concentration ratio is 0.2831. The percentage decrease in urban Gini ratio in 1986-87 is thus 21 percent. In 1992-93 pre-fiscal urban Gini ratio is 0.3835 and post- fiscal urban concentration ratio is 0.2555. The percentage decrease in urban Gini ratio is 33 percent. Similarly, in 2001-02 pre- fiscal Gini- ratio is 0.3892, while post-fiscal concentration ratio having smaller value in the same year is equal to 0.2995. Hence,

percentage decreases in urban Gini ratio due to fiscal action of the government is 23 percent.

Table 6.3

Gini and concentration coefficients (urban-rural), 1979, 1986-87, 1992-93 and 2001-02

Year		1979	1986-87	1992-93	2001-02
Urban	Pre-fiscal Gini ratio	0.4005	0.3565	0.3835	0.3892
	Post-fiscal concentration ratio	0.3116	0.2831	0.2555	0.2995
Rural	Pre-fiscal Gini ratio	0.3195	0.3121	0.3646	0.4816
	Post-fiscal concentration ratio	0.2870	0.2859	0.3309	0.4726
Percentage decrease in Gini ratio [urban]		22	21	33	23
Percentage decrease in Gini ratio [rural]		10	8	9	1.9
Percentage difference in urban-rural percentage decrease in Gini– Conc. ratios		120	163	267	1111

Turning to values of Gini and concentration ratios in rural areas and their percentage decreases, in 1979 pre-fiscal Gini ratio in rural areas is 0.3195 and post fiscal rural concentration ratio is 0.2870. Thus, the percentage decrease in rural Gini ratio is 10 percent. In 1986-87 pre-fiscal rural Gini ratio is 0.3121 and post-fiscal rural concentration ratio is 0.2859. The percentage decrease in rural Gini ratio in 1986-87 is 8 percent. Similarly, in 1992-93 pre-fiscal rural Gini ratio is 0.3646 and post- fiscal rural concentration ratio is 0.3309. The percentage decrease in rural Gini ratio is 9 percent. Finally, in 2001-02 pre-fiscal Gini ratio in rural areas is 0.4816 and post fiscal rural concentration ratio is 0.4726. Thus, the percentage decrease in rural Gini ratio is now only 1.9 percent.

Obviously, percentage decreases in urban Gini ratios due to fiscal actions are larger than these decreases in the Gini ratios of rural areas in all four selected years. In other words, after distributing government expenditure benefits and tax burden to each

income group of the urban-rural households, income distributions in urban areas have become relatively, though may not be absolutely, more equal than that of their counterpart rural areas. However, in absolute term post-fiscal rural concentration ratios may still be smaller, as in case of the year 1979, than that of the urban areas.

Again, by comparing the percentages given in rows 6 and 7 of table 6.3, we can get row 8. Here, percentage differences between urban-rural percentage decreases in Gini ratios, due to government actions, are given. From these percentage differences, one can quantify the effectiveness of fiscal parameters in lowering the value of urban Gini ratios, proportionately, more than their counterpart rural areas. For example, in 1979, percentage difference between urban-rural percentage decrease in Gini-concentration ratio is 120 percent. Whereas this difference is equal to 163 percent in 1986-87, 267 percent in 1992-93 and 1111 percent in2001-02. Hence, one can conclude that in 1979, fiscal structure was 120 percent more pro-poor in urban areas than it was in rural areas. Similarly, in 1986-87, 1992-93 and 2001-02 fiscal incidence in urban areas were 163, 267 and 1111 percent more pro-poor than that of their counterpart in rural areas.

6.4 Significance Tests

In the above discussion the role of Gini ratios in describing the degree of inequality in income dispersions of urban-rural areas is of informal nature. We have been showing, for example, that urban post- fiscal concentration ratio relative to its pre-fiscal Gini ratio is such and such percent lower (more pro-poor) than its counterpart concentration ratio in rural areas. Now we carry out a formal statistical test for differences in income distributions within urban-rural areas (pre- and post fiscal) and across the urban-rural areas (post- and post fiscal) in the same year or across the alternative years (post- and post-fiscal). The purpose of this test is to show that if

structural relationships have been changed the Gini- ratios should differ significantly. For this purpose, the data has been fitted to the following functional form.[6]

$$\eta = \eta e^{-\beta(1-\eta)} \tag{6.1}$$

Where η is cumulative proportion of income, and η is cumulative proportion of households. In case of $\beta > 0$, the Lorenz curve lies below the 45^{O} line, if $\beta = 0$ the curve coincides with the income equality (45^{O}) line, and if $\beta = \infty$ the curve lies along the x-axis and y-axis under the 45^{O} line. The Gini ratio can be calculated by the following expression.

$$G = 1 - \frac{2(\beta - 1)}{\beta^2} - \frac{2e^{-\beta}}{\beta^2} \tag{6.2}$$

By using equation 6.1, we can hypothesize the above concept in the following general forms.

$$\beta_{1979(U)} = \beta_{1986-87(U)} = \beta_{1992-93(U)} = \overline{\beta_U} \tag{6.3}$$

$$\beta_{1979(R)} = \beta_{1986-87(R)} = \beta_{1992-93(R)} = \overline{\beta_R} \tag{6.4}$$

Where β_U and β_R are the estimates of income distribution for urban and rural areas respectively. The results for fitting the data to the Lorenz function, equation 6.1, by ordinary least square method are shown in table 6.4. The resulting OLS Gini ratios are also given in the same table. Testing for equality of β coefficients and thus a test for equality of distribution of income within and across the different years in urban-rural areas.

[6] See Reynolds and Smolensky (1977)

Table 6.4

Results for Lorenz estimation (urban-rural)

OLS Experiment Items	1979		1986-87		1992-93		2001-02	
Pre-Fiscal								
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
β	1.55	1.18	1.53	1.23	1.65	1.48	2.04	2.44
$t-ratio$	21.4	28.43	27.2	30.2	21.2	23.0	14.7	31.9
R^2	0.93	0.97	0.95	0.97	0.92	0.95	0.87	0.98
$Gini-ratio$	0.3662	0.3001	0.3622	0.3095	0.3813	0.3539	0.4377	0.4881
Post- Fiscal								
	Urban	Rural	Urban	Rural	Urban	Rural	Urban	Rural
β	0.88	0.93	0.66	0.93	0.514	1.13	0.7856	2.35
$t-ratio$	16.8	25.4	9.7	23.4	5.28	21.0	10.3	31.2
R^2	0.86	0.96	0.40	0.95	0.56	0.92	0.50	0.98
$Concentration-ratio$	0.2386	0.2494	0.1878	0.2494	0.1514	0.2905	0.2177	0.4766

Chow test is carried out for significant differences in β coefficient. This test is an F test and shows the equality of regression coefficients, if $F_{cal} > F_{tab}$, the hypothesis that $\beta_1 = \beta_2 = \overline{\beta}$ is rejected. In table 6.5, five types of experiments are shown by applying Chow test. In first experiment, urban regression coefficients for the pre-fiscal distributions are statistically significantly different from their urban counterparts for the post-fiscal distributions at the 1 percent level in all four years. Moreover, this experiments can be matched with the corresponding poverty indices given by head count ratio in the four selected years[7]. Larger head count ratio shows greater level of poverty and vice versa. While, larger F- ratio shows greater equality in the post- fiscal distribution of income relative to that of pre- fiscal distribution and vice versa. In 1979, 1986- 87, 1992- 93 and 2001-02 the head count ratios of poverty in urban areas are 25.94, 14.99,

[7] Economic Survey, 2001-02 and 2002-03.

17.71 and 22.67 respectively, while, the corresponding F- ratios in table 6.5 are 56.1, 94.4, 83.78 and 62.59 respectively.

In second experiment, rural regression coefficients for the pre-fiscal distributions are statistically significantly different from their rural counterparts for the post-fiscal distributions also at the 1 percent level, except in 2001-02, where difference between pre- and post- fiscal distributions is statistically insignificant. This shows that the post fiscal concentration ratios in urban and rural areas possess significantly more equality in the distributions than that of the pre-fiscal Gini ratios in 1979, 1986- 87 and 1992- 93. Whereas, in 2001-02 effects of net government expenditures are not significant in equalizing more post- fiscal distribution than that of the pre- fiscal distribution. However, generally, government expenditures and taxes significantly decrease the final (post-fiscal) income inequalities in urban and rural areas in the selected years. Moreover, this experiment for rural areas can also be matched with the corresponding poverty indices in all four selected years[8]. The head count ratios are 32.51, 18.32, 23.91 and 38.99 in 1979, 1986-87, 1992-93 and 2001-02 respectively, while, their corresponding F- ratios in table 6.5 are 20.73, 28.40, 17.05 and 0.817 respectively. Hence, the extent of equality achieved in post- fiscal distribution of income is positively related to the extent of corresponding decrease in poverty index in both urban- rural areas in 1979, 1986- 87, 1992- 93 and 2001- 02.

[8] Ibid

Table 6.5

Chow breakpoint tests for significant differences in β coefficients

Distributive Experiment	F-statistic	Probability
1979–1979 pre- post-fiscal (urban)	56.1	0.000000
1986-87–1986-87 pre- post-fiscal (urban)	94.4	0.000000
1992-93–1992-93 pre- post-fiscal (urban)	83.78	0.000000
2001-02–2001-02 pre- post-fiscal (urban)	62.59	0.000000
1979–1979 pre- post-fiscal (rural)	20.73	0.000156
1986-87–1986-87 pre- post-fiscal (rural)	28.40	0.000024
1992-93–1992-93 pre- post-fiscal (rural)	17.05	0.000520
2001-02–2001-02 pre- post-fiscal (rural)	0.817	0.375845
1979–1979 post-fiscal (urban-rural)	0.55	0.467066
1986-87–1986-87 post-fiscal (urban-rural)	9.90	0.004686
1992-93–1992-93 post-fiscal (urban-rural)	24.74	0.000073
2001-02–2001-02 post-fiscal (urban-rural)	177.49	0.000000
1979–2001-02 post-fiscal (urban)	1.01	0.325829
1979–1992-93 post-fiscal (urban)	11.22	0.003031
1979–1986-87 post-fiscal (urban)	6.03	0.022418
1986-87–2001-02 post-fiscal(urban)	1.39	0.250894
1986-87–1992-93 post-fiscal (urban)	1.66	0.211439
1992-93–2001-02 post-fiscal (urban)	4.93	0.037491
1979–2001-02 post-fiscal (rural)	312.52	0.000000
1979–1992-93 post-fiscal (rural)	9.37	0.005934
1979–1986-87 post-fiscal (rural)	0.005	0.943151
1986-87–2001-02 post-fiscal (rural)	307.75	0.000000
1986-87–1992-93 post-fiscal (rural)	9.16	0.006426
1992-93–2001-02 post-fiscal (rural)	174.22	0.000000

In third experiment post- fiscal urban-rural inequality coefficients are compared in each year. In 1979, post- fiscal urban-rural inequality coefficients do not differ significantly, while, in 1986-87, 1992-93 and 2001-02 they do differ significantly at the 1

percent level. In fourth and fifth experiments a pair wise comparison for the post-fiscal inequality coefficients across the three years is carried out. In fourth experiment urban post- fiscal regression coefficients in the second and third pair differ significantly at the 1 percent and the 5 percent levels respectively. However, in all other pairs urban post-fiscal regression coefficients do not differ significantly, which shows that we cannot reject the hypothesis that differences in the post- fiscal inequality are merely due to chance variation. In fifth experiment, with the exception of third pair (1979– 1986-87), the statistical tests of all pairs show that rural post- fiscal regression coefficients do differ significantly at the 1 percent level.

Figure 6.1: Lorenz curve comparison, pre- and post- fiscal incidence (urban) 1979.

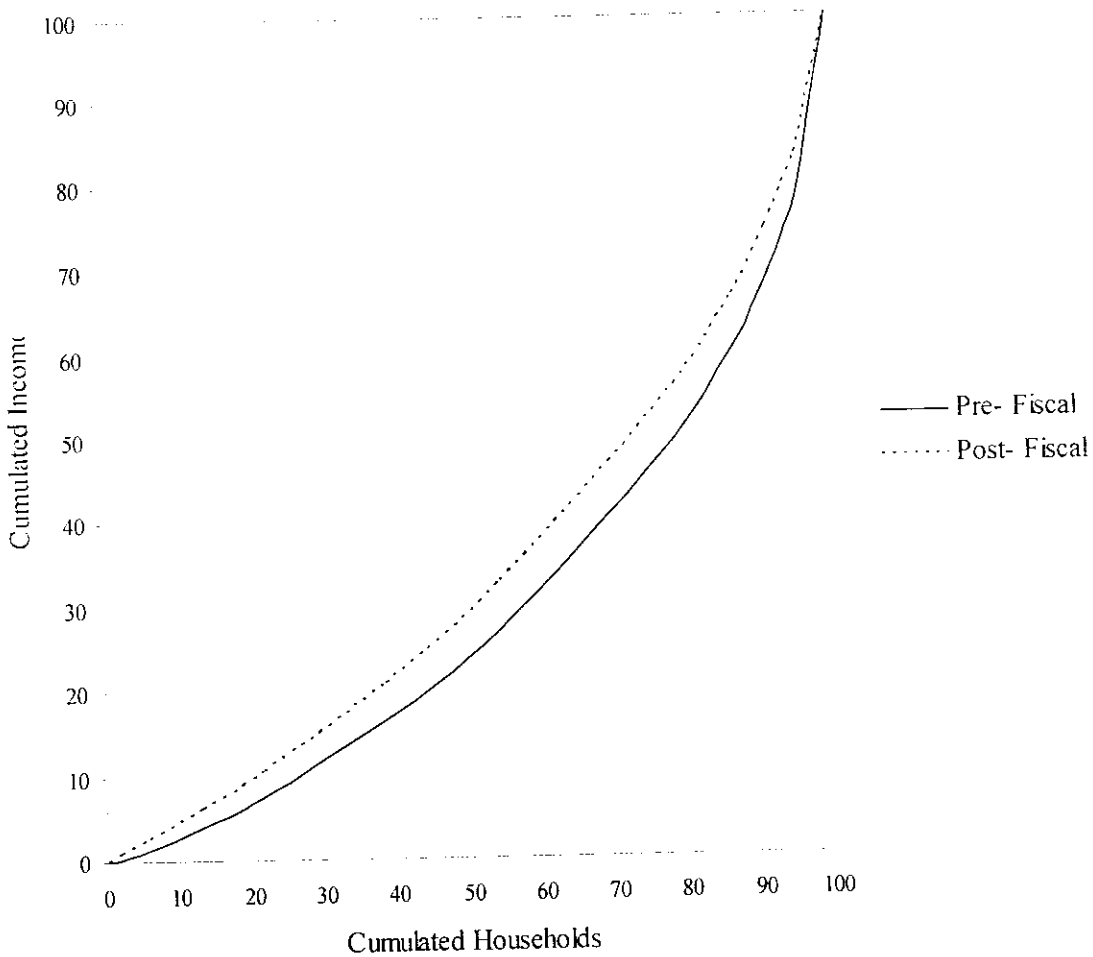


Figure 6.2: Lorenz curve comparison, pre- and post- fiscal incidence, (rural) 1979.

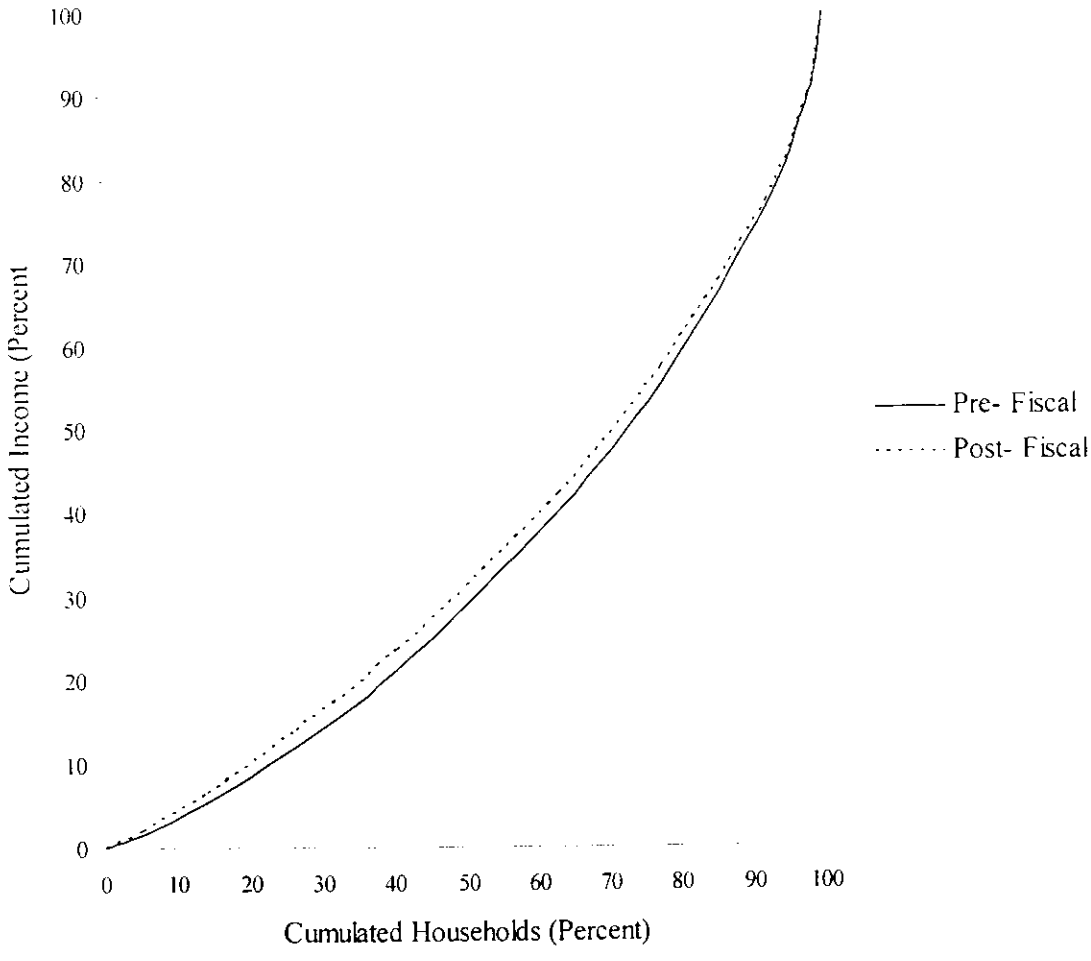


Figure 6.3: Lorenz curve comparison, pre- and post- fiscal incidence, (urban) 1986- 87.

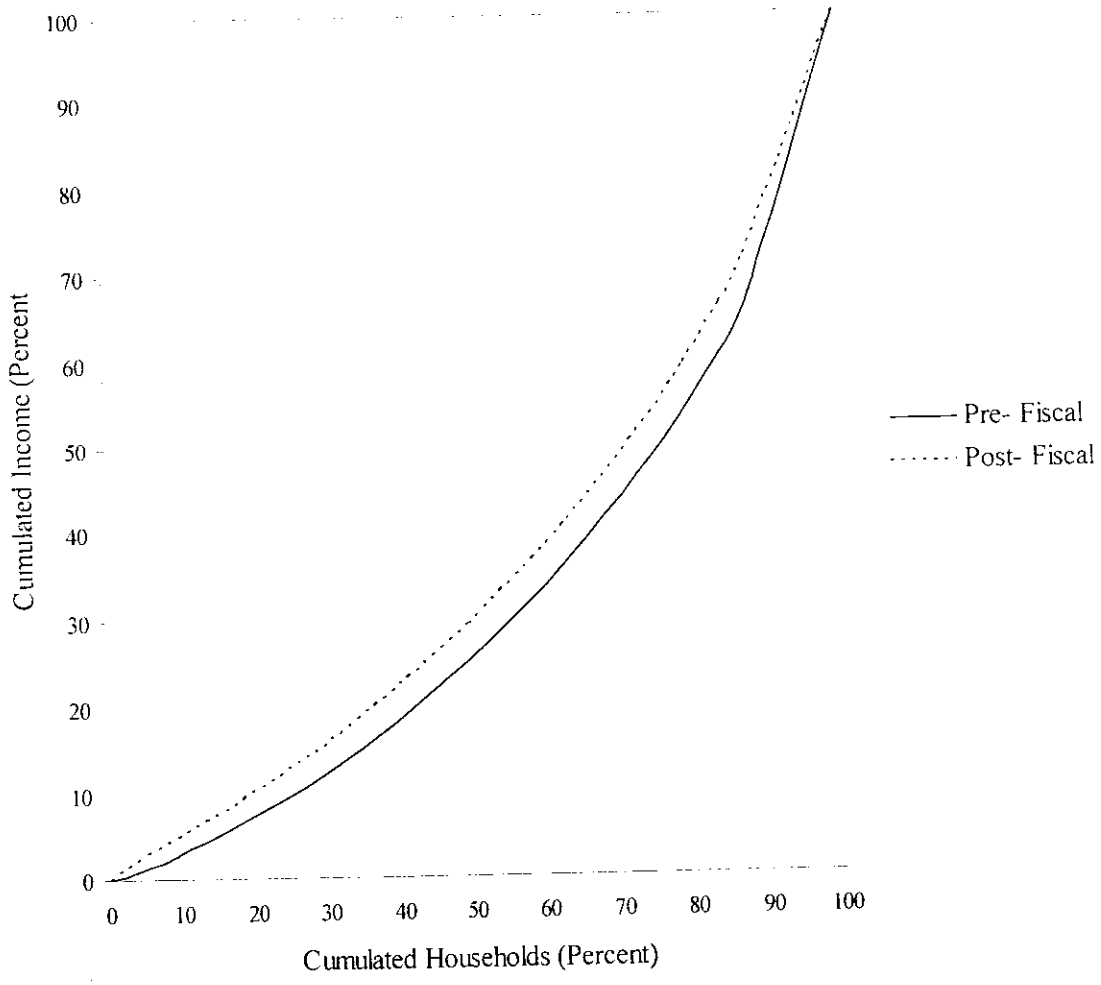


Figure 6.4: Lorenz curve comparison, pre- and post- fiscal incidence, (rural) 1986- 87.

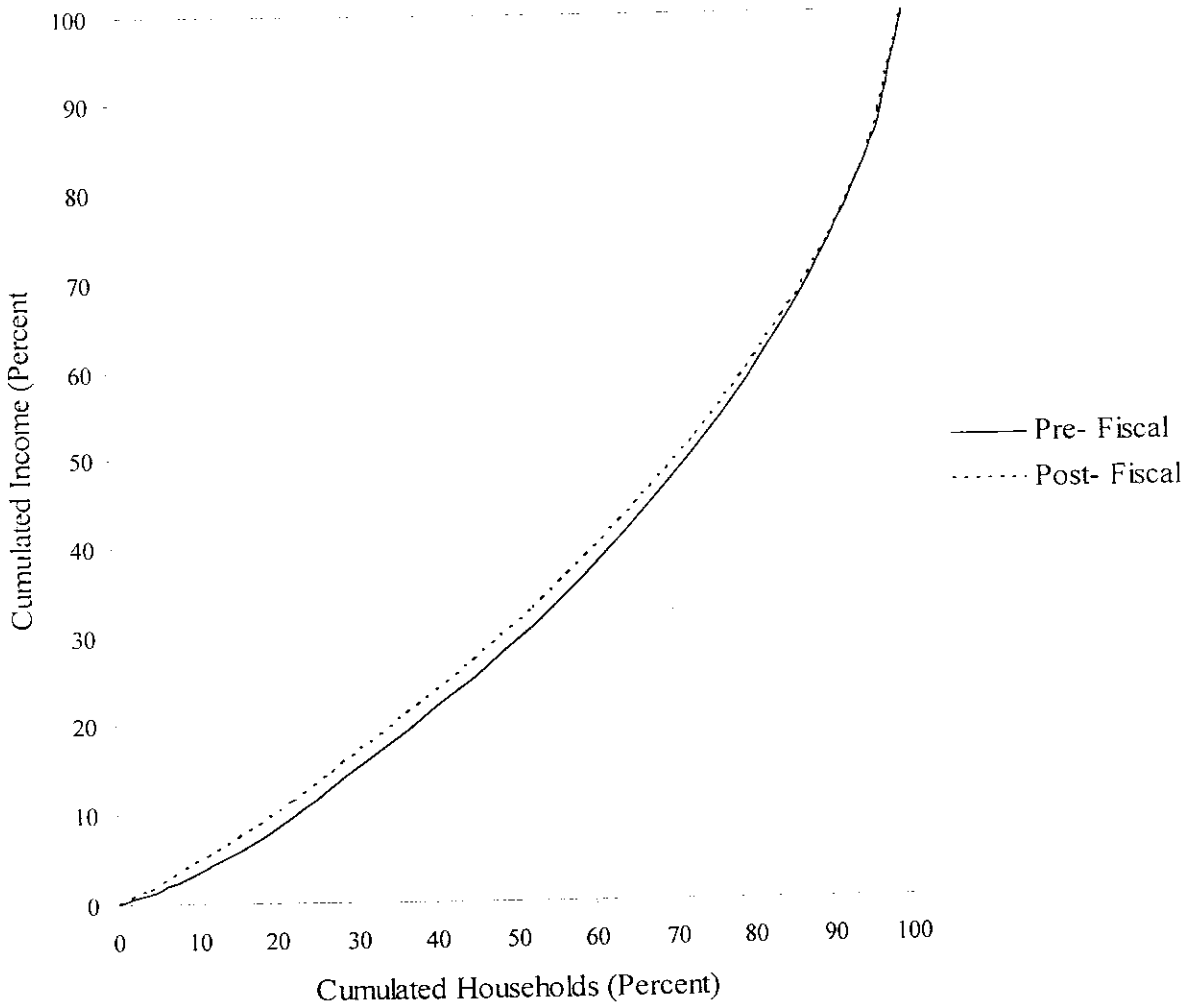


Figure 6.5: Lorenz curve comparisons, pre- and post- fiscal incidence, (urban) 1992- 93.

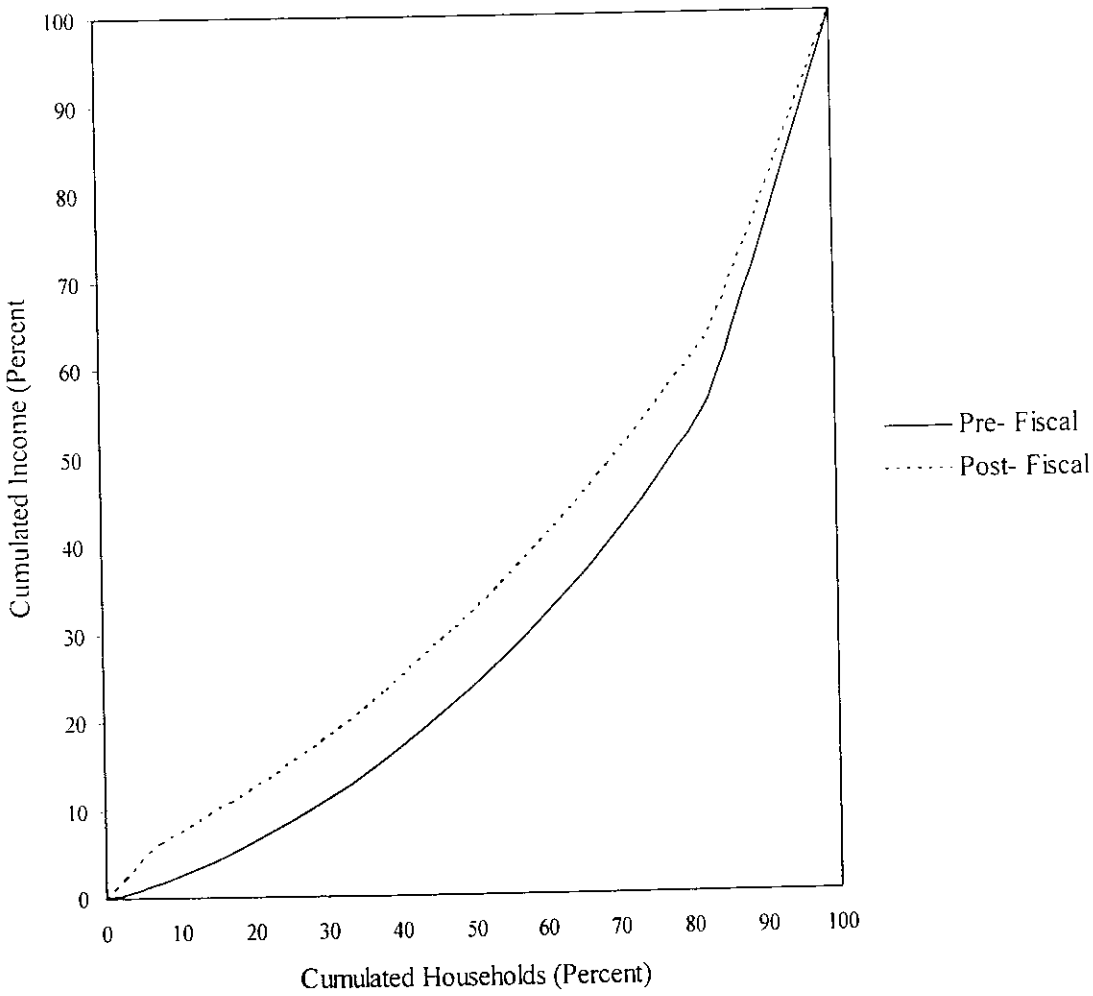


Figure 6.6: Lorenz curve comparisons, pre- and post- fiscal incidence, (rural) 1992- 93.

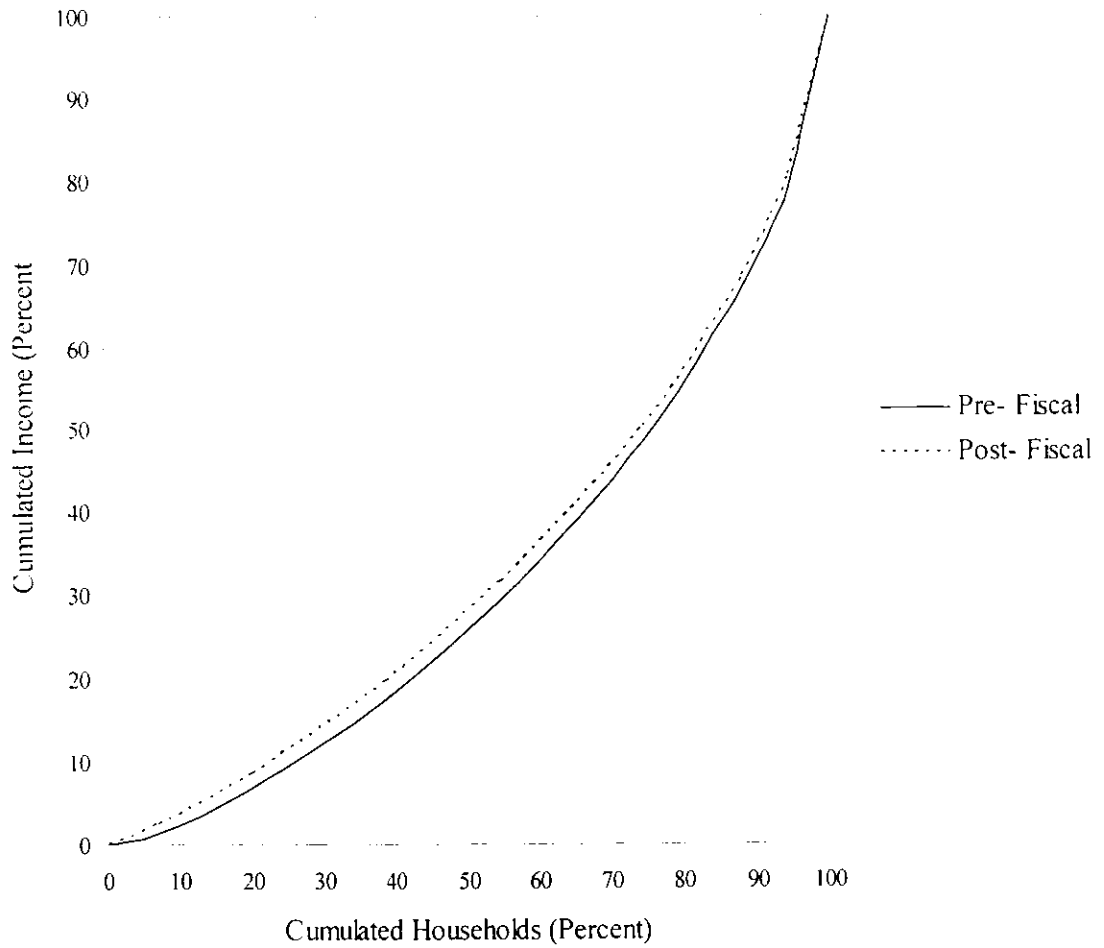


Figure 6.7:

Lorenz curve comprisons, pre- and post- fiscal incidence, (urban) 2001- 02.

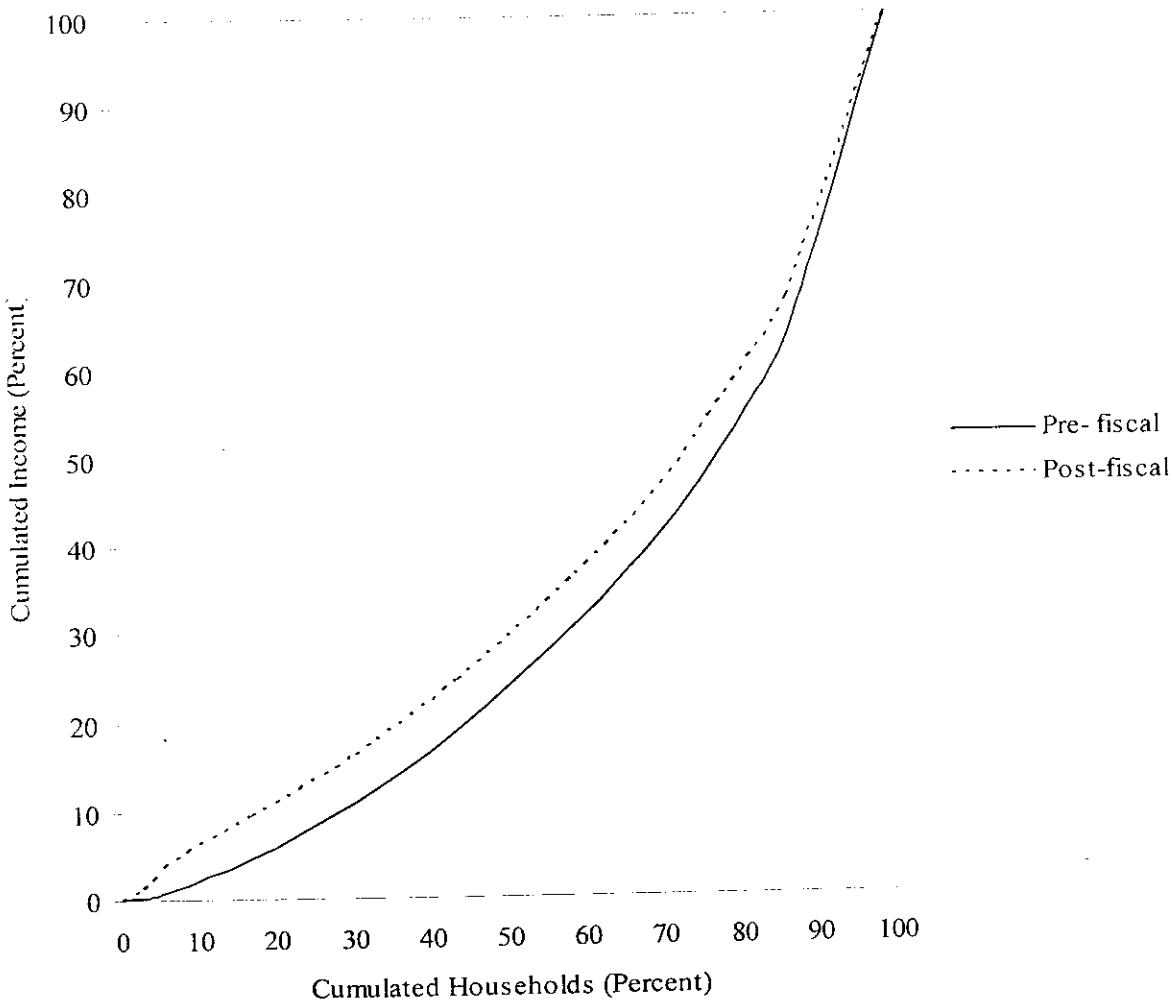
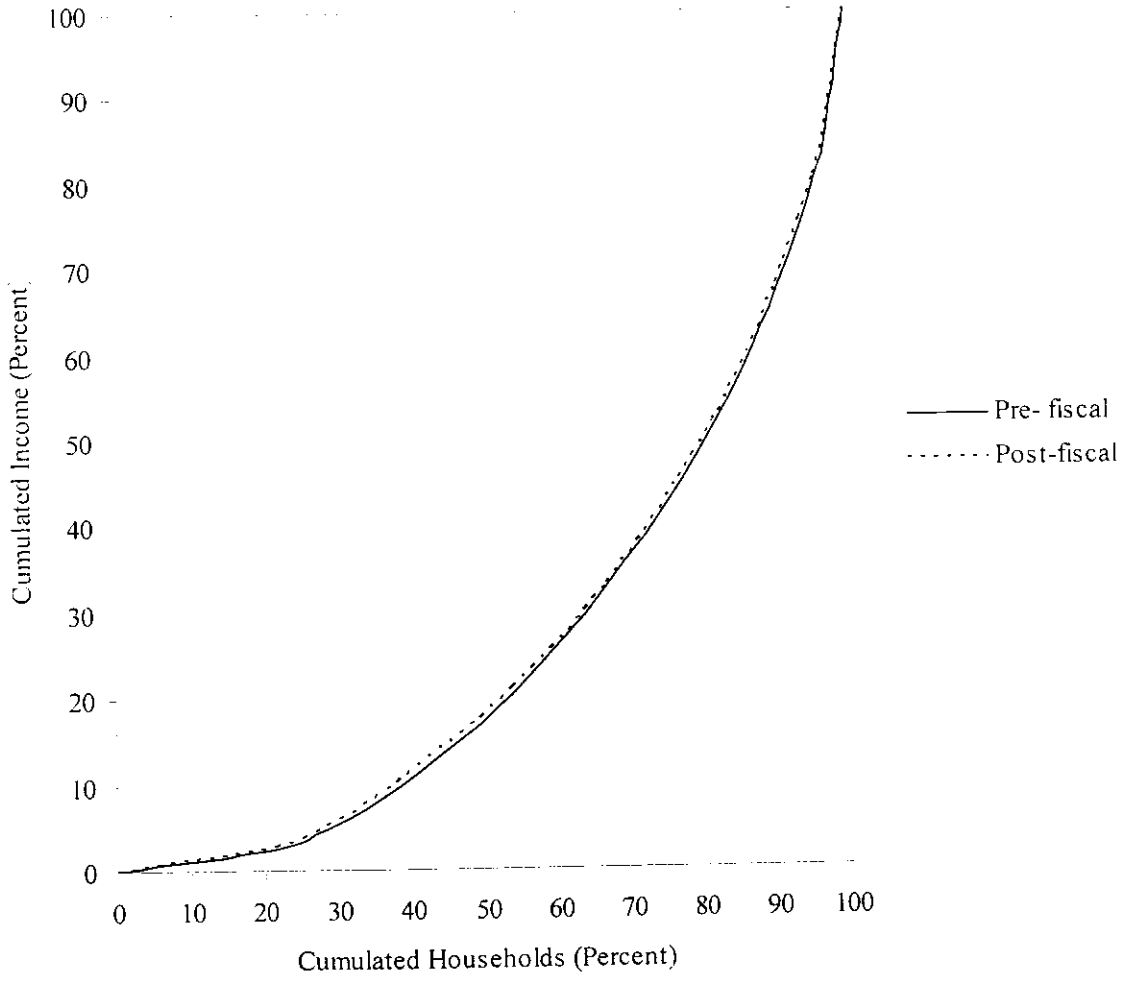


Figure 6.8:

Lorenz curve comparisons, pre- and post- fiscal incidence, (rural) 2001- 02.



CHAPTER 7

EFFECTS OF *ZAKAH* AND *USHR* ON THE DISTRIBUTION OF INCOME

Payment of *zakah* and *ushr*[1] is one of the pillers of Islam. It is an obligatory transfer by a *sahib-e-nisab*[2] (rich) to the *mustahequeen-e-zakah* (deserving poor). In Pakistan even before the introduction of official *zakah* and *ushr* system in June 1980, people were paying *zakah* and *ushr* voluntarily. Since its official application thousands of people have benefited either directly or indirectly through hospitals, education institutions both general and *Dini Madaris*[3] and other welfare institutions. Moreover, thousands of people have offered their services to *zakah and ushr* organization and continue to do so in purely voluntary capacities because of religious considerations.[4]

Zakah and ushr system is the best way of achieving economic justice in the society[5]. It automatically takes away a part of holdings of the rich and distributes it among the poor and needy. Prophet Muhammad (peace be upon him) took various measures to alleviate poverty and encouraged his followers to give *sadqat*[6] to the needy.

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[1] See, for detailed knowledge about the nature of *zakah* and *ushr* system, Qardawi, Yousaf al (1982).
[2] *Nisab*, in relation to assets liable to *zakah* (except agricultural produce and animals fed free in pastures) means 612.32 grams of silver, or cash or gold, or goods for trade or any assets liable to *zakah* under shari'ah, the aggregate value of which is equal to the value of 612.32 grams of silver, as notified by the Administration General for each *zakah* year or, in case of a person whose assets liable to *zakah* consist only of gold, 87.48 grams of gold.
[3] Religious Institutions.
[4] See Shirazi, N. S. (1996).
[5] See Badawi, M. A. Zaki (1979).
[6] *Zakah* and other general charity.

Because, fair distribution of income and wealth in the society is one of the basic objectives of Islam.

Unfortunately, no Islamic country practices the system in its true form. Muslims are not acting on Islamic teachings and the system of *zakah* and *ushr* also does not exist in its true form.[7] However, introduction of *zakah* and *ushr* system has proved its worth in making the distribution of income fairer in the urban-rural areas of Pakistan. In this chapter we examine the effects of *zakah* and *ushr* on the distribution of income by using fact and figures about the collection and disbursement of *zakah* and *ushr* in the urban-rural areas of Pakistan.

To show the effect of *zakah* and *ushr* on the income distribution of urban-rural areas, we will repeat the regression analysis of chapter 5 with *zakah* and *ushr* and also carry out the comparisons of pre and post- *zakah-ushr* incidences in urban-rural areas by using Gini ratio analysis of chapter 6. Furthermore, *zakah-ushr*[8] ordinance was enforced in 1980, therefore, in this chapter, we work with the data available for the years 1986-87, 1992-93 and 2001-02.

We begin to see the effect of *zakah-ushr* on the distribution of income in urban-rural areas by comparing the results of regression analysis carried out in chapter 5 with that of regression analysis in the presence of *zakah-ushr*. Our first set of analysis comprises the comparison between the results of with and without *zakah-ushr* regressions in urban areas in 1986-87, 1992-93 and 2001-02. In the second set we shall compare the results of the regressions for the rural areas worked out in chapter 5 and the results of the regressions with *zakah-ushr* for rural areas performed now in this chapter in 1986-87, 1992-93 and 2001-02. Finally a comparison among regressions of urban and rural with and without *zakah-ushr* will be carried out for both years. Note that collection of *zakah-ushr* by income brackets has been added in the amount of taxes paid by their respective

[7] See Shirazi, N. S. (1996).
[8] *Zakah* and *ushr*

income groups. While disbursement of *zakah-ushr* by income classes has been added in the government expenditures received by their respective income groups.[9]

7.1 Regressions for Urban Areas (with-without) *Zakah-Ushr*

The regression results for urban areas without *zakah* and *ushr* of chapter 5 and those computed now with *zakah* and *ushr* are given in the following table 7.1 for comparisons.

Table 7.1

Expenditure, tax and net benefit regressions of urban areas [with-without] *zakah-ushr*

Dependant Variables	Intercept			Slope			R^2		
	1986-87	1992-93	2001-02	1986-87	1992-93	2001-02	1986-87	1992-93	2001-02
Exp./ hh	16249	18897	35867	0.06	0.040	0.100	0.08	0.09	0.44
Tax / hh	-1016	-318	-3610	0.25	0.213	0.206	0.93	0.97	0.95
Net Ben / hh	17265	19215	39477	-0.190	-0.173	-0.106	0.62	0.69	0.55
Exp^Z / hh[10]	16618	19010	36070	0.052	0.039	0.097	0.07	0.09	0.43
Tax^Z / hh[11]	-1108	-327	-3661	0.252	0.215	0.207	0.93	0.97	0.95
Net^Z Ben / hh[12]	17726	19337	39731	-0.200	-0.176	-0.110	0.63	0.70	0.56

7.1.1 Expenditure Functions

A bird's eye view on the results of different regressions given in table 7.1 reveals that urban expenditure functions in 1986-87, 1992-93 and 2001-02 with *zakah-ushr* have become more regressive (pro-poor) than the expenditure functions of the same years in chapter 5. Similarly, all tax functions in these three years with *zakah-ushr* have become

[9] The regressions for the year 1986-87 and 2001-02 have number of observations, n = 12 and that of 1992-93 have n =11.
[10] Expenditure per household with *zakah and ushr*..
[11] Tax per household with *zakah and ushr*.
[12] Net benefit per household with *zakah and ushr*.

more progressive (pro-poor) than that of the tax functions given in chapter 5. Finally, the net benefit functions with *zakah-ushr* are also more pro-poor than their counterpart net benefit functions given in chapter 5 in 1986-87, 1992-93 and 2001-02.

Taking above cases turn by turn. In 1986-87, slope coefficient of the expenditure function without *zakah-ushr* is 0.060, while, in the same year, the slope coefficient with *zakah-ushr* has got the value equal to 0.052. Which is little less than the value of its counterpart slope coefficient calculated in chapter 5. Recall that larger expenditure slope advocates the progressive expenditures (pro-rich), while; smaller expenditure slope is considered to be pro-poor or advocates the regressivity in expenditures. Hence, in 1986-87, expenditure slope coefficient with *zakah-ushr* is more pro-poor (regressive) than the expenditure slope coefficient calculated without *zakah-ushr*. But, the difference between them is small i.e. 13 percent.

In 1992-93, expenditure slope coefficient without *zakah-ushr* is 0.04, while, with *zakah-ushr* it is equal to 0.039. The percentage decrease in the expenditure slope is only 2.5 percent. Hence, expenditure slope with *zakah-ushr* is more pro-poor than its counterpart expenditure slope without *zakah-ushr* by 2.5 percent in 1992-93. In 2001-02 the slope coefficient of the expenditure function without *zakah-ushr* is 0.10, while, in the same year, the slope coefficient with *zakah-ushr* has got the value equal to 0.097. Which is less than the value of its counterpart slope coefficient calculated in chapter 5 by 3 percent..

Table 7.2

Expenditure – percentage difference comparisons [with-without] *zakah-ushr* (urban) 1986-87, 1992-93 and 2001-02

Expenditure function	Percentage difference in expenditure functions (with-without) *zakah-ushr*		
Years	1986-87	1992-93	2001-02
Slope	13	2.5	3
Intercept	2.3	0.60	0.57

From table 7.2, it is clear that percentage difference in the slope coefficients of expenditure function (with-without) *zakah-ushr* is larger in 1986-87, smaller in 2001-02 and smallest in 1992-93. This trend shows that *zakah-ushr* system has become, from 1986-87 to 2001-02, decreasingly pro-poor.

Let us turn to the comparisons of expenditure intercepts (with-without) *zakah-ushr*. In 1986-87 expenditure intercept without *zakah-ushr* was 16249, while it was 16618 with *zakah-ushr* in that year. The percentage increase is 2.3 percent, as shown in table 7.2. Recall that, larger the intercept of expenditure function, larger the relative regressivity (pro-poor nature) in it and vice versa. It means that expenditure intercept with *zakah-ushr* is more pro-poor by 2.3 percent than the expenditure intercept without *zakah-ushr* in 1986-87. Similarly, in 1992-93 expenditure intercept without *zakah-ushr* was equal to 18897, while, it was with *zakah-ushr* equal to 19010. The percentage difference between the two is 0.60 percent. Hence, it can be said that expenditure intercept of urban areas in 1992-93 with *zakah-ushr* was 0.60 percent more pro-poor than its counterpart expenditure intercept without *zakah-ushr*. In 2001-02 expenditure intercept without *zakah-ushr* was 35867, while it was 36070 with *zakah-ushr* in that year. The percentage increase is 0.57 percent. It means that expenditure intercept with *zakah-ushr* is more pro-poor by 0.57 percent than the expenditure intercept without *zakah-ushr* in 2001-02.

As it was in the case of slope coefficient, the percentage difference in urban expenditure intercepts (with-without) *zakah-ushr* has decreased from 1986-87 (2.3 percent) to 0.60 percent and 0.57 percent in 1992-93 and 2001-02 respectively. As a whole, urban expenditure function with *zakah-ushr* has become more pro-poor (regressive) than the urban expenditure function without *zakah* and *ushr*.

7.1.2 Tax Functions

Turning to the comparison of urban tax functions (with-without) *zakah-ushr*, we again look at the regression results given in table 7.1. Also, recall that larger the slope coefficient of tax function the greater will be the relative progressivity in it and vice versa. Hence, tax slope coefficient with *zakah-ushr*, being 0.80 percent larger than the tax slope without *zakah-ushr*, is more pro-poor in 1986-87. In 1992-93, tax slope coefficient without *zakah-ushr* is 0.213 and with *zakah-ushr*, it is equal to 0.215. Here the percentage difference between the two is 0.94 percent. In other words, tax slope coefficient with *zakah-ushr* is more pro-poor (progressive) than the tax slope coefficient without *zakah-ushr* in the urban areas in 1992-93. In 2001-02, urban tax slope coefficient without *zakah-ushr* is equal to 0.206, while, it becomes equal to 0.207 when the effects of *zakah-ushr* are taken into consideration. The percentage difference is 0.49 percent.

Table 7.3

Tax – percentage difference comparisons [with-without] *zakah-ushr* (urban) 1986-87, 1992-93 and 2001-02

Tax function	Percentage difference in tax functions (with-without) *zakah-ushr* in urban areas		
Year	1986-87	1992-93	2001-02
Slope	0.80	0.94	0.49
Intercept	9.1	2.8	1.4

On the other hand, in 1986-87, tax intercept with the introduction of *zakah-ushr* has got the value equal to -1108, while its value before the introduction of *zakah-ushr* was -1016. Recall that smaller the tax intercepts, greater will be the progressivity in the tax function and vice versa. Therefore, in 1986-87, the negative tax intercept with *zakah-ushr*, being 9.1 percent smaller than its counterpart tax intercept without *zakah-ushr*, is more pro-poor (progressive). Similarly, in 1992-93, tax intercept without *zakah-ushr* is -318, while, it has value equal to -327 with *zakah-ushr*. The percentage difference

between the two is only 2.8 percent. It means that in 1992 tax intercept with *zakah-ushr* has become more pro-poor (progressive) than the tax intercept without *zakah-ushr*. In 2001-02, tax intercept without *zakah-ushr* is -3610, while, it has value equal to -3661 with *zakah-ushr*. The percentage difference between the two is only 1.4 percent. It means that in 2001-02 tax intercept with *zakah-ushr* has become more pro-poor (progressive) than the tax intercept without *zakah-ushr*.

The trend overtime, in the differences between the tax intercepts (with-without) *zakah-ushr* is strictly decreasing, as it is evident in table 7.3. However, trend overtime in the above mentioned differences cannot be shown clearly by using data of three years only. However, showing trend overtime is not our ultimate objective. In reality, we only want to show effect of *zakah and ushr* on the extent of progressivity (regressivity) in the tax (expenditure) functions of urban-rural areas. This goal has been targeted in our analysis. Up to now, we have seen that effect of *zakah-ushr* on the regressivity in expenditure function and progressivity in tax function is positive. In other words, the inclusion of *zakah-ushr* in our income distribution set up has increased the regressivity in expenditure function and the progressivity in the tax function.

7.1.3 Net Benefit Functions

Finally, we discern the influence of *zakah-ushr* on the urban net benefit functions found out in chapter 5. In table 7.1, the net benefit slope coefficient without *zakah-ushr* is equal to –0.190 in 1986-87 and in the same year this slope coefficient with *zakah-ushr* is equal to -0.200. The percentage difference between the two is 5.3 percent. Recall that, ceteris paribus, larger the absolute value of net benefit slope, with negative sign, the greater will be the relative pro-poor nature in it and vice versa. As net benefit slope after the inclusion of *zakah-ushr* is 5.3 percent, larger than the net benefit slope without *zakah-ushr*, hence, the former is more pro-poor than the later in urban areas, in 1986-87. In

1992-93, net benefit slope coefficient with *zakah-ushr* is -0.176, while the net benefit slope coefficient without *zakah-ushr* is -0.173. The percentage difference between the above two slope coefficients is 1.7 percent, as shown in table 7.4. Therefore, we can say that in 1992-93, net benefit slope coefficient with *zakah-ushr* is 1.7 percent more pro-poor than its counterpart, without *zakah-ushr* in urban areas. Similarly, in 2001-02 the net benefit slope coefficient without *zakah-ushr* is equal to –0.106 and in the same year this slope coefficient with *zakah-ushr* is equal to -0.110. The percentage difference between the two is 3.8 percent.

Table 7.4

Net benefit – percentage difference comparisons [with-without] *zakah-ushr* (urban) 1986-87, 1992-93 and 2001-02

Net benefit function	Percentage difference in net benefit functions [with-without] *zakah-ushr* in urban areas.		
Year	1986-87	1992-93	2001-02
Slope	5.3	1.7	3.8
Intercept	2.7	0.63	0.64

Now turning to the interpretation of intercepts of the net benefit functions in urban areas. In 1986-87, urban net benefit function without *zakah-ushr* has the intercept equal to 17265, while, the intercept of the net benefit function with *zakah-ushr* has value equal to 17726. The percentage difference between the two is 2.7 percent. Therefore net benefit intercept with *zakah-ushr* is 2.7 percent more pro-poor than the net benefit intercept without *zakah-ushr*. Recall that, relatively larger the net benefit intercept in absolute term greater will be the relative pro-poor nature in it and vice versa. In 1992-93, net benefit intercept without *zakah-ushr* is 19215, while with *zakah-ushr* it is equal to 19337. Hence the net benefit intercept with *zakah-ushr* is 0.63 percent more pro-poor than its counterpart net benefit intercept in 1992-93. Similarly, in 2001-02, urban net benefit function without *zakah-ushr* has the intercept equal to 39477, while, the intercept of the net benefit function with *zakah-ushr* has value equal to 39731. The percentage

difference between the two is 0.64 percent. Therefore net benefit intercept with *zakah-ushr* is 0.64 percent more pro-poor than the net benefit intercept without *zakah-ushr*. By examining table 7.4 it is clear that the effect of *zakah* and *ushr* system remained more pro-poor in 1986-87 than that in 1992-93 and 2001-02.

7.2 Regressions for Rural Areas (with-without) *Zakah-Ushr*

Now we compare the results of the regression analysis carried out for rural areas in chapter 5 with the results of regressions, which include the disbursement and collection of *zakah-ushr* by income brackets. This comparison is given in table 7.5. One can easily infer from these results that expenditure, tax and net benefit functions with *zakah-ushr* in rural areas have become more pro-poor than their counterparts without *zakah-ushr*. In the following lines, we shall discuss each set of functions turn by turn.

Table 7.5

Expenditure, tax and net benefit regressions for rural areas [with-without] *zakah-ushr*

Dependent Variable	Intercept			Slope			R^2		
	1986-87	1992-93	2001-02	1986-87	1992-93	2001-02	1986-87	1992-93	2001-02
Exp / hh	4114	8862	12716	0.1696	0.1198	0.1103	0.57	.59	0.79
Tax / hh.	1100	2590	2834	0.092	0.071	0.1026	0.97	.95	0.68
Net Ben / hh	3014	6272	9882	0.078	0.049	0.008	0.19	.16	0.02
Exp^2 / hh	4212	9180	13138	0.1685	0.1173	0.1098	0.56	0.58	0.75
Tax^2 / hh	1092	2578	2879	0.094	0.074	0.1040	0.97	0.96	0.68
Net^2 Ben / hh	3120	6602	10259	0.075	0.043	0.006	0.18	0.13	0.01

7.2.1 Expenditure Functions

In table 7.5, the slope of rural expenditure function without *zakah-ushr* in the year 1986-87 is 0.1696, while this slope coefficient with *zakah-ushr* has decreased to 0.1685 in the same year. The percentage difference between these two slope coefficients is 0.65 percent. Hence, it can be said that in 1986-87 expenditure slope coefficient with *zakah-ushr* is 0.65 percent more pro-poor than the expenditure slope coefficient without *zakah-*

ushr. In 1992-93, rural expenditure slope coefficient without *zakah-ushr* is 0.1198 and its counterpart coefficient with *zakah-ushr* has value equal to 0.1173. The percentage difference between the above two slope coefficients is 2.1 percent. Therefore, later is 2.1 percent more pro-poor than the former. Similarly, the slope of rural expenditure function without *zakah-ushr* in the year 2001-02 is 0.1103, while this slope coefficient with *zakah-ushr* has decreased to 0.1098 in the same year. The percentage difference between these two slope coefficients is 0.45 percent.

Table 7.6

Expenditure – percentage difference comparisons [with-without] *zakah-ushr* (rural) 1986-87, 1992-93 and 2001-02

Expenditure function	Percentage difference in expenditure functions [with-without] *zakah-ushr* in rural areas		
Year	1986-87	1992-93	2001-02
Slope	0.65	2.1	0.45
Intercept	2.4	3.6	3.3

We can see in table 7.6, that percentage difference between expenditure slopes with and without *zakah-ushr* in rural areas has increased from 0.65 percent in 1986-87 to 2.1 percent in 1992-93 and then decreased to 0.45 in 2001-02. On the other hand, expenditure intercept without *zakah-ushr* in 1986-87 is equal to 4114, while this intercept with *zakah-ushr* has value equal to 4212. Recall that, opposite to expenditure slope coefficient, relative increase in expenditure intercept means increase in the pro-poor nature in the expenditure function and vice versa. Therefore, it is clear that 2.4 percent increase in the intercept, due to inclusion of *zakah-ushr* element in the data has made it more pro-poor by this percentage than its counterpart expenditure intercept without *zakah-ushr*.

Similarly, in 1992-93, expenditure intercept without *zakah-ushr* is equal to 8862, while, this intercept with *zakah-ushr* has got the value equal to 9180. In percentage term,

the difference in these intercepts is 3.6 percent. In other words, expenditure intercept with *zakah-ushr* is 3.6 percent more pro-poor than its counterpart expenditure intercept without *zakah-ushr* in rural areas. Finally, the expenditure intercept without *zakah-ushr* in 2001-02 is equal to 12716, while this intercept with *zakah-ushr* has value equal to 13138. The increase in the expenditure intercept is 3.3 percent. By looking at table 7.6 it is clear that expenditure function in rural areas with *zakah* and *ushr* was relatively more pro-poor in 1992-93 than in 1986-87 and 2001-02.

7.2.2 Tax Functions

In table 7.5, tax slope coefficient without *zakah-ushr*, in 1986-87 is 0.092. While, with *zakah-ushr*, it is equal to 0.094. The percentage difference between them is 2.2 percent. In other words, tax slope coefficient with *zakah-ushr* is 2.2 percent more pro-poor (progressive) than its counterpart tax slope without *zakah-ushr* in 1986-87. Whereas, in 1992-93 tax slope coefficient without *zakah-ushr* is 0.071, while, this coefficient with *zakah-ushr* has the value equal to 0.074 in the same year. The percentage difference between these two slope coefficients is 4.2 percent. One can say that in 1992-93 rural tax slope coefficient with *zakah-ushr* is 4.2 percent more progressive (pro-poor) than the tax slope coefficient without *zakah-ushr* in the same year. Finally, tax slope coefficient without *zakah-ushr*, in 2001-02 is 0.1026. While, with *zakah-ushr*, it is equal to 0.1040. The percentage difference between them is 1.36 percent.

Table 7.7

Tax – percentage difference comparisons [with-without] *zakah-ushr* (rural) 1986-87, 1992-93 and 2001-02

Tax function	Percentage difference in tax functions [with-without] *zakah-ushr* in rural areas		
Year	1986-87	1992-93	2001-02
Slope	2.2	4.2	1.36
Intercept	0.73	0.46	1.59

On the other hand, tax intercept in 1986-87 without *zakah and ushr* in table 7.5 is equal to 1100, while, it is with *zakah-ushr* is equal to 1092. The percentage difference between the two is 0.73 percent (table 7.7). Therefore, tax intercept with *zakah-ushr* is 0.73 percent more pro-poor than this intercept without *zakah-ushr* in 1986-87 in rural areas. Whereas, in 1992-93 rural tax intercept without *zakah-ushr* has value equal to 2590, while, it has value with zakah-ushr equal to 2578. Percentage difference between the two is only 0.46 percent. Similarly, in 2001-02 rural tax intercept without *zakah-ushr* has value equal to 2834, while, it has value with *zakah-ushr* equal to 2879. Percentage difference between the two is now 1.59 percent. Here, the percentage difference between the tax intercepts has decreased in 1986-87 and then increased in 2001-02. However, in the next section the quantum of these percentage differences would guide us to see the relative effectiveness of *zakah-ushr* system in urban-rural areas in above-mentioned three selected years.

7.2.3 Net Benefit Functions

Again looking at table 7.5, the net benefit slope coefficient without *zakah-ushr* in 1986-87, is 0.078, while, this slope coefficient has got the value 0.075 with the inclusion of *zakah-ushr* in that year. Here the percentage difference between these coefficients is 3.8 percent. In other words, rural net benefit slope coefficient with *zakah-ushr* in 1986-87 is 3.8 percent more pro-poor than its counterpart slope coefficient in that year.

Whereas, in 1992-93, the rural net slope coefficient is 0.049 without inclusion of *zakah-ushr*. While, it becomes equal to 0.043 due to *zakah-ushr* element in the regression analysis. Furthermore, in this case the net benefit slope coefficients are positive. Recall that we have discussed the qualitative and quantitative nature of net benefit slopes in chapter 5. In short, relatively smaller positive net benefit slope coefficient advocates the

relatively greater pro-poor nature and vice-versa. Therefore, relatively smaller positive net benefit slope coefficient (0.043) is more pro-poor than its counterpart slope coefficient having somewhat larger positive value equal to 0.049. Here the percentage difference between the net benefit slope coefficient with and without *zakah-ushr* is only 12.2 percent. Finally, the net benefit slope coefficient without *zakah-ushr* in 2001-02, is 0.008, while, this slope coefficient has got the value 0.006 with the inclusion of *zakah-ushr* in that year. Here the percentage difference between these coefficients is 25 percent.

Table 7.8

Net benefit – percentage difference comparisons [with-without] *zakah-ushr* (rural) 1986-87, 1992-93 and 2001-02

Net benefit function	Percentage difference in net benefit functions [with-without] *zakah-ushr* in rural areas		
Year	1986-87	1992-93	2001-02
Slope	3.8	12.2	25
Intercept	3.5	5.3	3.8

On the other hand, net benefit intercept without *zakah-ushr* in 1986-87 is equal to 3014, while, it is with *zakah-ushr* equal to 3120. The percentage difference between these two types of coefficients is 3.5 percent (table 7.8). Therefore, net benefit intercept with *zakah-ushr* is 3.5 percent more pro-poor than the net benefit intercept without *zakah-ushr* in rural areas in 1986-87. While, in 1992-93 rural net benefit intercept without *zakah-ushr*, calculated in chapter 5, equal to 6272 and its counterpart intercept with *zakah-ushr* has value 6602. The percentage difference between them is 5.3 percent. In other words, net benefit intercept with *zakah-ushr* in 1992-93 is 5.3 percent more pro-poor than its counterpart net benefit intercept without *zakah-ushr*. Similarly, the net benefit intercept without *zakah-ushr* in 2001-02 is equal to 9882, while, it is with *zakah-ushr* equal to 10259. The percentage difference between these two types of coefficients is 3.8 percent

Recall that these intercepts belong to positive net benefit functions rather than negative one. However, increase in intercept due to inclusion of *zakah-ushr* is still pro-poor, as the intercepts are the estimated rupees worth of gain or loss at zero income. Obviously, increase in net benefit intercepts always favour low-income groups or strictly saying zero-income groups and vice versa. Summing up the above discussion, the rural net benefit function in 2001-02 with *zakah-ushr* seems to be more pro-poor than its counterpart rural net benefit function in 1986-87 and 1992-93 with *zakah-ushr*.

7.3 Urban versus Rural Regressions (with- without) *Zakah-Ushr*

The results of urban-rural regressions with and without *zakah-ushr* are given in table 7.9. We shall compare turn by turn the expenditure, tax, and net benefit functions with and without *zakah-ushr* in the years 1986-87, 1992-93 and 2001-02. These sets of comparisons will tell us about relative effectiveness of *zakah-ushr* system in urban-rural areas. Let us start with first set of comparison i.e. comparing expenditure functions of urban-rural areas.

Table 7.9

Expenditure, tax and net benefit regressions of urban-rural areas [with-without] *zakah-ushr* 1986-87 and 1992-93 and 2001-02

Urban-Rural Regressions [with-without] *Zakah-Ushr*									
Dependent Variable	Intercept			Slope			R^2		
	1986-87	1992-93	2001-02	1986-87	1992-93	2001-02	1986-87	1992-93	2001-02
URBAN									
Exp / hh	16249	18897	35867	0.060	0.040	0.100	0.08	0.09	0.44
Tax / hh	-1016	-318	-3610	0.250	0.213	0.206	0.93	0.97	0.95
Net / hh	17265	19215	39477	-0.190	-0.173	-0.106	0.62	0.69	0.55
Exp^Z / hh	16618	19010	36070	0.052	0.039	0.097	0.07	0.09	0.43
Tax^Z/ hh	-1108	-327	-3661	0.252	0.215	0.207	0.93	0.97	0.95
Net^Z Ben / hh	17726	19337	39731	-0.200	-0.176	-0.110	0.63	0.70	0.56
RURAL									
Exp / hh	4114	8862	12716	0.1696	0.1198	0.1103	0.57	.59	0.79
Tax / hh	1100	2590	2834	0.092	0.071	0.1026	0.97	.95	0.68
Net Ben / hh	3014	6272	9882	0.078	0.049	0.008	0.19	.16	0.02
Exp^Z / hh	4212	9180	13138	0.1685	0.1173	0.1098	0.56	0.58	0.75
Tax^Z/hh	1092	2578	2879	0.094	0.074	0.1040	0.97	0.96	0.68
Net^Z Ben / hh	3120	6602	10259	0.075	0.043	0.006	0.18	0.13	0.01

7.3.1 Expenditure functions

Table 7.10 is produced on the basis of the information given in table 7.2 and 7.6. Here, in 1986-87 the percentage decrease in the urban expenditure slope due to the introduction of *zakah* and *ushr* in the regression analysis 13 percent. While, the same decrease in the rural slope coefficient is only 0.65 percent. Recall that, lesser the expenditure slope coefficient greater will be the regressivity (pro-poor nature) in the expenditure function and vice-versa. Hence, urban slope coefficient is 1900 percent more pro-poor than rural slope coefficient after the inclusion of *zakah* and *ushr* system in the regression analysis in 1986-87. In 1992-93 the decrease in urban expenditure slope coefficient in only 2.5 percent, while, this decrease in 1992-93 in rural areas is 2.1 percent. Hence, rural slope coefficient is now 19 percent more pro-poor than its urban counterpart. Similarly, in 2001-02 the decrease in urban expenditure slope coefficient in 3 percent, while, this decrease in the same year in rural areas is 0.45 percent. Hence, rural slope coefficient is now 567 percent more pro-poor than its urban counterpart.

Table 7.10

Expenditure – percentage difference comparisons [with-without] *zakah-ushr* (urban-rural) 1986-87, 1992-93 and 2001-02

Expenditure function	Percentage change in expenditure functions (with-without) *zakah-ushr*		
Years	1986-87	1992-93	2001-02
Slope (urban)	13	2.5	3
Slope (rural)	0.65	2.1	0.45
Intercept (urban)	2.3	0.60	0.57
Intercept (rural)	2.4	3.6	3.3
Percentage difference in urban-rural percentage change in slope	1900	19	567
Percentage difference in urban-rural percentage change in intercept	4.3	500	479

On the other hand, the percentage increase in the urban expenditure intercept due to the introduction of *zakah* and *ushr* in the regression analysis in 1986-87 is 2.3 percent. While, the same increase in the rural intercept is 2.4 percent. Recall that, larger the expenditure intercept greater will be the regressivity (pro-poor nature) in the expenditure function and vice-versa. Therefore, rural expenditure intercept is 4.3 percent more pro-poor than its urban counterpart in 1986-87. In 1992-93 the percentage increase in the urban expenditure intercept after the introduction of *zakah* and *ushr* system in the regression analysis is only 0.60 percent. While, this increase in the rural intercept is 3.6 percent. Hence, rural expenditure intercept is 500 percent more pro-poor than its urban counterpart in 1992-93. In 2001-02 the percentage increase in the urban expenditure intercept after the introduction of *zakah* and *ushr* system in the regression analysis is only 0.57 percent. While, this increase in the rural intercept is 3.3 percent. Hence, rural expenditure intercept is 479 percent more pro-poor than its urban counterpart.

7.3.2 Tax functions

By discerning table 7.9, it is clear that all tax functions in urban areas are qualitatively progressive (having negative intercepts). While all tax function in rural areas are qualitatively regressive (having positive intercepts). Recall that, larger the tax slope coefficient greater will be the pro-poor nature in the tax function and vice-versa and relatively larger the tax intercept, relatively lesser will be the progressivity (pro-poor nature) in it and vice versa. But in our comparison, all urban intercepts are negative, while, all rural intercepts are positive. For a tax intercept with negative sign, the larger its absolute value the lesser will be its actual value and vice versa.

Table 7.11

Tax– percentage difference comparisons [with-without] *zakah-ushr* (urban-rural) 1986-87, 1992-93 and 2001-02

Tax function	Percentage change in tax functions (with-without) *zakah-ushr*		
Years	1986-87	1992-93	2001-02
Slope (urban)	0.80	0.94	0.49
Slope (rural)	2.2	4.2	1.36
Intercept (urban)	9.1	2.8	1.4
Intercept (rural)	0.73	0.46	1.59
Percentage difference in urban-rural percentage change in slope	175	347	178
Percentage difference in urban-rural percentage change in intercept	1147	509	14

Table 7.11 is produced on the basis of the information given in table 7.3 and 7.7. In 1986-87 the percentage increase in the urban tax slope due to the introduction of *zakah* and *ushr* in the regression analysis 0.80 percent. While, the same increase in the rural slope coefficient is 2.2 percent. Recall that larger the tax slope coefficient greater will be the pro-poor nature in the tax function and vice-versa. Hence, rural slope coefficient is 175 percent more pro-poor than urban slope coefficient after the inclusion of *zakah* and *ushr* system in the regression analysis in 1986-87. In 1992-93 the increase in urban tax slope coefficient in only 0.94 percent, while, this increase in rural areas is 4.2 percent in 1992-93. Hence, rural tax slope coefficient is now 347 percent more pro-poor than its urban counterpart. In 2001-02 the increase in urban tax slope coefficient in 0.49 percent, while, this increase in rural areas is 1.36 percent. Hence, rural tax slope coefficient is now 178 percent more pro-poor than its urban counterpart.

On the other hand, the percentage decrease in the urban tax intercept due to the introduction of *zakah* and *ushr* in 1986-87 is 9.1 percent. While, the same decrease in the rural intercept is only 0.73 percent. Recall that, smaller the taxes intercept the greater will be the pro-poor nature in the tax function and vice-versa. Therefore, urban tax intercept is 1147 percent more pro-poor than its rural counterpart in 1986-87. Similarly, in 1992-93 the percentage decrease in the urban tax intercept after the introduction of *zakah* and *ushr* system in the regression analysis is 2.8 percent. While, this decrease in the rural intercept

is 0.46 percent. Hence, urban tax intercept is 509 percent more pro-poor than its rural counterpart. While, in 2001-02 the percentage decrease in the urban tax intercept after the introduction of *zakah* and *ushr* system in the regression analysis is 1.4 percent. While, this decrease in the rural intercept is 1.59 percent. Now, rural tax intercept is 14 percent more pro-poor than its urban counterpart.

7.3.3 Net Benefit Functions

Table 7.12 is produced on the basis of the information given in table 7.4 and 7.8. Recall that, ceteris paribus, larger the absolute value of net benefit slope, with negative sign, the greater will be the relative pro-poor nature in it and vice versa. Also, relatively smaller positive net benefit slope coefficient advocates the relatively greater pro-poor nature in the net benefit function and vice-versa. In 1986-87 the percentage increase in the negative urban net benefit slope due to the introduction of *zakah* and *ushr* in the regression analysis is 5.3 percent. While, the decrease in the positive rural slope coefficient is 3.8 percent. Hence, urban net benefit slope coefficient is 39 percent more pro-poor than that of rural slope coefficient after the inclusion of *zakah* and *ushr* system in the regression analysis in 1986-87. In 1992-93 the increase in negative urban net benefit slope coefficient in 1.7 percent, while, decrease in positive rural net benefit slope coefficient is 12.2 percent due to *zakah* and *ushr*. Hence, rural slope coefficient is 618 percent more pro-poor than its urban counterpart in 1992-93. In 2001-02 the increase in negative urban net benefit slope coefficient in 3.8 percent, while, decrease in positive rural net benefit slope coefficient is 25 percent due to *zakah* and *ushr*. Hence, rural slope coefficient is 558 percent more pro-poor than its urban counterpart

Table 7.12

Net Benefit– percentage difference comparisons [with-without] *zakah-ushr* (urban-rural) 1986-87, 1992-93 and 2001-02

Net Benefit function	Percentage change in net benefit functions (with-without) *zakah-ushr*		
Years	1986-87	1992-93	2001-02
Slope (urban)	5.3	1.7	3.8
Slope (rural)	3.8	12.2	25
Intercept (urban)	2.7	0.63	0.64
Intercept (rural)	3.5	5.3	3.8
Percentage difference in urban-rural percentage change in slope	39	618	558
Percentage difference in urban-rural percentage change in intercept	30	741	494

On the other hand, the percentage increase in the urban net benefit intercept due to the introduction of *zakah* and *ushr* in the regression analysis in 1986-87 is 2.7 percent. While, the same increase in the rural intercept is 3.5 percent. Recall that, larger the net benefit intercept greater will be the pro-poor nature in the net benefit function and vice-versa. Therefore, rural net benefit intercept is 30 percent more pro-poor than its urban counterpart in 1986-87. Similarly, in 1992-93 the percentage increase in the urban net benefit intercept after the introduction of *zakah* and *ushr* system in the regression analysis is only 0.63 percent. While, this increase in its counterpart rural intercept is 5.3 percent. Hence, in this case rural net benefit intercept is 741 percent more pro-poor than its urban counterpart.

Finally, in 2001-02 the percentage increase in the urban net benefit intercept after the introduction of *zakah* and *ushr* system in the regression analysis is only 0.64 percent. While, this increase in its counterpart rural intercept is 3.8 percent. Hence, in this case rural net benefit intercept is 494 percent more pro-poor than its urban counterpart. Summing up the above results, in 1986-87, 1992-93 and 2001-02 due to inclusion of *zakah-ushr* system in our regression analysis, pro-poor nature in both urban-rural net

benefit functions has increased. However, in 1986-87 the net effects of *zakah-ushr* system in providing more equal distribution of income were slightly more effective, in urban areas than in rural areas. As favouring urban areas, percentage difference in urban-rural percentage change in slope (39 percent) was slightly larger than the counterpart percentage difference (30 percent), favouring rural areas in 1986-87. Whereas, in 1992-93 and 2001-02 rural net benefit function due to *zakah* and *ushr* had become more pro-poor than its counterpart net benefit function in urban areas.

7.4 Effects of *Zakah-Ushr* on (Urban- Rural) Gini Ratios and Lorenz Curves

In chapter 6 Gini ratios of pre- and post- fiscal incidence for urban-rural areas in the four selected years were calculated for comparisons. In this chapter we shall see the effect of *zakah-ushr* system on the magnitude of post-fiscal Gini ratios. As it has already been explained that we could not include our one of the four selected years i.e. 1979, due to unavailability of data on *zakah-ushr* in that year. However, we shall perform above-mentioned comparisons for the years 1986-87, 1992-93 and 2001-02. This section also comprise three sets of comparisons (1) pre- and post- *zakah-ushr* incidence in urban areas, (2) pre- and post- *zakah-ushr* incidence in rural areas and (3) urban verses rural, pre- and post- *zakah-ushr* incidence.

7.4.1 Pre- and Post- *Zakah-Ushr* Incidence in Urban Areas

In the preceding section, results of the regression analysis with and without *zakah-ushr* ensure that the inclusion of *zakah-ushr* system in the regression analysis always brings favorable changes in terms of better distribution among different groups of the society. Therefore, it can be anticipated that with the introduction of *zakah-ushr*

system in our analysis, the values of all Gini ratios should be smaller than their values without *zakah-ushr*. In table 7.13, post-fiscal concentration ratios of chapter 6 (pre-*zakah-ushr*) and their counterpart ratios with *zakah-ushr* for urban areas are given for comparisons.

Table 7.13

Concentration coefficients – pre- and post- *zakah-ushr* (urban) 1986-87, 1992-93 and 2001-02

Year	1986-87	1992-93	2001-02
Pre- *zakah-ushr* concentration ratio	0.2831	0.2555	0.29952
Post- *zakah-ushr* concentration ratio	0.2804	0.2545	0.29950
Percentage decrease	0.95	0.39	0.007

It is obvious in table 7.13 that post- *zakah-ushr* urban concentration ratios in 1986-87 and 1992-93 are smaller than pre- *zakah-ushr* urban concentration ratios in the same years. As in 1986-87, pre-*zakah-ushr* coefficient in urban areas is 0.2831, while post- *zakah-ushr* urban concentration coefficient is equal to 0.2808. The percentage decrease in urban concentration ratio (pre-*zakah-ushr*) is 0.95 percent. Hence, in 1986-87 due to *zakah-ushr* incidence, the distribution of income has become biased toward lower income groups in urban areas. Equivalently saying, in 1986-87 after the introduction of *zakah and ushr* in the analysis distribution of income has become relatively more equal than it was without *zakah* and *ushr* in urban areas.

Similarly in 1992-93, pre- *zakah-ushr* urban concentration coefficient is 0.2555 and its counterpart post- *zakah-ushr* concentration ratio has value equal to 0.2545. The percentage decrease in the pre- *zakah-ushr* urban concentration ratio is 0.39 percent. Hence, in 1992-93 after *zakah-ushr* incidence the distribution of income in urban areas has become fairer than it was in the pre- *zakah-ushr* era. Finally, in 2001-02 pre- *zakah-ushr* urban concentration coefficient is 0.29952 and its counterpart post- *zakah-ushr* concentration ratio has value equal to 0.29950. The percentage decrease in the pre-*zakah-ushr* urban concentration ratio is only 0.007 percent. Hence, in 2001-02 the

distributive effects of *zakah-ushr* in urban areas are negligible. In summary, the distributions of income after the introduction of *zakah-ushr* in the analysis have become more equal in 1986-87, 1992-93 and 2001-02. However, it is clear in table 7.13 that pro-poor behaviour of *zakah-ushr* system in urban areas is decreasing overtime.

7.4.2 Pre- and Post- *Zakah-Ushr* Incidence in Rural Areas

In table 7.14 the values of pre- *zakah-ushr* and post- *zakah-ushr* concentration ratios in rural areas are given for comparisons. In 1986-87 pre *zakah-ushr* rural concentration ratio is 0.2859, while, post *zakah-ushr* rural concentration ratio in the same year is 0.2851. The percentage decrease in pre *zakah-ushr* rural concentration ratio is 0.28 percent. Thus, due to *zakah-ushr* incidence the distribution of income in rural areas in 1986-87 has become more equal than before by 0.28 percent.

By the same token, in 1992-93 pre *zakah-ushr* rural Gini ratio is 0.3309 and corresponding post *zakah-ushr* rural concentration ratio is equal to 0.3279. The percentage decrease in pre- *zakah-ushr* rural concentration ratio, in this case, is 0.91 percent. Hence, post- *zakah-ushr* income distribution has become more egalitarian than the pre- *zakah-ushr* income distribution in rural areas in 1992-93. Finally, in 2001-02 pre *zakah-ushr* rural concentration ratio is 0.4726, while, post *zakah-ushr* rural concentration ratio in the same year is 0.4719. The percentage decrease in pre *zakah-ushr* rural concentration ratio is 0.15 percent. Thus, due to *zakah-ushr* incidence the distribution of income in rural areas in 1986-87 has become more equal than before by 0.15 percent.

In summary, the introduction of *zakah-ushr* system in the analysis caused a reduction in the pre- *zakah-ushr* concentration ratios of rural areas in all three years i.e. 1986-87, 1992-93 and 2001-02. Secondly, the percentage decrease in pre- *zakah-ushr* concentration ratios of rural areas is relatively larger in 1992-93 than in 1986-87 and 2001-02.

Table 7.14

Concentration coefficients – pre- and post- *zakah-ushr* (rural) 1986-87, 1992-93 and 2001-02

Year	1986-87	1992-93	2001-02
Pre *zakah-ushr* concentration ratio	0.2859	0.3309	0.4726
Post *zakah-ushr* concentration ratio	0.2851	0.3279	0.4719
Percentage decrease	0.28	0.91	0.15

7.4.3 Urban versus Rural Pre- and Post- *Zakah-Ushr* Incidence

The results given in tables 7.13 and 7.14 are jointly quoted for comparisons in table 7.15. In 1986-87 percentage decrease in pre- *zakah-ushr* urban concentration ratio due to the introduction of *zakah-ushr* system in the analysis is 0.95 percent. which means that post- *zakah-ushr* urban concentration ratio is 0.95 percent more pro-poor or having 0.95 percent more equally distributed income relative to pre- *zakah-ushr* concentration ratio in urban areas in 1986-87. While, percentage decrease in its counterpart rural pre-*zakah-ushr* concentration ratio is only 0.28 percent after the inclusion of *zakah-ushr* in the analysis. Which also shows 0.28 percent more pro-poor nature or more equal distribution of income in post- *zakah-ushr* rural concentration ratio relative to pre-*zakah-ushr* rural concentration ratio in 1986-87.

Table 7.15

Concentration coefficients – pre- and post- *zakah-ushr* (urban-rural) 1986-87, 1992-93 and 2001-02

Year		1986-87	1992-93	2001-02
Urban	Pre-*zakah-ushr* concentration ratio	0.2831	0.2555	0.29952
	Post *zakah-ushr* concentration ratio	0.2804	0.2545	0.29950
Rural	Pre-*zakah-ushr* concentration ratio	0.2859	0.3309	0.4726
	Post *zakah-ushr* concentration ratio	0.2851	0.3279	0.4719
Percentage decrease in urban conc. ratio		0.95	0.39	0.007
Percentage decrease in rural conc. ratio		0.28	0.91	0.15
Difference in the urban-rural percentage decreases in conc. ratio		239	133	2043

Consequently, difference in the above urban-rural decreases is equal to 239 percent. Which means that urban post- *zakah-ushr* concentration ratio is 239 percent more pro-poor or having 239 percent more equal distribution than its counterpart post-*zakah-ushr* rural concentration ratio in 1986-87. Hence, it can be concluded that urban areas have been benefited by the introduction of *zakah-ushr* system in terms of acquiring 239 percent more equal distribution than its counterpart rural areas in 1986-87.

On the other hand, in 1992-93 percentages decrease in urban pre- *zakah-ushr* concentration coefficient after the inclusion of *zakah-ushr* system in the analysis is 0.39 percent. Which means that in urban areas post- *zakah-ushr* concentration ratio represented 0.39 percent more equal distribution of income relative to pre- *zakah-ushr* concentration coefficient in 1992-93. Similarly, in the same year, the percentage decrease in rural Gini ratio due to the *zakah-ushr* system is 0.91 percent. Which means that in rural areas post- *zakah-ushr* concentration ratio represented 0.91 percent more equal distribution of income relative to pre- *zakah-ushr* concentration coefficient in 1992-93. Moreover, the difference between above mentioned urban-rural decreases in the pre-*zakah-ushr* concetration ratios is equal to 133 percent. Which means that rural post-*zakah-ushr* concentration ratio shows 133 percent more egalitarian income distribution than the urban post- *zakah-ushr* concentration ratio in 1992-93.

Finally, in 2001-02 percentage decrease in pre- *zakah-ushr* urban concentration ratio after the introduction of *zakah-ushr* system in the analysis is only 0.007 percent, which means that post- *zakah-ushr* urban concentration ratio is 0.007 percent more pro-poor relative to pre- *zakah-ushr* concentration ratio in urban areas in 2001-02. While, percentage decrease in its counterpart rural pre- *zakah-ushr* concentration ratio is 0.15 percent. Which shows 0.15 percent more pro-poor nature or more equal distribution of income in post- *zakah-ushr* rural concentration ratio relative to that of pre-*zakah*-ushr concetration ratio in 2001-02.

In summary, the *zakah-ushr* system is very helpful in achieving the goal of equal distribution of income in the society. As in all three years, the values of pre- *zakah-ushr* concentration ratios for urban- rural areas have decreased after the introduction of *zakah-ushr* system in the analysis. However, extent of these decreases can be known by comparing the degree of egalitarian distribution acquired due to *zakah-ushr* system in urban-rural areas in 1986-87, 1992-93 and 2001-02. In 1986-87, percentage decrease in urban pre- *zakah-ushr* Gini ratio is larger (0.95 percent) than its rural counterpart (0.28 percent). Hence, in 1986-87, urban areas have been benefited more in terms of acquiring more equal distribution of income by the application of *zakah-ushr* than their counterpart rural areas. In 1992-93 and 2001-02, rural areas have got more benefits from the system of *zakah-ushr*, in terms of having more egalitarian distribution of income among their households, belonging to different income groups than their counterpart urban areas.

Furthermore, these results of pre- and post- concentration ratios are quite consistent with the results of regression analyses with and without *zakah-ushr* for the urban-rural areas in 1986-87, 1992-93 and 2001-02. For example, in 1986-87 Gini ratio analysis as well as regression analysis both settled down at the same conclusion that the net effects of *zakah-ushr* system were relatively more effective, in terms of providing more equal distribution of income, in the urban areas than in rural areas. By the same token, in 1992-93 and 2001-02, Gini ratio and regression analyses have shown that the *zakah-ushr* system has more pro-poor distributive impacts on rural areas than that of the urban areas. Hence, the results of both type of analyses support each other. At the end of this chapter, figures 7.1, 7.2, 7.3, 7.4, 7.5 and 7.6 for pre-, post-fiscal and post- *zakah*[13] Lorenz and concentration curves have been depicted for urban-rural areas in 1986-87, 1992-93 and 2001-02. By discerning these figures, one can say that the shapes and positions of these curves coincide with the values of Gini and concentration ratios for urban-rural areas in 1986-87, 1992-93 and 2001-02.

[13] Here post-*zakah* means post-*zakah and ushr*.

7.5 Significance Tests

To execute a formal statistical test for differences in income distributions within urban-rural areas (pre-fiscal and post- *zakah-ushr*) and between urban-rural areas (post- and post- *zakah-ushr*) in the same year or across the alternative years (post- and post- *zakah-ushr*), we follow the procedure described in chapter 6. The data has been fitted to the equation 6.1, after including effects of disbursement and collection of *zakah* and *ushr* in urban-rural areas in 1986-87, 1992-93 and 2001-02. The values of post- *zakah* and *ushr* β, $t-values$ and R^2 thus produced by applying OLS operation on equation 6.1 are shown in table 7.16. In the same table pre- and post- fiscal OLS items are also given for comparisons. Post- *zakah-ushr* concentration ratios have been calculated by using equation 6.2 of chapter 6, and their values have been shown in the same table (7.16) along with their pre- and post- fiscal counterparts for comparisons.

In table 7.16, it is evident that the values of estimated urban-rural post-*zakah-ushr* βs are smaller than the values of their counterpart post-fiscal βs in all years except in urban 2001-02. Consequently, post- *zakah-ushr* concentration ratios are also smaller than their counterpart post- fiscal ratios in urban-rural areas in all year except in urban 2001-02. This informally shows that after the inclusion of *zakah* and *ushr* system in the post-fiscal data the distributions of income have become more equal in urban-rural areas in 1986- 87, 1992- 93 and rural 2001-02. However, in case of urban 2001-02, distributive impacts of *zakah-ushr* are not favourable in equalizing the distribution of income in urban areas as post- *zakah-ushr* concentration ratio (0.2197) is larger than that of the post fiscal concentration ratio (0.2177).

Table 7.16

Results for Lorenz estimation– urban-rural (*zakah-ushr*)

OLS Experiment Items	1986- 87		1992- 93		2001- 02	
Pre- Fiscal						
β	Urban	Rural	Urban	Rural	Urban	Rural
	1.53	1.23	1.65	1.48	2.04	2.45
$t-ratio$	27.2	30.2	21.2	23.0	14.7	31.89
R^2	0.95	0.97	0.92	0.95	0.87	0.98
$Gini-ratio$	0.3622	0.3095	0.3813	0.3539	0.4377	0.4881
Post- Fiscal						
	Urban	Rural	Urban	Rural	Urban	Rural
β	0.66	0.93	0.514	1.13	0.7856	2.35
$t-ratio$	9.7	23.4	5.28	21.0	10.3	31.2
R^2	0.40	0.95	0.56	0.92	0.50	0.98
$Concentration-ratio$	0.1878	0.2494	0.1514	0.2905	0.2177	0.4766
Post- *Zakah-Ushr*						
	Urban	Rural	Urban	Rural	Urban	Rural
β	0.65	0.92	0.51	1.11	0.795	2.347
$t-ratio$	9.3	23.2	5.24	20.3	10.38	31.03
R^2	0.35	0.95	0.57	0.92	0.52	0.98
$Concentration-ratio$	0.1858	0.2474	0.1503	0.2864	0.2197	0.4762

A formal statistical test (Chow test) for differences in pre-fiscal and post- *zakah* and *ushr* income distributions has been conducted for equality of regression coefficients as described earlier in chapter 6. By applying Chow tests, the results of five types of experiments in the presence of *zakah* and *ushr* system are shown in table 7.17. We can see that little larger values of $F-ratios$ with *zakah* and *ushr* carry relatively more significant results than that of the post- fiscal $F-ratios$.

In first experiment urban regression coefficients for the pre-fiscal distributions are statistically significantly different from their urban counterparts for the post- *zakah* and *ushr* distributions at the 1 percent level and showing values of $F-ratios$ relatively

larger than $F-ratios$ of the first experiment executed in chapter 6 except in case of 2001-02, where the F- ratio with *zakah* and *ushr* is smaller than that of the corresponding post- fiscal ratio given in table 6.5. In second experiment rural regression coefficients for the pre-fiscal distributions are statistically more significantly different from their rural counterparts for the post- *zakah* and *ushr* distributions at the 1 percent level than that of the significant differences in the pre- and post- fiscal distributions given in chapter 6 (see table 6.5). This shows that pre- fiscal Gini and post- *zakah* and *ushr* concentration ratios in urban and rural areas possess significantly more different distributions than that of the pre-fiscal Gini ratios and the post- fiscal concentration ratios in each year. Hence, *zakah* and *ushr* system significantly decrease the final (post- *zakah* and *ushr*) income inequalities in both urban and rural areas in all three years except in urban 2001-02.

In the third experiment post- *zakah* and *ushr* urban-rural inequality coefficients are compared in each year. In 1986-87 post- *zakah* and *ushr* urban-rural[14] inequality coefficients differ relatively more significantly at the 1 percent level than that of the significant difference in the third experiment executed in chapter 6 (table 6.5) for the post- and post- fiscal distributions. Whereas, in 1992-93 and 2001-02 post- *zakah* and *ushr* urban-rural inequality coefficients differ relatively less significantly at the 1 percent level than that of the significant difference in the third experiment executed in chapter 6 (table 6.5) for the post- and post- fiscal distributions in urban rural areas. In fourth experiment urban post- *zakah* and *ushr* regression coefficients do not differ significantly, which shows that we cannot reject the hypothesis that differences in the post- *zakah* and *ushr* inequality are only due to chance variation.

[14] Shows the comparisons between the distributions of urban and rural areas.

Table 7.17

Chow breakpoint tests for significant differences in β coefficients urban-rural (*zakah-ushr*)

Distributive Experiment	F-statistic	Probability
1986-87–1986-87 pre- fisc– post-*zakah–ushr* (urban)	96.5	0.000000
1992-93–1992-93 pre-fisc– post-*zakah–ushr* (urban)	84.49	0.000000
2001-02–2001-02 pre-fiscal–post-*zakah–ushr* (urban)	61.59	0.000000
1986-87–1986-87 pre-fisc– post-*zakah–ushr* (rural)	30.07	0.000016
1992-93–1992-93 pre-fisc– post-*zakah–ushr* (rural)	18.48	0.000350
2001-02–2001-02 pre-fiscal–post-*zakah–ushr* (rural)	0.855	0.365105
1986-87–1986-87 post- *zakah- ushr* (urban-rural)	10.4	0.003881
1992-93–1992-93 post- *zakah–ushr* (urban-rural)	24.0	0.000088
2001-02–2001-02 post- *zakah–ushr* (urban-rural)	173.5	0.000000
1986-87–2001-02 post-*zakah–ushr* (urban)	2.05	0.165960
1986-87–1992-93 post-*zakah–ushr* (urban)	1.36	0.256437
1992-93–2001-02 post-*zakah–ushr* (urban)	5.44	0.029743
1986-87–2001-02 post-*zakah–ushr* (rural)	308.2	0.000000
1986-87–1992-93 post- *zakah–ushr* (rural)	8.61	0.007924
1992-93–2001-02 post-*zakah–ushr* (rural)	176.1	0.000000

In fifth experiment, significance test of the pairs, 1986-87– 2001-02 and 1992-93– 2001-02, shows that rural post- *zakah* and *ushr* regression coefficients differ relatively more significantly from its rural pre-fiscal regression coefficients than that of the significant difference between pre- fiscal and post- fiscal distributions (table 6.5) at the 1 percent level. While, significance test of the pair, 1986-87– 1992- 93 shows that rural post- *zakah* and *ushr* regression coefficients differ relatively less significantly from its

rural pre-fiscal regression coefficients than that of the significant difference between pre-fiscal and post- fiscal distributions in table 6.5 at the 1 percent level.

Figure 7.1: Lorenz curve comparisons, pre-, post- fiscal and post- *zakah-ushr* incidence, (urban) 1986- 87.

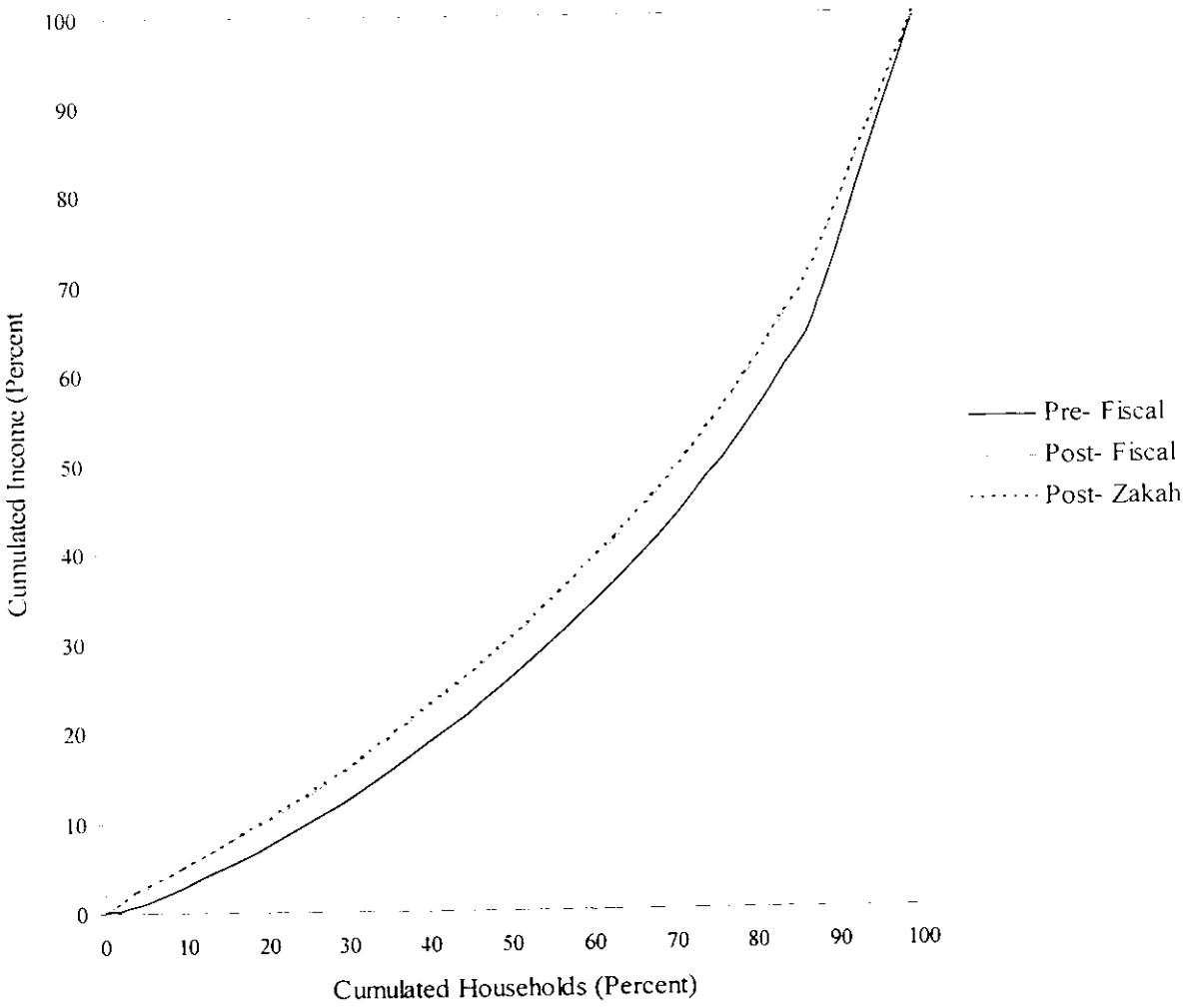


Figure 7.2: Lorenz curve comparisons,pre-, post- fiscal and *post- zakah -ushr* incidence, (rural) 1986- 87.

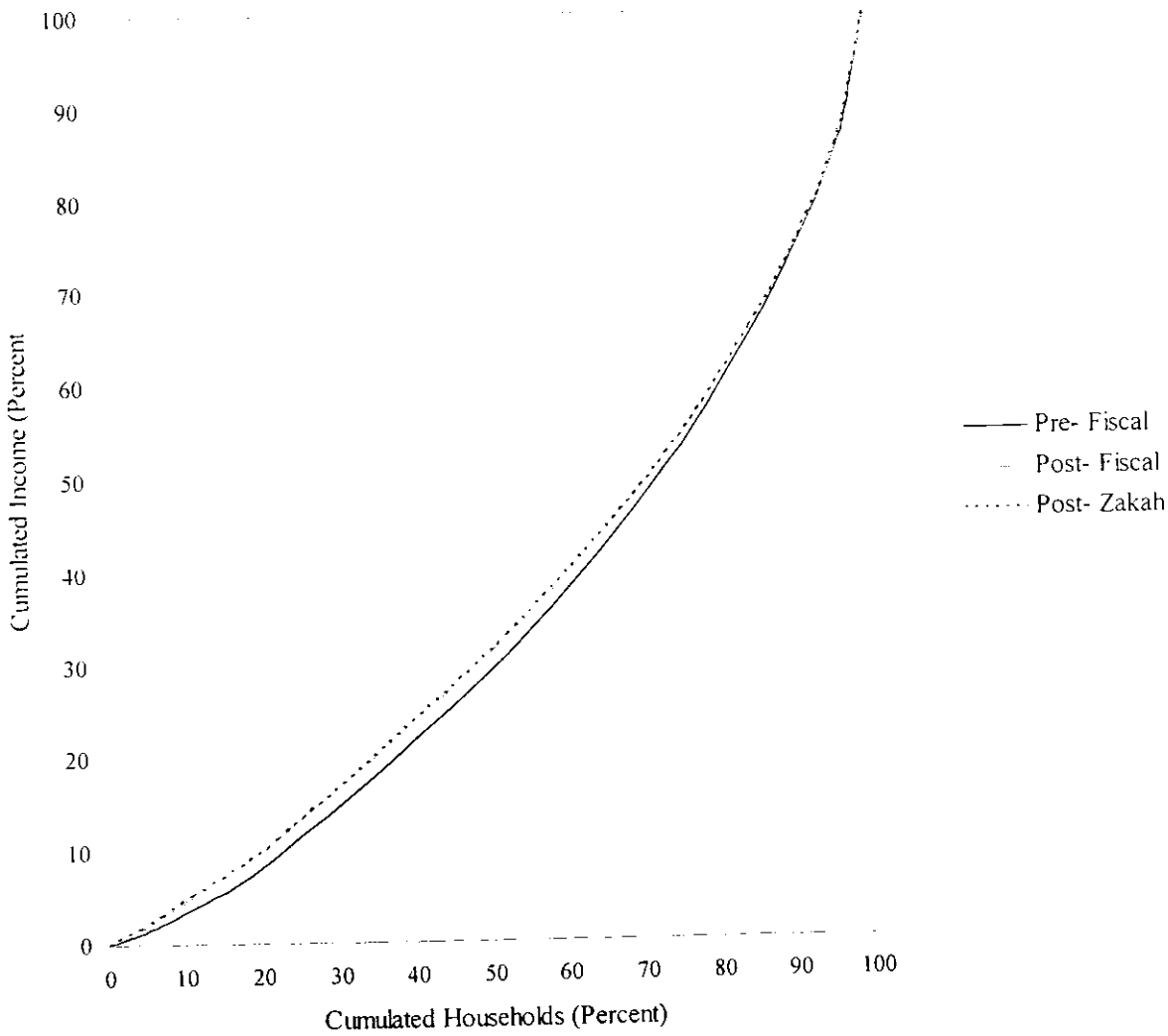


Figure 7.3: Lorenz curve comparisons, pre-, post- fiscal and Post- *zakah-ushr* incidence, (urban) 1992- 93.

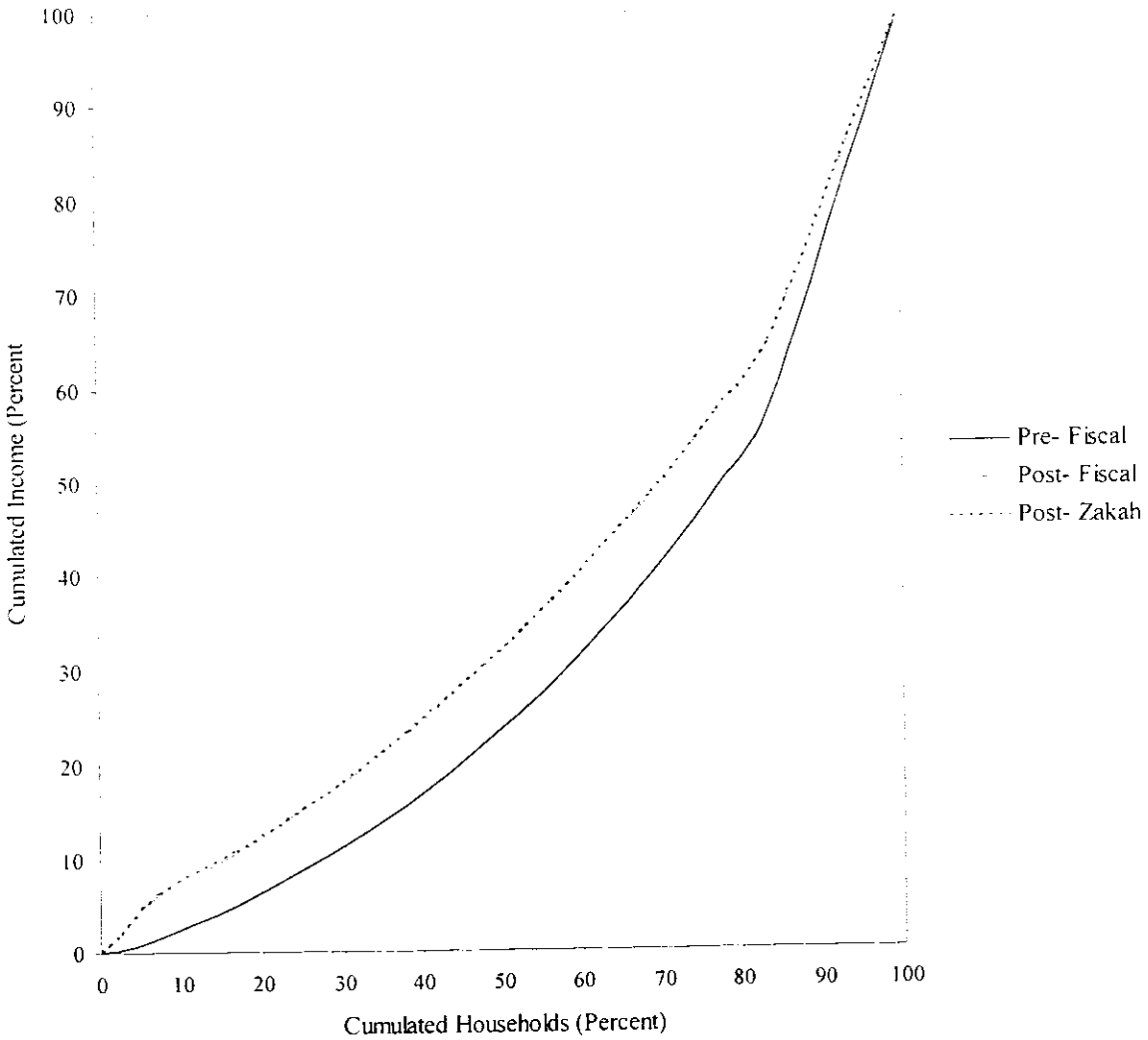


Figure 7.4: Lorenz curve comparisons, pre-, post- fiscal and post- *zakah- ushr* incidence, (rural) 1992- 93.

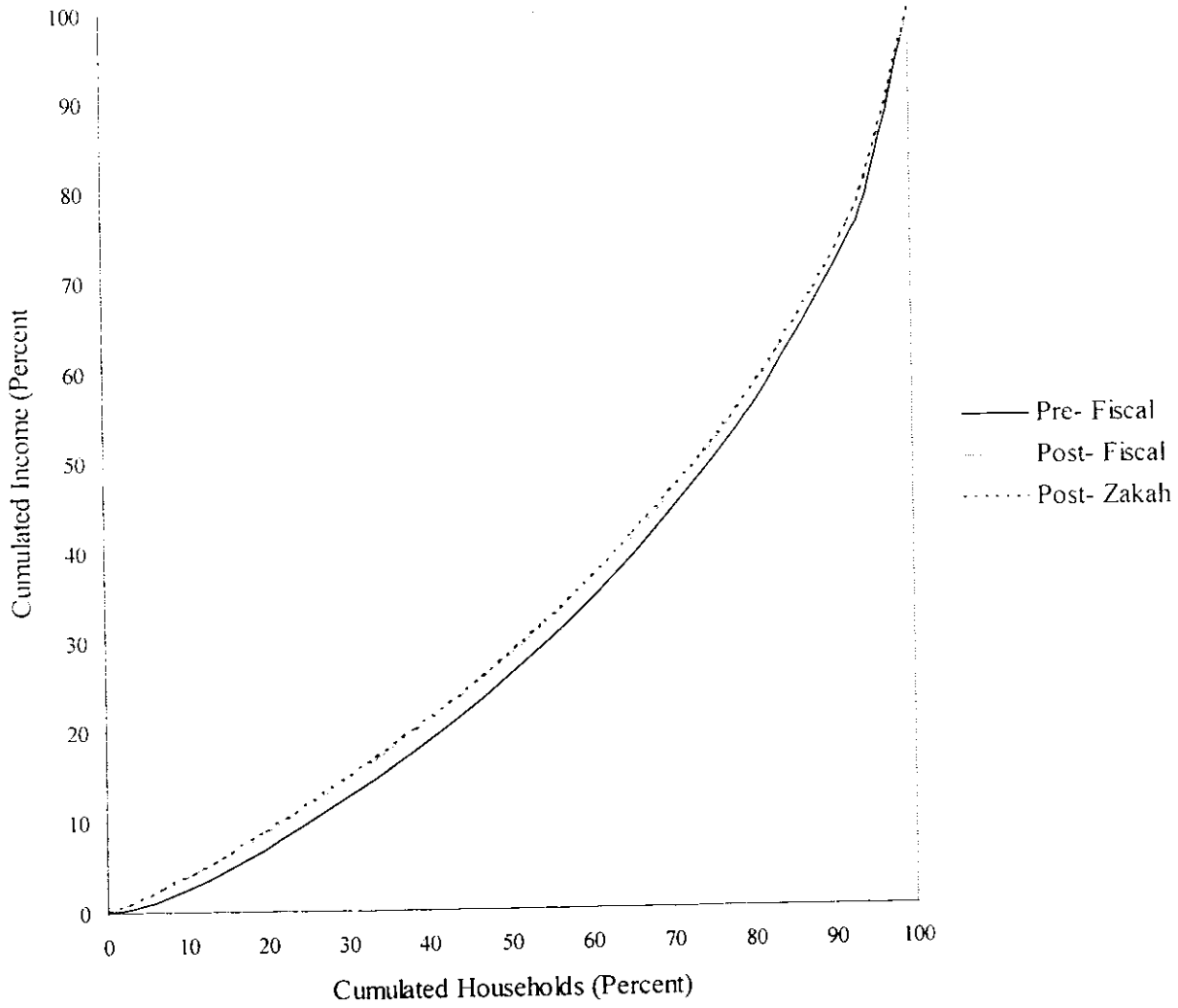


Figure 7.5:

Lorenz curve comparisons, pre-, post- fiscal and post- *zakah-ushr* incidence, (urban) 2001-02.

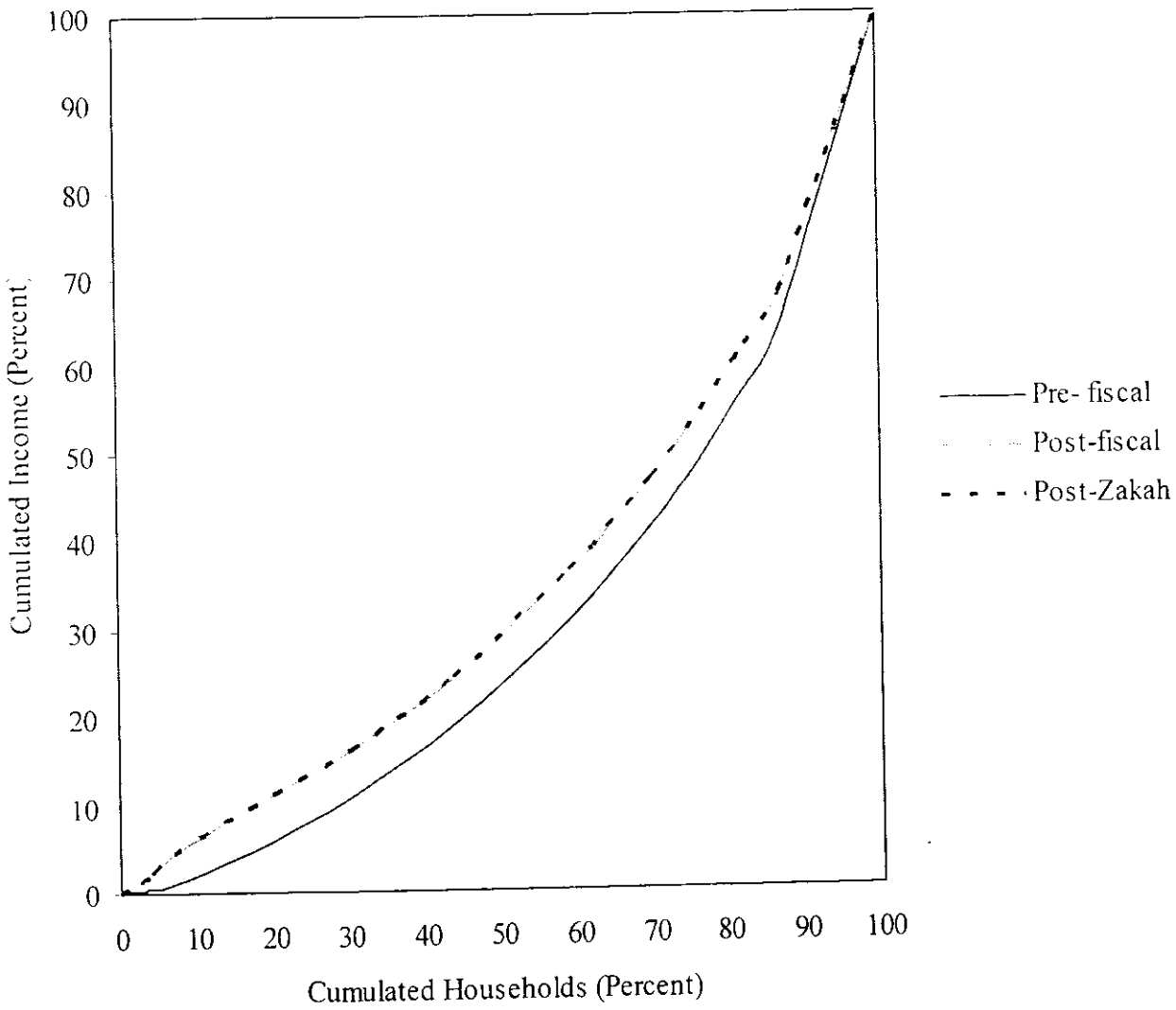
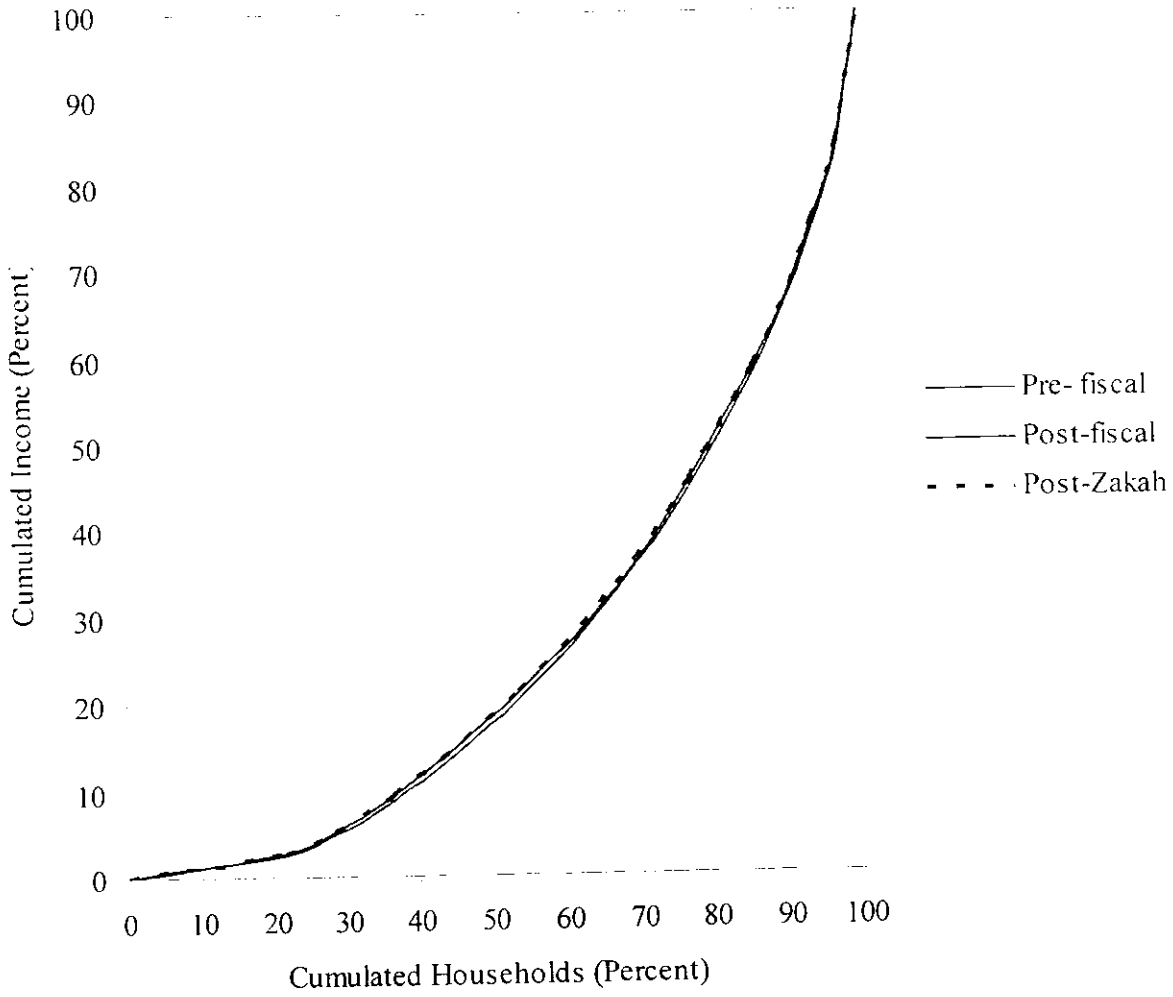


Figure 7.6:

Lorenz curve comprisons, pre-, post- fiscal and post- zakah-ushr incidence, (rural) 2001- 02.



CHAPTER 8

DISAGGREGATED ANALYSIS OF EXPENDITURES AND TAXES, AND POLICY IMPLICATONS

In chapters 4, 5 and 6 we have proved that distribution of income can be improved by the government actions. Urban areas have relatively more benefited by the fiscal actions of the government than their counterpart rural areas. We can further observe the role of government expenditures and taxes in the distribution of income by performing a decomposition analysis for them. The decomposition analysis comprises following three items:

1. The share of population, corresponding to different expenditures and taxes in each selected year.
2. Changes in the relative share of each type of expenditure and tax with respect to their total amount in urban- rural areas
3. Changes in the pro-poor nature of each type of expenditure and tax (concentration-ratio analysis) in urban rural areas.

8.1 A Disaggregated Analysis for Expenditures

Table 8.1 shows the shares of urban-rural areas in the total population or in total number of households, the share of each expenditure item in the total expenditures

imputed to urban-rural areas and the concentration ratios for each expenditure item in the four selected years. We discuss the case of each expenditure type turn by turn. The concentration ratios for defense expenditures have lesser value through out in the first three selected years for rural areas than for the urban areas. It means that defense expenditures have been more equally distributed among the rural households than that of urban households in the three selected years. While, in 2001-02 urban concentration ratio is smaller than rural concentration ratio which shows that defense expenditures have been more equally distributed among the urban households than that of rural households in 2001-02.

Firstly, it is due to the fact that the lower staff of the forces, especially, soldiers mostly belongs to rural areas while the commanding staff mostly belongs to urban areas. This composition of the armed forces have made the defense expenditures, in the form of salaries and other facilities to their employees, biased toward high income group in urban areas and lower income groups in rural areas. Secondly, we have distributed the defense expenditure half on household income and half on number of household. As household income is relatively more equally distributed among the rural households than its urban counterpart therefore, concentration coefficients for rural areas have given lesser values for defense expenditure than that of its urban counterpart in the first three selected years. Whereas, in 2001-02 smaller urban concentration ratio is perhaps due to change in the trend of forces in terms of having residences and offices in urban areas.

Whereas, expenditures on general administration which include the functions of organs of state, fiscal administration, economic regulations, foreign aid, statistics, foreign affairs and some other miscellaneous functions, have larger concentration ratios in 1979, 1986-87 and 1992-93 in urban areas than in rural areas. However, in 2001-02 the urban concentration ratio for general administration has smaller value than that of its rural counterpart, which shows that some or all functions of general administration were, more or less, equally biased towards urban areas in terms of equal distribution of general administration expenditures.

Table 8.1

Disaggregated analysis for government expenditures (urban-rural), 1979, 1986, 1992, 2001-02

Year	1979		1986-87		1992-93		2001-02	
URBAN								
Population share	0.26		0.27		0.30		32.5	
Expenditure	Exp. share	Conc. ratio	Exp. share	Conc. ratio	Exp. share	Conc. ratio	Exp. share	Conc. ratio
Defense	0.229	0.2007	0.253	0.1783	0.234	0.1923	0.167	0.1949
G. Admin.	0.054	0.1005	0.064	0.0893	0.054	0.0967	0.102	0.0987
Education	0.143	0.3703	0.192	0.3129	0.144	0.0745	0.118	0.3604
Health	0.016	-0.2867	0.031	-0.3196	0.019	-0.2389[1]	0.021	0.1477
Agriculture	0.042	0.5541	0.017	0.5048	0.006	0.5198	0.030	-0.1873
Interest	0.055	0.1913	0.122	0.2588	0.226	-0.4188	0.347	-0.0701
Development	0.383	0.0004	0.204	0.0002	0.204	0.0007	0.039	0.0006
Community services	0.079	0.1015	0.118	0.1106	0.064	0.1076	0.176	0.1369
Total expenditures	0.407	0.1379	0.428	0.1541	0.478	-0.0234	0.576	0.0836
RURAL								
Population share	0.74		0.73		0.70		67.5	
Expenditure	Exp. share	Conc. ratio	Exp. share	Conc. ratio	Exp. share	Conc. ratio	Exp. share	Conc. ratio
Defense	0.251	0.1603	0.309	0.1568	0.285	0.1842	0.233	0.2642
G. Admin.	0.060	0.0807	0.078	0.0795	0.066	0.0939	0.142	0.1539
Education	0.036	0.6025	0.036	0.5428	0.039	0.4579	0.043	0.6963
Health	0.034	0.0362	0.048	-0.0327	0.038	0.1074	0.049	0.4938
Agriculture	0.074	0.4861	0.026	0.3966	0.012	0.4590	0.050	0.3188
Interest	0.050	0.5458	0.111	0.5652	0.169	0.3443	0.185	0.5792
Development	0.410	0.0026	0.248	0.0017	0.248	0.0047	0.054	0.0452
Community services	0.084	0.1096	0.144	0.0989	0.078	0.1068	0.245	0.2728
Total expenditures	0.593	0.1467	0.572	0.1605	0.522	0.1615	0.424	0.3297

[1]Negative concentration ratios correspond to the concentration curves that lie entirely above the 45° line.

Although, generally, defense and general administration expenditures were biased, in terms of equal distribution of these expenditures towards rural areas, but their shares relative to number of households in urban-rural areas were larger for urban areas than that of the rural areas in all four selected years (see table 8.1).

Turning to the government expenditures on education, in table 8.1 the concentration ratios for education expenditure in urban areas are smaller than in rural areas in 1979, 1986-87, 1992-93 and 2001-02. It is perhaps due to the fact that usually, middle and high-income class households got benefits of government expenditures on education by admitting their children in the government schools in rural areas. While very few low income households, generally, afford to educate their children in rural areas. Moreover, very few higher and highest income households in rural areas like to educate their children in some well-reputed and costly institutions usually organized by private sector. While, in urban areas these higher and highest income households are relatively larger in number than that of the rural areas and they unusually like to educate their children in costly private sector institutions not only at school level but also at college and university level of education. In this way, higher and highest income groups in urban areas, generally, do not get benefits out of government expenditures on education, while, high, middle and low income groups these areas get benefits out of education expenditures.

Furthermore, government expenditures on education mainly consist of providing primary and middle school education to the rural households rather than higher secondary, college and university level of education facilities present in urban areas. Therefore, government expenditures on education in urban areas have mainly fallen on high, middle and low-income groups in 1979, 1986-87, 1992-93 and 2001-02, while, in same years these expenditures have, generally, fallen on high and middle-income households in rural areas. Which, as a result, produced lower concentration ratios in urban areas than that of the rural areas in 1979, 1986-87, 1992-93 and 2001-02. Lower literacy rates in rural areas than in urban areas for all four years were due to less or no

interest in education of the households belonging to lower and lowest income brackets. And also due to less participation of female members of the households in the education programmes, belonging to almost all income groups. On the other hand, in urban areas education upto degree level in the form of colleges is common and also well organized. The households belonging to high, middle and low-income groups enjoy the benefits of government education in urban areas, while low-income group household in rural areas might not afford or willing to educate their children even upto secondary school level or less than that. Therefore, education concentration ratios in urban areas were smaller (giving more equal dispersion) than in rural areas in all four selected years.

Moreover, the amounts of education expenditures allocated to urban areas are absolutely larger than that of the rural areas, in all four years. For example, in 1979, 1986-87, 1992-93 and 2001-02 these are 0.143, 0.192, 0.144 and 0.118, respectively, of the total urban expenditures. While, in rural areas these values are 0.036, 0.036, 0.039 and 0.043 of the total rural expenditures, respectively, in 1979, 1986-87, 1992-93 and 2001-02. The difference between above mentioned education expenditure shares in total expenditures of urban- rural areas further increases if population shares of urban-rural areas are also taken into account. For example, in 1979 education expenditure share per household in urban areas is (0.143 / 0.26) 0.55 and in rural areas is (0.036 / 0.74) 0.049. This situation is self explanatory, because all costly and big education institution in the form of colleges and universities are situated in urban areas.

Let us turn to the health expenditures of the government in urban-rural areas. In table 8.1 it is evident that all concentration coefficients for health expenditure in the rural areas are larger than their urban counterpart concentration ratios in all four years. It means that government health expenditures were more unequally distributed among the households living in rural areas than that of living in urban areas in all four selected years. This situation quite coincides with the real life experience. In rural areas the health curing facilities are in the form of dispensaries or, at the most, in the form of mini hospitals having only one or two simple MBBS doctors. This type of curing set up

provides the patient only temporary relief in case of serious attack of a disease or facing accident and, somewhat, complete relief in case of minor diseases like, flue etc. In both cases, high-income as well as middle and lower income group households can get benefit out of these health facilities provided by the government in rural areas.

Looking other side of the picture, health facilities in the form of modern health equipment and set up are available in urban areas. Moreover, specialist physicians and surgeons are also available in urban areas. But, however, these health facilities are supposed to be far and very far from the rural areas. Therefore, mostly rich and richer households of rural areas can have access to these health facilities. While poor households of rural areas mostly do not have access to these facilities. It is, perhaps, due to the fact that they cannot afford to buy costly medicines and also traveling and staying expenditures in the cities. Whereas in urban areas, more or less, each household can approach to these modern health facilities provided by the government. Therefore, health expenditures are supposed to be more equally distributed among urban households than among rural households. This situation is evident in the values of concentration ratios of health expenditures given in table 8.1 for urban-rural areas.

Now taking the case of government expenditures on agriculture, in table 8.1 all values of agriculture-expenditure concentration ratios in rural areas are smaller than these values in urban areas except in 2001-02. Which means that agriculture expenditures were more equally distributed in rural areas than the urban areas in 1979, 1986-87 and 1992-93. While, in 2001-02 this concentration ratio in urban areas is smaller than that of in rural areas. These results are self-explanatory because most of the big agriculturists live in urban areas and also most of the main agriculture offices, departments, universities and other big institutions are situated in urban areas. While, almost all low and middle income farmers and workers who take part in the actual process of cultivation live in rural areas. Hence, rural areas are the source of agriculture products, whereas urban areas are, generally, beneficiaries or the consumers of these products. Being the source of agriculture products the rural households directly or indirectly from top to low income

groups get benefits out of government programmes about agriculture at relatively more equal rates than the urban households related to agriculture sector. However, in 2001-02 the smaller concentration ratio in urban areas is perhaps due to relatively larger number of middle and low income rural households shifting to urban areas and showing their income in the account of agriculture sector.

Interest-expenditure concentration ratios for urban households show more equal distribution of expenditures than these concentration ratios for rural areas. Recall that interest payment is distributed along the income groups of urban-rural areas according to their volume of deposits (or interest earned) in the financial institutions. As urban households even belonging to low-income groups normally have some deposits in the financial institutions say in a bank, while, rural household belonging to low or even middle income groups rarely do this practice either due to unawareness or due to unavailability of any financial institution in nearby vicinity. Hence, interest expenditures fall more equally in urban areas than in rural areas. Consequently, urban concentration ratios have smaller values than rural concentration ratios in 1979, 1986-87, 1992-93 and 2001-02.

Development concentration ratios in urban areas have smaller values than their counterpart rural areas in 1979, 1986-87, 1992-93 and 2001-02. It is due to the fact that development programmes of the government generally fall in urban areas more abundantly than that of the rural areas. Moreover, Development programmes effect general public more in urban areas than in rural areas. As it is seen that development programme are more or less, influenced by the richest or big landlords in rural areas. Whereas, this type of influence in urban areas is very rare due to relatively more awareness and personal independence in the general public. As a result, in table 8.1 the development concentration ratios in urban areas are smaller than in rural areas in 1979, 1986-87, 1992-93 and 2001-02.

In table 8.1, the shares of expenditure on community services in their respective urban-rural total expenditures are almost equal in 1979, 1986-87, 1992-93. However, in

2001-02 urban share is larger than the rural share. Similarly, concentration ratios in urban-rural areas have, generally, very slight difference between them in first three years. However, in 1986-87 and 2001-02 urban concentration ratios have larger value than their counterpart rural concentration ratios. This is perhaps due the fact that types of community services for urban areas were more sensitive to middle and high income groups, while, the community services allocated to rural areas were more biased towards low and middle income groups in 1986-87 and 2001-02.

Finally, discerning total urban-rural expenditure shares and concentration ratios in table 8.1 for all four years, we come across with some very interesting results. Concentration ratios in rural areas are larger than that of the urban areas in 1979, 1986-87, 1992-93 and 2001-02. Hence, expenditures were relatively more pro-poor in urban areas than in rural areas in all above mentioned years. Total expenditure shares in urban areas[2] are smaller than that of their counterpart in rural areas in 1979, 1986-87 and 1992-93. But, in 2001-02 total expenditure share in urban areas are larger than that of their counterpart in rural areas.

However, when these shares are calculated with respect to population shares of urban-rural areas, the resultant per capita expenditure shares in urban areas become almost double than in rural areas as shown in table 8.2. In row 2, urban expenditure shares are increasing from 1979 to 2001-02. Similarly, in row 3 urban population shares are increasing overtime. The resultant per capita expenditures for urban areas are also increasing from 1979 to 2001-02 in row 4. On the other hand, rural expenditures shares in row 5 are decreasing overtime. Similarly, in row 6, rural population shares are also decreasing from 1979 to 2001-02. The resultant per capita expenditure shares in rural areas in row 7 are also decreasing overtime from 1979 to 2001-02.

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[2] Total imputed expenditures (urban) / Overall total actual expenditures (Pakistan) = Total expenditure share (urban).

Table 8.2

A comparison between expenditure shares (urban-rural)

	1979	1986-87	1992-93	2001-02
Urban expenditure share	0.407	0.428	0.478	0.576
Urban population share	0.26	0.27	0.30	0.325
Per capita expenditure share (urban)	1.57	1.59	1.60	1.77
Rural expenditure share	0.593	0.572	0.522	0.424
Rural population share	0.74	0.73	0.70	0.675
Per capita expenditure share (rural)	0.80	0.78	0.75	0.63

8.2 A Disaggregated Analysis for Taxes

Table 8.3 shows the shares of urban-rural areas in the total population or in total number of households, the share of each tax item in the total taxes imputed to urban-rural areas along with tax shares of these areas relative to overall actual collection of taxes in Pakistan and the concentration ratios for each tax item in 1979, 1986-87, 1992-93 and 2001-02. The concentration ratio provides a rough estimate for the degree of progressivity for each tax. A '0' value means that the tax is equally distributed among households. As the concentration ratio rises toward '1' more of the tax burden falls upon higher income groups. If a tax starts out as progressive in the sense that the concentration index is higher than the concentration for pre-fiscal income, a lower concentration ratio overtime usually can be interpreted as unfavourable for the low and middle income groups, because it means that the rich pay a smaller share of taxes and lower income households pay a larger share.

In table 8.3, income and corporate tax concentration index for urban areas in 1979 is 0.7041, while, for rural areas HIES[3] did not report these taxes in the said year. In 1979 high concentration ratio (0.7041) in urban areas for income and corporate taxes shows that most of the tax burden falls upon higher income groups. Whereas no such burden

[3] Household Income Expenditure Survey.

falls upon higher income groups in rural areas in 1979. Therefore, a comparison of urban-rural tax structure in 1979 would show a more progressive (pro-poor) income and corporate taxes in urban areas and no income and corporate taxes in rural areas (pro-rich). Moreover, income and corporate tax share was 0.330 of the total tax imputed to urban areas in 1979. While rural areas have '0' percent of this tax share in the total tax imputed to rural areas in this year. Keeping in view the properties of income and corporate taxes, the concentration ratio and the tax shares comparison, it is easy to say that the tax structure of urban areas was more pro-poor than the tax structure of rural areas in 1979.

Similarly, in 1979, property tax concentration ratio for urban areas was 0.8400 while in the same year HIES did not report any property tax for rural areas. Obviously, property tax in urban areas has been more progressive than the rural areas in 1979. In terms of tax shares comparison, the share of property tax in urban areas was 0.021 percent of the total tax imputed to urban areas in 1979. While this tax share, in the same year, for rural areas was '0' percent.

In 1986-87, 1992-93 and 2001-02 income and corporate tax concentration ratios in urban areas were smaller than their corresponding tax concentration ratios in rural areas. It means that income and corporate taxes in urban areas were less progressive than that of the rural areas in 1986-87, 1992-93 and 2001-02. But, the tax and the household share for the two areas might play an important role in understanding the whole story. In the years 1986-87, 1992-93 and 2001-02, although income and corporate taxes looking more progressive in rural areas than that of the urban areas, due to their concentration ratio comparisons but in these three years the tax shares (household shares) were larger (smaller) for the urban areas than that of the rural areas.

Table 8.3

Disaggregated analysis for taxes (urban-rural), 1979, 1986-87, 1992-93, 2001-02

Year	1979		1986-87		1992-93		2001-02	
URBAN								
Population share	0.26		0.27		0.30		32.5	
Taxes	Tax share	Conc. ratio	Tax share	Conc. ratio	Tax share	Conc. ratio	Tax share	Conc. ratio
Income and corporate tax	0.330	0.7041	0.258	0.6465	0.341	0.6772	0.370	0.7686
Property tax	0.021	0.8400	0.018	0.3963	0.026	0.3345	0.011	0.4413
Sale tax and excise duty	0.304	0.3407	0.205	0.3333	0.242	0.3026	0.376	0.2680
Import duty	0.284	0.3424	0.269	0.3345	0.256	0.3029	0.114	0.2632
Export duty	0.011	0.4006	0.003	0.3575	0.004	0.3822	.00004	0.3892
Vehicle tax	0.010	0.6055	0.008	0.5434	0.007	0.4864	0.007	0.5100
Gas Tax	–	–[4]	0.045	0.3534	0.065	0.0638	0.061	0.2214
Petroleum tax	–	–	0.117	0.2436	0.032	0.3616	0.061	0.3764
Total tax	0.473	0.5452	0.476	0.4453	0.549	0.4271	0.578	0.4600
RURAL								
Population share	0.74		0.73		0.70		67.5	
Taxes	Tax share	Conc. ratio	Tax share	Conc. ratio	Tax share	Conc. ratio	Tax share	Conc. ratio
Income and corporate tax	–	–	0.004	0.9794	0.020	0.8907	0.197	0.9446
Property tax	–	–	0.001	0.4191	0.003	0.7742	0.009	0.3085
Sale tax and excise duty	0.464	0.2738	0.318	0.2733	0.441	0.2233	0.477	0.1263
Import duty	0.438	0.2744	0.412	0.2732	0.464	0.2261	0.207	0.1660
Export duty	0.016	0.3213	0.004	0.3119	0.006	0.3654	.00005	0.4816
Vehicle tax	0.009	0.8123	0.011	0.7681	0.008	0.7415	0.007	0.3544
Gas Tax	–	–	0.005	0.7326	0.002	0.4171	0.009	0.4023
Petroleum tax	–	–	0.153	0.3977	0.031	0.5540	0.095	0.2650
Total tax	0.527	0.2842	0.524	0.2402	0.451	0.2303	0.422	0.3148

Recall that concentration ratio is calculated by using the cumulative percentage distribution of households and the cumulative distribution of the variable for which it is

[4] Not available

being calculated. Hence, concentration ratio does not take into consideration the absolute amounts of the variables in their computation process. Therefore, relatively larger values of concentration ratios for income and corporate taxes in the rural areas were due to the reason that some higher income group households were paying these taxes but in an absolute lesser amount relative to urban areas. Moreover, in urban areas, the range of high-income group taxpayers was larger than in the rural areas. This phenomenon has also made the concentration ratios of income and corporate taxes for the urban areas relatively smaller than the rural areas in 1986-87, 1992-93 and 2001-02.

By the same token, in 1986-87 and 1992-93 the concentration ratios for the property tax in rural areas were larger than their counterparts in urban areas. Apparently, it would seem that a higher concentration ratios for property tax in rural than in urban areas, confirm a greater progressivity in the rural property tax structure than that of the urban areas. But, taking into account the tax shares, population shares and the taxpayers' ranges for the urban and rural areas, we can complete the same story mentioned above in case of income and property taxes (see table 8.3 and compare rows 6 and 18). However, in 2001-02 the concentration ratio for the property tax in urban areas was larger than that of its counterpart in urban areas. Which shows that urban property tax structure has greater progressivity than that of the rural areas in 2001-02.

Now, turning to the indirect taxes, we can see from the table 8.3 that sale tax and excise duty, import and export duties have larger concentration ratios in urban areas than that of the rural areas in all four selected years except the case export duty in 2001-02 where rural concentration ratio for export duty is larger than that of its counterpart in urban areas. In general, these indirect taxes are more pro-poor in urban areas than that of the rural areas in 1979, 1986-87 1992-93 and 2001-02. While, the tax shares of these indirect taxes in total taxes imputed to urban-rural areas are larger in rural areas than in urban areas in all four years. This shows that burden of these indirect taxes remained more on rural areas than on urban areas in 1979, 1986-87, 1992-93 and 2001-02.

On the other hand, in table 8.3, concentration ratios for taxes on vehicles, natural gas and petroleum are larger in rural areas than in urban areas in 1979[5], 1986-87, 1992-93. It means that these indirect taxes have shown more pro-poor behaviour in rural areas than in urban areas in these years. However, in 2001-02 the concentration ratios for taxes on vehicles, and petroleum are larger in urban areas than in rural areas and that of natural gas is larger in rural areas than the urban areas. This shows that in 2001-02 some of government taxes are relatively more equally distributed in urban areas than that of the rural areas.

This phenomenon can also be seen in the poverty head count ratio- differences between urban- rural areas, see chapter 6, where head count ratio of urban areas is 22.67 percent and that of rural areas is 38.99 percent. The tax shares of vehicle taxes in total taxes imputed to urban-rural areas are more or less equal in both areas. While, the tax shares of natural gas in total taxes imputed to urban-rural areas are larger in urban areas than in rural areas in 1986-87, 1992-93 and 2001-02. This behaviour is self-explanatory, as urban areas are provided natural gas (sui gas) through pipelines, while, rural areas generally use cylinder gas. Obviously, urban areas have far lager share of natural gas relative to rural areas. In table 8.3, tax share of petroleum in total taxes imputed to urban-rural areas are larger in rural areas than in urban areas in all years except in 1992-93 where urban share (0.032) is slightly larger than that of rural areas (0.031). This shows that transportation and traveling have been used more by the rural households than that of the urban households due to the fact that rural households have to travel larger distances to reach their destinations.

Finally, we examine urban-rural tax shares in total taxes and their respective concentration ratios in table 8.3. Concentration ratios for total taxes in urban areas are larger than that of in rural areas in all four years. Which shows that total taxes in urban areas are more pro-poor or less pro-rich than that of the rural areas in 1979, 1986-87,

[5]In 1979 taxes on natural gas and petroleum have not been reported in HIES.

1992-93 and 2001-02. Total tax shares in urban areas[6] are smaller than that of their counterpart in rural areas in 1979, 1986-87. However, in 1992-93 and 2001-02 total tax shares in urban areas have become larger than that of the rural areas. This shows that overtime, tax share in urban areas were increasing, while, tax share in rural areas were decreasing as shown in table 8.3. Moreover, when these shares are calculated with respect to population shares of urban-rural areas, the resultant per capita tax shares in urban areas become almost double than that of in rural areas as shown in table 8.4. In row 2, urban tax shares are increasing from 1979 to 2001-02. Similarly, in row 3 urban population shares are also increasing overtime. The resultant per capita taxes for urban areas are of cyclical nature in row 4. On the other hand, rural tax shares in row 5 are decreasing overtime. Similarly, in row 6, rural population shares are also decreasing from 1979 to 2001-02. The resultant per capita tax shares in rural areas in row 7 are also of cyclical nature like in urban areas.

Table 8.4

A comparison between tax shares (urban-rural)

	1979	1986-87	1992-93	2001-02
Urban tax share	0.473	0.476	0.549	0.578
Urban population share	0.26	0.27	0.30	0.325
Per capita tax share (urban)	1.82	1.76	1.83	1.78
Rural tax share	0.527	0.524	0.451	0.422
Rural population share	0.74	0.73	0.70	0.675
Per capita tax share (rural)	0.71	0.72	0.64	0.63

8.3 Policy Implications

In the previous section we have analyzed the distributive impacts of different expenditures and taxes upon the urban-rural areas of Pakistan in 1979, 1986-87, 1992-93 and 2001-02. On the expenditure side, defense, general administration, general

[6] Total imputed taxes (urban) / Overall total actual taxes (Pakistan) = Total tax share (urban).

community services and development expenditures have indirect impacts on the distribution of income in the urban-rural areas of Pakistan. The agriculture expenditures are, undoubtedly, biased towards rural areas in terms of fair distribution of income agriculture expenditure shares in. In table 8.1 urban agriculture concentration ratios are larger than that of rural concentration ratios except in 2001-02, it implies that a large portion of agriculture expenditures went to the high income groups in 1979, 1986-87 and 1992- 93. It is perhaps due to fact that big agriculturists live in urban areas and also they get big exemptions from taxes by showing their income in account of agriculture income. It is suggested that agriculture income of these big agriculturist should taxed and that amount should be used for the welfare of low-income farmers and workers engaged in cultivation process. Moreover, low-income farmers should also be treated equally to the rich agriculturists in providing subsidies and other financial and material supports by the government in both urban- rural areas.

Whereas in case of development expenditures, rural concentration ratios are larger than urban concentration ratios in all four years. It shows that in rural areas the benefits of development expenditures were not distributed more equally. Hence, the development expenditure benefits largely went to rich community in rural areas. It is suggested that those development programmes should be given priority whose benefits largely go to the low and middle-income groups in the rural areas. Interest expenditures are concerned with the volume of deposits deposited (or interest earned) by the urban-rural households mainly in the government based financial institutions. Rural interest-concentration ratios are larger than that of urban areas, which indicate that amounts of interest earned by the low and middle income groups are small. This is perhaps due to the reason that rural households are relatively more religious and they do not want to go against Islamic injunctions about the prohibition of 'riba' (interest). This fact can be supported by the very low rural interest- expenditure share as compare to urban interest- expenditure share in table 8.1.

Education and Health expenditures have direct and policy oriented distributive impacts upon urban-rural areas. Therefore, our main stress should be on the fair distribution of education and health expenditures in the urban-rural areas. In table 8.1, the concentration ratios for education expenditure in urban areas are smaller than these concentration ratios in rural areas in 1979, 1986-87, 1992-93 and 2001-02. Hence, education expenditures have been more equally distributed among urban households than that of the rural households. This phenomenon has been discussed in, somewhat, detail in the previous section. The education expenditure shares in the rural areas were absolutely lesser than in urban areas (compare the education expenditure shares for urban-rural areas in the four selected years given in table 8.1).

Also, examine the household shares in total number of households for urban-rural areas in the all four selected years, as given in table 8.1. From these information, it can be suggested that share of the rural areas should be increased in the total education expenditures. Because, government expenditures on education allocated for the rural areas had not been in accordance with the number of households living in those areas in 1979, 1986-87, 1992-93 and 2001-02. In this connection, it is suggested that at least higher secondary and college level education should be provided to rural areas.

Special consideration should be given to the education of female in rural areas. Because, low literacy rate in rural areas is mainly due to the fact that, mostly, female community is not benefiting from education expenditures either willingly or unwillingly. This may be due to unavailability of girls' schools and colleges in the vacinity of rural areas. Therefore, boy and girl schools and colleges should be built and organized well, keeping in view, the number of households living in different rural areas and the distances of these rural areas from nearby towns or cities.

Turning to the health expenditures, in table 8.1, the concentration ratios for health expenditures in rural areas are larger than the concentration ratio in their counterpart urban areas in 1979, 1986-87, 1992-93 and 2001-02. It means that government health expenditures had been more equally distributed in urban areas than in rural areas.

Moreover, the health expenditure shares in rural households were relatively more than that of urban areas in all four years. This can be justified, partly, by taking into consideration urban rural population or number of households.

However, larger health expenditure share for the rural areas, inspite of the fact that most of government health expenditures are allocated for the urban areas in the form of hospitals and other health facilities, was due to the reason that we are considering health expenditures benefits received by the households and not only government expenditures on health. Therefore, rural households suffering from serious diseases definitely go to the hospital situated in, nearby, town or city and get benefits out of government expenditures on health. Keeping in view, health concentration ratios, health expenditure shares and population shares given in table 8.1 for the urban-rural areas in the four years, we suggest following policies for the government:

The hospitals should be opened in the rural areas according to their number of households and the probability of occurring different diseases in these areas. If, in some rural areas the hospitals and other health creating, maintaining and curing activities cannot be provided either due to financial constraints or due to some other reasons, including, unwillingness of physicians and other medical staff to go in some remote rural areas, then ambulance and other mobile medical services should be provided to cure serious and accidental patients. The provision of lady doctors should be made possible, especially, for pregnancy cases in the rural areas to ensure equal distribution of health expenditures.

Let us turn to the government tax structure in urban-rural areas. Income and corporate taxes are considered to be progressive, but these taxes in rural areas have negligible share with respect to total tax collection in rural areas (see table 8.3). Therefore, to acquire the target of, more or less, equal distribution of income in the rural areas, income and wealth taxes should be levied within a suitable range of higher income groups. Alternatively, income and wealth tax base should be broadened in the rural areas

according to the number of acre of fertile land owned by the high-income group households.

Furthermore, by discerning the table 8.3, it is clear that all indirect taxes have regressive pattern in the rural areas. In other words, the indirect taxes have played main role in worsening the post-fiscal income distribution in the rural areas relative to that in urban areas. Therefore, it is suggested that indirect taxes should be minimized, especially, those which largely affect the rural areas. Because, prices of daily used items shoot up due to indirect taxes. Which, in turn cause harm, largely, to the middle and low-income groups in the rural areas. It is also suggested that toll tax especially in the rural areas should be abandoned. This will help to control the prices of the daily used items by decreasing their transportation cost in the remote rural areas. Another suggestion to control the adverse effect of indirect tax is to establish utility stores in the rural areas. In this way, daily used items can be provided to the poor households in the rural areas on concessional rates.

Turning to the *zakah-ushr* system, it is suggested that *zakah-ushr* system should be applied efficiently to get more equal distribution of income in urban and rural areas. In table F-4[7] there are big gaps between collections and assessments of *ushr*, especially, from 1986-87 to onwards. It is suggested that these gaps should be minimized to real fruit of *ushr* system. The credibility of the *zakah* system needs to be maintained so that the general public not only knows but also feels that their *zakah* money is distributed properly, according to rules of the shari'ah and not a penny is wasted or used for political and other unlawful purposes. Only then the public will trust the system and pay their due *zakah* to the Central *Zakah* Administration.

Disbursement to Medicare, educational institutions, *Dini Madaris* and welfare institutions should be continued. However, it should be made sure that funds are really

utilized for the prescribed purposes. Regular checking of the record of these institutions is needed. The number of beneficiaries should be recorded properly and the records should be maintained. The allocation of funds to these institutions must be subject to regular audit by reputable audit firms. The deserving poor, individually or jointly, can be provided with funds for establishing small industries, manufacture of wooden and leather articles, tailoring, garments, embroidery and other handicrafts etc.[8]

[7] See Appendix F.
[8] Shirazi, N. S. (1996).

CHAPTER 9

SUMMARY AND CONCLUSIONS

The objective of this research work was to explore the effects of government expenditure and taxes on the distribution of income in the urban-rural areas of Pakistan. This task was accomplished by using statistical facts and figures in the years 1979, 1986-87, 1992-93 and 2001-02. To conduct this study some hypotheses have been made which can be summarized in this way that the effects of government expenditures are pro-poor while that of the taxes are pro-rich. Moreover, fiscal policy causes more fair distribution of income in urban areas than that of the rural areas.

Literature review of the relevant studies has shown that on the very nature of this work, no study as yet has been attempted in case of Pakistan. However, some relevant studies were reviewed which tried to explore effects of taxes on the distribution of income, like, Azfar (1972), Jeetun (1978), and, Malik and Saqib (1989). While, some other traced the effects of government expenditures on the size distribution of income, for example, Ghaus (1989). Shirazi (1996) analyzed the distribution and collection of *zakah* and *ushr* in urban-rural areas of Pakistan.

Although, Ghaus (1989) has shown the net fiscal effects but she found them by incorporating the results of another study on the tax incidence carried out by Ghaus and Pasha (1990) on the incidence of provincial and municipal taxes in Karachi. Hence, the work of Ghaus (1989) essentially covers the aspect of expenditure incidence only. However, Shirazi, Ilyas and Mehboob (2002) worked on distribution of income comparison between urban- rural areas by analyzing distributive effects of overall government expenditures and taxes. This research work, has also taken into account the

impacts of both government expenditures and taxes at all levels. Moreover *zakah* and *ushr* analysis added something more in the credibility of this work.

This work falls among the technical studies. It measures the income inequality by organizing and analyzing statistical facts and figures in a suitable way. It includes all the expenditures and taxes at all levels (provincial and federal) in 1979, 1986-87, 1992-93 and 2001-02. In the beginning of empirical analysis a suitable pre- fiscal definition of income was required. In this connection value of net national product (NNP) has been defined as pre-fiscal income to be distributed among different income groups of urban-rural areas in Pakistan in 1979, 1986-87, 1992-93 and 2001-02. As urban-rural wise data on NNP is not available, therefore, total value of NNP has been divided into its urban-rural constituents through a suitable weighting system. After that these urban-rural values of NNP have been distributed among income groups of urban-rural areas by using data given in HIESs of 1979, 1986-87, 1992-93 and 2001-02 according to the percentage distribution of income along the income groups of urban-rural areas in the above-mentioned four years. In this way pre- fiscal income in the urban rural areas have been calculated in these four years.

In the process of distribution of government expenditures and taxes among the income groups of urban-rural areas in four years, it was impossible to make division of government expenditures and taxes into their urban-rural categories by using government accounts. Therefore, in this study some suitable weighting systems were introduced to divide government expenditures and taxes into their urban-rural categories in all four years. The hardest part of this research work was to distribute government expenditures and taxes along the income groups of urban-rural areas. Any source of statistical data seldom provides a clear identification of beneficiaries and taxpayers. Therefore best-correlated data available has been used in forming incidence assumptions to distribute government expenditures and taxes along the income groups of urban-rural areas which suggest an appropriate, though rough, imputation. Moreover, benefit (burden) approach has been used instead of money flow approach and accounting approach has been used

rather than behavioral approach. Consequently, the study has followed the proposition that tax revenues are equal to total burden and government expenditures are equal to total benefits. In this way, we excluded all micro (such as efficiency cost) and macro (such as level of output, level of employment, price level and growth) effects of fiscal policies from this analysis. Thus by using above mentioned methods and some suitable incidence assumptions government expenditures and taxes have been distributed along the income groups in the urban-rural areas of Pakistan in1979, 1986-87, 1992-93 and 2001-02.

Moreover, the percentage average expenditures, average taxes and average net benefits for each income class of urban-rural areas in all four years have been calculated. To show pro-poor nature in average expenditures, average taxes and average net benefits in the four selected years a pro-poor ratio has been calculated by taking the ratio of approximately bottom 40 percent to top 20 percent of income groups. For urban areas the values of pro-poor ratio for average expenditures were 10.9, 12.9, 24 and 35.03, respectively, in 1979, 1986-87, 1992-93 and 2001-02. Hence, in 2001-02, the urban expenditures have shown more pro-poor behaviour than the rest of three years. Similarly, in 1992- 93, the urban expenditures have remained more pro-poor than in 1986-87 and 1979. Whereas, the values of urban pro-poor ratios for average taxes were 0.92, 2.30 and 2.40 and 3.48 in 1979, 1986-87, 1992-93 and 2001-02 respectively. This has shown that pro-poor nature was decreasing overtime. The pro-poor nature in the urban average net benefits was increasing overtime, as they have values 9.98, 10.6, 21.6 and 31.55 of the pro-poor ratios in 1979, 1986-87, 1992-93 and 2001-02 respectively.

For rural areas the values of pro-poor ratios for average expenditures were4.15, 4.09, 5.21 and 4.13, respectively, in 1979, 1986-87, 1992-93 and 2001-02. Hence, in 1992-93 the rural average expenditures have shown more pro- poor behaviour than the rest of three selected years. Similarly, in 1979 the rural expenditures have remained more pro-poor than in 1986-87 and 2001-02. The values of pro-poor ratios for rural average taxes were 2.23, 3.67, 4.81 and 4.52 in 1979, 1986-87, 1992 and 2001-02 respectively. Hence, rural average taxes have shown more pro-poor nature in 1979 and 1986-87.

While, they have shown less pro-poor nature in 1992-93 and 2001-02. On the other hand, pro-poor nature in the rural average net benefits have decreasing trend in the four years, as they have values 1.92, 0.42, 0.40 and -0.39 of the pro-poor ratios in 1979, 1986-87, 1992-93 and 2001-02 respectively.

The regression analyses have been carried out for urban-rural areas, in 1979, 1986-87, 1992-93 and 2001-02. All tax functions were found to be progressive (pro-poor) in the urban areas, having negative intercepts. While, in rural areas all tax functions were regressive (pro-poor), having positive intercept. On the other hand the expenditure functions have been more regressive (pro-poor) in urban areas than that of the rural areas. Consequently, the net benefit functions for urban areas in the all four years have been more pro-poor than that of the rural areas.

To show pre- and post fiscal incidence, Lorenz curve and Gini ratio analysis have been carried out. Pre-fiscal Gini ratios of rural areas in 1979, 1986-87, 1992-93 and 2001-02 were smaller than that of the urban areas. It means the pre-fiscal distributions of income have been fairer in rural areas than that of the urban areas. However, decreases in the Gini ratios due to fiscal action of the government in the all four years have been larger for the urban areas than that of the rural areas. This means that post-fiscal income distributions relative to the pre-fiscal income distributions have been fairer for the urban areas than that of the rural areas in all four years.

By introducing *zakah-ushr* system in our regression analyses of chapter 5 and in Gini ratio analysis of chapter 6, we have come to know that income distribution have become fairer than before in urban-rural areas in 1986-87, 1992-93 and 2001-02. However, urban-rural comparisons have shown that in 1986-87 urban expenditure, tax and net benefit functions have become more pro-poor than that of their counterpart rural areas after the introduction of *zakah* and *ushr*. Whereas, in 1992-93 and 2001-02, distributive effects of *zakah* and *ushr* were larger in rural areas than in urban areas. Similar results have been traced by the concentration ratio and Lorenz curve analyses, with and without *zakah* and *ushr*, in 1986-87, 1992-93 and 2001-02.

A disaggregated analysis for the tax and expenditure distributors has shown some very interesting results. For policy makers it has been suggested that they should concentrate mainly on the composition, quality and magnitude of the education and health expenditures to acquire the goal of fairer distribution of income among the households in urban-rural areas. The rural concentration ratios for the education expenditures in the all four selected years have been larger (pro-rich) than that of the urban concentration ratios. It has been suggested that school and colleges for boys as well as for girls should be built in rural areas or in their nearby vicinity to acquire the goal of equal distribution of education expenditures. Whereas, in all four years, shares of the education expenditures in rural areas have been smaller than these shares in urban areas. It has been suggested that education expenditure share in rural areas should be increased to get fairer distribution of income in these areas and thereby getting an overall more equal distribution of income in urban-rural areas of Pakistan.

Similarly, health and interest and development expenditures have been more equally distribution in the urban areas than that of the rural areas. It has also been suggested to increase share of the health expenditures for the rural areas. Whereas, defense, general administration and agriculture expenditures were found to be more equally distributed among the rural households than that of the urban households. However, expenditures on community services found to be distributed more equally in urban areas than that of the rural areas in 1979 and 2001-02. While, in 1986-87 and 1992-93 they were more equally distributed in rural areas than in urban areas. On the other hand, the regressivity in the rural tax structures in the four selected years have been due to lesser or negligible direct taxes on the rich income classes and also due to heavier burden of indirect taxes on the low income classes in the rural areas than that of the urban areas. The importance of *zakah-ushr* system was stressed by suggesting that the credibility of the *zakah-ushr* system should be maintained to get the confidence of *zakah* and *ushr* payers. They should feel that their *zakah-ushr* money would be distributed

properly, according to rules of the shari'ah and not a rupee would be wasted in unlawful purposes.

This research has guided us to reach on some useful conclusions, which are as under.

- The effects of government expenditures were found to be more favourable for the poor in the both urban-rural areas than that of the taxes in all four years. While the comparisons between the urban-rural areas have shown that expenditures and taxes were more pro-poor in the urban areas than that of the rural areas in each year.
- The net effects of fiscal incidence, in general, show pro-poor behaviour in both urban-rural areas in each year. However, the net effects of fiscal incidence are more pro-poor in urban areas than that of the rural areas. Formal statistical significance tests have shown that the net effects of government upon the post-fiscal distributions were substantial in each year. Post- fiscal incomes were more equally distributed than the pre- fiscal incomes and the differences between them were found to be statistically significant at the 1 percent level in both urban and rural areas in all years except in rural 2001-02. Moreover, this experiments can be matched with the corresponding poverty indices given by head count ratio in the four selected years. In 1979, 1986- 87, 1992- 93 and 2001-02 the head count ratios of poverty in urban areas are 25.94, 14.99, 17.71 and 22.67 respectively, while, the corresponding $F-ratios$ in table 6.5 are 56.1, 94.4, 83.78 and 62.59 respectively. For rural areas the head count ratios are 32.51, 18.32, 23.91 and 38.99 in 1979, 1986-87, 1992-93 and 2001-02 respectively, while, their

corresponding $F-ratios$ in table 6.5 are 20.73, 28.40, 17.05 and 0.817 respectively. Hence, the extent of increases in equality due to distributive effects of government expenditures and taxes are, more or less, directly proportional to the extent of decreases in the poverty head count ratios in both urban- rural areas in 1979, 1986-87, 1992- 93 and 2001- 02. Urban-rural comparisons for their post-fiscal distributions in the same year have shown that in 1986-87, 1992-93 and 2001-02 urban-rural differences in their post- fiscal distributions were both statistically significant at the 1 percent level. However, in 1979 this difference was not significant. In case of statistical tests for alternative years, the differences in the urban post- fiscal distributions between pairs of years, 1979 – 1986-87, 1979 – 1992-93 and 1992-93– 2001-02 were statistically significant at the 5 percent level, 1 percent level and 5 percent level respectively. Whereas, in pair, 1986-87– 1992-93, 1979– 2001-02 and 1986-87– 2001-02 this difference was not significant. In case of rural areas, differences in the post –fiscal distributions between pairs of years, 1979 – 1992-93, 1979– 2001-02 and 1986-87 –1992-93, 1986-87– 2001-02 and 1992-93–2001-02 were statistically significant at the 1 percent level. While, in pair, 1979 – 1986-87, this difference in rural areas was not significant.

- *Zakah-ushr* system has pro-poor effects on the distribution of income in both urban-rural areas of Pakistan. However, urban-rural comparisons show that in 1986-87, after the introduction of *zakah* and *ushr* system in the analysis urban expenditure, tax and net benefit functions are more pro-poor than that of their counterpart rural areas. Whereas, in 1992-93 and 2001- 02, expenditure, tax and net benefit functions with *zakah* and *ushr* in rural areas, contrary to our hypothesis

5.[1] are more pro-poor than that of the urban areas. Therefore, it can be said, roughly, that *zakah* and *ushr* system is becoming more pro-poor for rural areas than the urban areas with the passage of time. A formal statistical significance test has shown that the net effect of *zakah* and *ushr* system upon the post- fiscal distributions was proportionately considerable in both years. As post- *zakah* and *ushr* incomes (including post- fiscal incomes also) were more equally distributed than the pre- and post- fiscal incomes and the differences between pre- fiscal and post- *zakah* and *ushr* distributions were found to be statistically significant at the 1 percent level in both urban and rural areas in all years except in rural 2001- 02. Urban-rural comparisons for their post- *zakah* and *ushr* distributions in the same year have shown that in 1986-87 urban-rural difference in their post- *zakah* and *ushr* distributions was statistically more significant, than that of pre- and post fiscal difference, at the 1 percent level. However, in 1992-93 and 2001- 02 this difference with *zakah* and *ushr* remained less significant than in case of pre- and post fiscal difference, at the 1 percent level. In case of statistical tests for alternative years, the difference in the urban post – *zakah* and *ushr* distributions between the pair, 1986-87 – 1992-93 and 1986-87– 2001-02 was not statistically significant. However, in pair 1992- 93– 2001-02 the difference in their post- *zakah* and *ushr* distributions was statistically more significant, than that of pre- and post fiscal difference, at the 1 percent level. Whereas, the difference in rural post– *zakah* and *ushr* distributions between the same pair of years was statistically significant at the 1 percent level but has lesser $F-ratio$ in the pair, 1986- 87– 1992-93, than that of the rural post- fiscal distributions in the same pair of years.

- The less pro-poor behaviour of the expenditure structure of the government in the rural areas than that of the urban areas is generally due to the small expenditure shares relative to the population shares for the rural areas than for the urban areas

[1] See chapter 1.

and due to the influence of the big agriculturists in the utililisation of funds in each year.

- The pro-rich behaviour of the taxes is mainly, due to the fact that the shares of indirect taxes are more than that of the direct taxes in all four years. However, in the comparisons of urban-rural tax structures across the selected years the rural tax structure is found to be less pro-poor than that of its counterpart urban areas in 1979, 1986-87 and 1992-93. This behaviour in the rural tax structure is due to the larger amount of indirect taxes along with the smaller or even negligible amount of the direct taxes on the households belonging to high-income groups.

Appendix A

SOME CONCEPTS AND TERMINOLOGIES

Some Concepts Related to Income Recipient Unit.

1. The Household

Household can be defined as a single person or a group of people who live together as a single unit in the sense that they have common house keeping arrangements; that is, they have common provision for food and other essentials of living. Persons living in the same dwelling but having separate catering arrangements constitute separate household. The individual and the family are the subsets of a household. A household may consist of an individual or a family or families or plus other persons, or contain only unrelated persons. A ledger that usually lives in a household but takes meals at a hotel, restaurant etc, will constitute a separate household. Whereas, a group of people living separately but taking their meals together will constitute a distinct household. [Kakwani (1986); HIES (1992–93)]

2. Head of Household

If a person lives alone, then that person will be considered as the head of household. If a group of persons live and eat together, as defined above, the head of household shall be that person who is considered as the head by the household members. [HIES (1992–93)]

3. Household members

There are all such individuals or group of individuals in a household who normally live and eat together in a family style and consider the living space occupied by them as their usual place of residence. The individuals may be family members, boarders, lodgers, servants and other employees present in the household. Moreover, all such individuals who usually live and eat in the household in a family style but are casually absent for reasons such as visiting, traveling for the sake of business, attending schools and so forth are also included in the household. However, guests and other visitors who consider their usual place of residence elsewhere but are found staying with the sample household are not considered as household members. [HIES (1992–93)]

4. Family members

These include household, wife/wives, unmarried sons and daughters and other direct dependents such as parents, unmarried sisters, brothers, separated/divorced sisters and daughters. Other persons, servants, boarders and lodgers who live and eat within the household with or without payment are considered as members of the household and not the members of a family. [HIES (1992–93]

5. Household Income

It means material returns in cash or in kind in exchange for goods and services etc., by household earners other than boarders, lodgers and servants. The income of a household may be classified into monthly and annual income in cash or in kind and imputed income. Monthly income shall relate to wages, salaries, pensions, contribution made by boarders and lodgers and professionals' fees etc. Whereas yearly income shall refer to interest and dividends, earning from agriculture activities, business commercial and industrial undertakings land and property rents, gifts and assistance *(zakah)* and relief in cash or in kind, bonus, social and insurance benefits, etc. It also includes the remittances from other household members who are permanently absent. [HIES (1992– 93)]

6 Income in Cash

It means, money receipts such as wages, salaries, rent from land and property, income from self-employment, gifts (*nazrana*), assistance (*zakah*) etc. [HIES 1992– 93)]

7. Imputed income

It is the estimated value of current market prices of the goods received by the household for which no cash payment is made. Imputed income may comprise the estimated value of home produced goods consumed by the household rent free dwellings, gifts and assistance received in kind and provision of free meals by an employer. [HIES (1992– 93)]

8. Household Expenditure

It means the total expenses incurred in the survey year, whether or not payment was made during the year. Similarly, payment made in the survey year on the purchases prior to the survey year is not recorded as expenditure. [HIES (1992– 93)]

9. Earner

It is a person who brings material return in cash or in kind for services rendered. The persons like pensioners, landlords etc. are considered as earners of the household. Unpaid family helper(s) shall also be considered as earner(s). [HIES (1992– 93)]

Functional and Size Distributions of Income

To deal with the distribution problem analytically one has to be very clear about these two basic concepts, namely (1) the functional or the factor share distribution of income and (2) the size or personal distribution of income. The distinction between the two has been elaborated below.

Functional Distribution of Income

A large part of theoretical literature has been erected around the concept of functional distribution of income. It elaborates the share of total national income that each factor of production receives. Process of functional income distribution requires the comparison of the percentage that labor receives as a whole with the percentage of total income distributed in the form of rent, interest and profit. The actual process can be illustrated by the firm-individual relationship. At first the flow from the firm to individuals, who are the owners of the factors employed. The landlord receives his rent, the worker his wages, the investor his interest and profits.

The war of tug between entrepreneurs and workers springs from the conflict of interests present among them. As, it is well known, the profit is the residual balance of the activities of the firm or, saying more precisely, is the share of entrepreneurs. So, the quantum of this residual depends upon the payments made to other factors, that is, if wage, rent and interest rates are decreased (increased), the profit will be increased (decreased). Remember that the profit also varies with the prices of commodities and services produced by the firm, but it is not the point to be concentrated in our present discussion.

It is obvious from the interdependent nature of profit with other rewards that the willingness of entrepreneur to hire factors of production in such proportion, which gives him larger share in the enterprise, plays a major role in the distribution of rewards. The theory that explains the extent of willingness of entrepreneur in hiring factors of production is termed as "marginal productivity theory of factor prices." This theory elaborates that factor will be rewarded well or ill according to its contribution to the total product or revenue of the firm.

Formally, marginal productivity theory can be defined as the increase in total revenue or total output of the firm resulting from the employment of an additional (last) unit of the factor. The specification of the term additional unit with the 'last unit' necessitate that the marginal unit of the factor is the unit the entrepreneur has just hired, in an expanding industry; or is about to discard in an contracting industry.

It is clear that the demand for factors is created by entrepreneurs in the factors market and this demand is a derived demand which arises not due to the factors are demanded for themselves, but for what they can create: goods and services. This process bestows the entrepreneur maximum profit through the channel of least cost combination of the factors and the greater revenue from the sale of these goods and services. So, if demand for final goods and services produced by a firm is higher (lower) then the demand for the factors producing those goods and services by the firm will be higher (lower).

Size Distribution of Income

There are many criticisms on the marginal productivity theory; but we explore those, which serve our purpose of shifting the discussion from functional to size distribution of income. To judge a country's performance, empirical verification by using facts and figures is unavoidable. Marginal productivity theory of distribution on the other hand possesses mostly theorizing style and very little bother for empirical verification. Mark Blaug (1980) interpreted the above fact in the following fashion:

> "Much of this empirical work was little more than "measurement without theory." What emerged in the process was the simplest marginal productivity theory that characterized a large number of journal articles in the 1960's: one or two outputs, two inputs, twice differentiable, aggregate production functions obeying constant returns to scale, malleable, homogeneous capital, a monotonic relationship between the capital-labor ratio and the rate of return on capital, disembodied technical progress classified as neutral or factor saving, perfect competition, instantaneous adjustments, and costless in formation. Even "the new quantitative economic history" of that decade became thoroughly infected by this style of theorizing in which dramatic conclusions about the past are derived from the global measurement of a few well selected microeconomic variables [Blaug, 1980, pp. 195]."

He further added,

> "What practical inferences can be drawn from a simpliste marginal productivity theory of distribution? Radical critics of orthodox economics are persuaded that questions of union, the corporate power structure, the state of aggregate demand, and government policies toward incomes and prices, all of which seem to be relevant to problems of income distribution, are somehow relegated to "sociology" by neoclassical theory, which explains wages and profits simply by technology, consumers preferences, and given factor supplies. This criticism should not be lightly shrugged off but it does involve a certain confusion of language. By a theory of distribution, the critics mean a theory of distributive shares, where as in orthodox economics, the theory of income distribution is the theory of factor pricing; until Hicks there was in fact no theory of the share of wages and profits in national income that commanded universal assent [Blaug, 1980, pp. 195]."

From the above paragraph, it is clear that Hicks was the pioneer, who broached for the first time an aggregate production function of the simple Cobb-Douglas variety. In this way, possibility of defining distributive shares of different factors in the national income came into existence. But even distributive shares are the result of many heroic and naïve assumptions. As Mark Blaug has rightly said:

> "The fact of the matter is that the distribution shares are the outcome of a wide variety of forces and any theory that attempt to tackle them directly find itself making so many heroic, simplifying assumptions that the results are simply analytical curiosities. Apart from obeisance to past traditions and particularly some of

> the questions posed by Ricardo. I personally can find no persuasive reasons to justify the obsessive preoccupation with distributive shares in the writing of both critics and defenders of marginal productivity theory [Blaug, 1980, pp. 198]."

Hence, functional distribution is little helpful in an empirical work of our type, especially, where horizontal and vertical equity are the objectives of a national government. Furthermore, grouping of factors with different incomes is also difficult. For example, groups of workers with identical skills, who are paid alike, difficult to construct practically due to the difficulty of identifying better and worse workers with common skill. So some workers in that skill will be paid more; some will be paid less than their actual individual marginal products. Similar difficulties can be seen in the grouping of workers of a given sex, age and educational qualification in a particular industry, where firms may pay these groups same wage. Especially, in the beginning due to the problem of accurately measuring the marginal products of individuals.

All the above problems can be avoided by adopting the idea of size distribution, particularly, when one wants to judge empirically the effect of government programme upon different income groups of the society as a whole. Concept of size distribution of income also bestows the researchers different tools; like, Lorenz curve and Gini concentration ratio, for examining the degree of fair or worse distribution of income. Needless to say, the above outcomes of the concept of size of distribution of income have made easy to examine the poverty conditions of a country at an aggregate level.

Playing the final round against functional distribution of income, a person may be the employee of a firm but, at the same time, he is earning interest from his investment or he may have inherited property that can comprise many forms. For example, fertile land, commercial land, residence building given on rent etc. So it will be difficult to categories him rightly.

The only solution is to divide all individuals not on the basis of their sources of earning but on their earnings. This above notion leads us to a precise definition of personal or size distribution of income, which can be defined as, "It is a measure that solely deals with individual person or households and the total earning they receive, while ignoring their sources of income". It means that no matter the incomes in the pockets of persons or households are derived from employment only or from other different sources like profits, rents, interest, inheritance, gifts and so forth, they are grouped according to their quantum of incomes and not according to the different channels by which their earnings move into their pockets.

Also, the occupational sources of earning like trade, manufacturing, agriculture, services and the spatial consideration or location are shrugged off. Moreover, number of working hours, sex, age, educational qualification, skill, experience, status and other items of these types deserve no attention. For example, if a person A is more qualified than a person B, but they possess same quantum of earnings, then they will be adjusted in the same group irrespective of the difference in their qualification. Same is the case with other items.

The procedure of constructing a size distribution of income for a country is very simple. Firstly, different income groups, each having some particular income ranges, are ordered in ascending fashion. And then, according to their personal incomes, all individuals or households are adjusted in different income groups, having definite income ranges. This process gives a column of income groups in ascending order. The second column is of personal income, which is usually taken in percentage, this column determines what proportion of total national income each income group receives.

The Individual, the Family and the Household, Comparing their Validity as the Income Recipient Unit.

We compare these three income recipient units, keeping in view three validity criteria proposed by Kuznets (1974, 1976) that must be satisfied by income recipient unit. Which are, (i) income recipient unit must be easily identifiable (ii) it must be independent (iii) it must include total population.[1]

Income recipient unit used in the present study is the household.[2] It is obvious that the household is the central unit within which production and consumption decisions are taken. However, it is not final whether it can be considered to be the most appropriate income recipient unit, until and unless, a comparison among three main types of income recipients, the individual, the family and the household could be carried out. Since income is earned mainly by individuals it seems natural to use individual as the basic unit for analyzing income distribution. Moreover, if the purpose is to explain the generation of income by means of economic and institutional factors such as, sex, age occupation, education and even family status, the individual income earner seems to be the logical choice.

However, from the welfare point of view, the use of individual as the recipient unit raises a number of conceptual problems. For example, the first of the three criteria proposed by Kuznets for the choice of suitable income recipient unit is that the income unit must be easily identifiable. In case of wage and salary income, the problem of identification of an individual as the income earner is not serious. However, the problem becomes almost unsolvable with respect to income from small-scale family enterprises or property that are jointly owned by the family members. The allocation of income among husband, wife and other members of the family in the above-mentioned cases is almost arbitrary. The problem gets even more serious if the allocation of non-money income among the family members is carried out.

Analysis of the individual as the income recipient unit in the light of Kuznets second criteria which relates independence of income unit, reveals that the decision made by any recipient unit, say 'A' on income gaining and income spending is not dependent on any other unit, say 'B'. This assumption of

[1] The discussion in this section is based upon Kakwani (1986): chapter 2.
[2] Household can be defined as a single person or a group of people who live together as a single unit in the sense that they have common house keeping arrangements; that is, they have common provision for food and other essentials of living.

independence among individual income units is hard to justify given the fact that a considerable sharing or pooling of income takes place within families and households. Despite the fact that a considerable number of married women and children have either very low or zero income, they enjoy a standard of living that would be impossible they are depended only on their own incomes.

> "The individual as recipient unit is, therefore, too narrow a concept primarily because it ignores customary dependency relationship [Epstein 1969: 158, quoted in Kakwani (1986)]."

Moreover, individual decisions are strongly affected by these dependency relationships. For example, the selection among different occupations, especially in case of the young, whether to put them for income earning or education, as Kuznets pointed out, is largely dependent on the family decision. Similarly, the decision of a married woman on whether to join the workforce depends on her husband's willingness and his income. To satisfy the second criterion, those individuals who are largely dependent on others can be excluded from the analysis. But, this would dissatisfy the third criterion; that is, income recipient must include total population. Hence exclusion of a large proportion of the population, like, younger, non-working individuals, retired old people and women, from our analysis would clearly lead to misleading results. Furthermore, the identification problem of the first criterion also becomes hurdle in choosing, which individual should be included or excluded.

Second type of income recipient unit, which has been considered more appropriate for welfare purposes, in the studies of size distribution of income, than the individual, is the Family.

> "The members of the family share the goods and services owned or acquired for consumption and pay for their purchases from their joint receipts from earnings or other sources of income [Brady 1958, quoted in Kakwani (1986)]."

Hence the family considerably satisfies the first criterion for income recipient unit, proposed by Kuznets. As the income of the family as a whole is clearly more identifiable than that of particular individuals belonging to it. And the problems that arise in case of individual as the income recipient unit are no more there.

According to second criterion, which calls for independency of income recipient unit, the choice of the family as income recipient unit does not look attractive. For example, two families, having following composition, live jointly.

Husband	
Wife	
Daughter	8 years old
Married son	28 y ears old
Baby of son	2 years old

Using the definition of a family, the above composition comprises two families. These two families might have an entirely different standard of living if they had the same income but were living separately. These differences in living standards when the families live together or separately will almost certainly bias our conclusions about the actual disparity of economic welfare. This problem becomes more severe if any one of the two families has zero income. Assuming that the son is unemployed and then obviously, cannot maintain his family's living standard without joint family system. Hence families living together cannot be assumed to be completely independent of one another. Thus the second criterion proposed by Kuznets, for the suitable income recipient unit does not, generally, favour the choice of the family as the income recipient unit.

In the light of the third criterion, the choice of the family as the income recipient unit is not much appropriate. As, if we collect information on families only, then all the households, which are not families by definition, have to be excluded from the analysis. Similarly all unrelated persons like servants, employees etc. living with families would also be excluded from the analysis. Ultimately this will violate Kuznets inclusion criterion. And, an exclusion of a considerable proportion of population from our analysis would clearly lead to misleading conclusions. Analyzing our selected income recipient unit, the Household, in the light of three criteria given by Kuznets, we would confront with pleasant conclusion. According to first criterion, suggested by Kuznets, the household as the income recipient unit can be easily identifiable. This phenomenon has been explained by an example of hypothetical household structure.

Husband	Head of the Household
Wife	
Married Son	28 years old
Baby of the son	2 years old
Unrelated persons	Servants etc.

In the above example the household consists of two families, having similar status and condition as in the preceding example of the Family and some unrelated persons that could be servants, boarders and lodgers, who live and eat within the household with or without payment and are considered as members of the household but not as members of the families. We also suppose that husband is the head of the household. Now, whether the income is from wages and salaries or from jointly owned enterprise and property or there is a matter of allocation of non-money income among family members; in all cases, the household as an income recipient unit can easily be identifiable.

Viewing the household as an income recipient unit from the spectacle of second criterion, proposed by the Kuznets, it is evident from the above example of household and its constituents that independency problem which exists in the cases of individual and family, as the income recipient unit, is no more there. It is because, the household consists of, as in our case, two families, such that the son's family

is dependent on the father's family. But the household itself is an independent income recipient unit, although it contains son's dependent family unit. Thus the household can be treated, more confidently, as an independent income recipient unit than the individual or the family. Nevertheless there may exist some weak connections of dependency among different households but their presence has ignorable effects on our conclusions.

Viewing through the window of third criterion for suitable income recipient unit, the choice of the household, here also, proves its worthiness. From the welfare point of view it appears that the family is a more suitable income recipient unit than the household. But if we collect information on families only, then all the households, which are not families, have to the excluded from the analysis. But this violates, clearly, the inclusion criterion of Kuznets. Moreover, all unrelated persons, like boarders, lodgers and servants have to be excluded also. Which will obviously, lead us to some biased conclusions.

Hence, by using the household as the income recipient unit we can acquire maximum population coverage, as it is evident from its definition and by the hypothetical but the typical example of the household given above. It can, therefore, be concluded that the choice of the household, as the income recipient unit, according to all three criterions proposed by Kuznets is superior to all other income recipient units.

Some Propositions for Tax and Expenditure Incidence

To distribute government expenditures and taxes along the income groups of urban-rural areas. A comprehensive holds on the knowledge of tax and expenditure incidence is needed. Unfortunately, the incidence of both fiscal items is so ambiguous that one cannot be confident in defining them exactly. Nevertheless, we elaborate the nature and concept of incidence by adopting following three propositions.[3]

1. It can be stated confidently and unambiguously that the ultimate place of incidence for both taxes and expenditures are the individuals.
2. For operational purposes, it is assumed that

Tax revenue	=	Total burden
Expenditures	=	Total benefits

3. If the above equalities do not hold such that,

Tax revenue	≠	Total burden
Expenditures	≠	Total benefits

[3] The idea of these propositions is based upon Musgrave et al. (1989).

Then the distributional effects (incidence) of fiscal items interact with their micro effects, like efficient use of resources as well as macro effects; such as, level of output employment, prices and growth. The explanation of the above-mentioned three propositions is given as under.

Proposition 1: The Ultimate Points of Incidence for Taxes and Expenditures are the Individuals

To fix the idea correctly, we explore the historical background of distribution problem. For the classical economist, like, Ricardo and his other orthodox fellows, the theory of distribution of income is basically the theory of factor pricing, which is obviously, a theory grounded on micro-paradigm. It was Hicks, for the first time, among the neoclassical economists who aggregated the micro-production functions of the firms into a production function for the economy as a whole. This aggregation of production functions of the firms shifted the micro-nature of the distribution theory, viewed by classical economists, to the macro oriented distribution theory, which defined the distributive shares of the factors of production in national income. Similar notion can be traced from Mark Blaug's interpretation, as under:

> "By a theory of distribution, critics mean a theory of distributive shares, whereas in orthodox economics, the theory of income distribution is a theory of factor pricing: until Hicks there was in fact no theory of the share of wages and profits in national income that commanded universal assent" [Mark Blaug (1980), pp. 195-196]."

Thus, the classical economists, similar to their paradigm about distribution theory, discerned the incidence problem in terms of the impact of tax burdens and expenditure benefits on the suppliers of labour, capital and land. Hence for them, the incidence theory was primarily an aspect of the theory of factor shares or factor pricing. This was also useful from the point of view of public policy since, in their time, industry, labour and agriculture did in fact reflect the major social groups. However, in recent time, the class struggle of the classical economists' regime has lost its intense drastically due to advancement in social and technological aspects. As Musgrave pointed out,

> "Today the pattern is more mixed and primary concern – from the viewpoint of social policy – has moved to the size distribution of income rather than functional distribution of income [Musgrave et al. (1989)]."

It is quite clear that the entire tax burden and expenditure benefits, in the end, are born by individuals. For example, firms or corporation are owned by individuals and taxes levied on such enterprises must fall on their owners, employees and customers. Moreover, the class struggle, which was prevailing among landlords, capitalist and labours in the classical era, is no more there, in its original shape, now. For instance, a person possessing only a small amount of capital income and unable to work is poor whereas a person with no capital income but receiving a large salary is well off. And it is also in conformity

with the general income tax approach, where the main concern is with the individual's level of total income irrespective of a particular source from which it is derived. Practically, it is not feasible to determine the incidence, of a particular fiscal change, on each individual. Hence, the concept of household rather than individual is used as an income recipient unit in this work. Moreover, to make our operation easy, households must be grouped in different classes according to their level of incomes. Grouping of the households with respect to their age, education etc can also be done, but it is not desirable in our present research work. Hence, in this thesis, our main aim is to analyze distribution of burden and benefits across the income groups of urban-rural areas in Pakistan.

Proposition 2: In an Empirical Incidence Analysis Taxes and Expenditures are made Equal to Burden and Benefits to the Households Respectively

Here we distinguish between two ultimate consequences of budget policies; one that leads to resource transfer to the public sector and the other that does not. We shall discuss the above two consequences, say 'a' and 'b', of the budget policies as under.

a. Let the government imposes taxes to finance its expenditures, needed to provide social goods and services. Assume that, the tax revenue collected by government is equal to Rs. 12 billions. Further, assume that the government spends this amount of Rs. 12 billions on the construction of Kala Bagh Dam. Consequently the resources available for private use equivalent to Rs. 12 billion will be shifted to public sector for the construction of the dam. This is the opportunity cost or the burden of the dam construction on the private sector. Tax incidence refers to the pattern in which this total burden is shared among individual households. This total burden, obviously, accompanied by total benefits of dam construction. Hence expenditure and tax incidence refer to the pattern in which total benefits and total burden are distributed among individual households belonging to different income groups. As total benefits and burden cannot be known practically, hence we assume the following proposition:

Tax revenue	=	Total burden
Expenditures	=	Total benefits

b. In this case, the budget operations do not involve resource transfer from private to public sector. Government simply collects taxes from the private sector and returns the same collected amount in the form of transfer to that sector. Here no transfer of resources to public use and no net change in income available for private use. Some may gain while others will lose. Here, the problem of incidence points out only the redistribution of private income among different households or the groups of households by income classes.

Proposition 3: Fiscal Items have their Micro and Macro Effects other than Distributional Effects

When the tax revenues and the government expenditures are not equal to total burden and total benefits, respectively, then it means that other micro and macro effects of fiscal policy have come to interfere in the analysis of income distribution through budget policies. The inequalities in this proposition hold due to these three effects (1) Excess burden effect (1) Input effect (3) Demand effect. We will discuss them, turn by turn, as follows.

1. Excess burden effect

The total burden may exceed the revenue collected or the total benefits may fall short of government expenditures as a result of efficiency loss or 'excess burden'. This happens due to the fact that taxes and government expenditures interfere with consumers' choices. To illustrate these facts, we take, at first, the case of a tax imposition. Suppose that Rs. 2 billion revenue is collected from import duty. Although total tax collection from the consumers is Rs. 2 billion, but the total burden on the private sector will be greater, due to the fact, tax interferes with consumer choices.

Thus, many consumers might not purchase their beloved imported items as their prices have risen up significantly due to heavy import duty. Hence the consumers' preferences and expenditures pattern have been distorted by the taxes on imports and they suffer a burden, which is greater than the amount of revenue collected. Moreover government also plays its role in increasing excess burden through administration cost and the compliance cost for the taxpayers.

Turning to the expenditure side, the total benefits often less than the government expenditures, carried out to enhance the social welfare level. This may happen due to mismanagement and misallocation of resources, frauds, nepotism, and wrong judgment about the preferences of the people.

2. Input Effect

Tax revenues and government expenditures may not equal to total burden and total benefits, respectively, due to change in factor supply and in total output. Factor supply is affected not only by the taxes but also by the government expenditures. We may illustrate the effects of taxes and government expenditures on work effort by the following figure A[4]

Let us start from the expenditure effects on the work effort of labour and then the tax effect will be shown in the same figure 'A' to examine the role of the budget policies in incentive to work. To make the analysis understandable we observe only the effect of transfer payment from expenditure side. Transfer

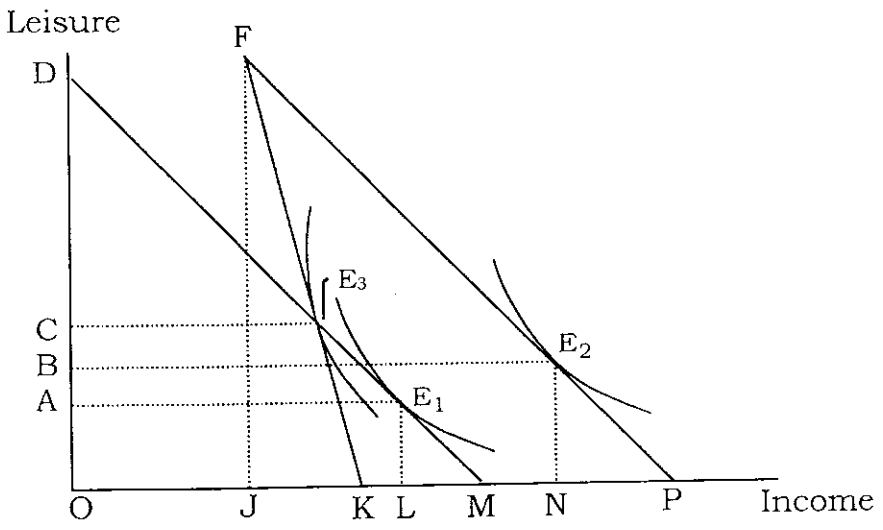
[4] Musgrave et al. (1989): pp. 298–303

payments may be treated as negative taxes. In figure A, leisure is measured on the vertical axis and the amount of rupees is shown on the horizontal axis.

The exchange or price line before government intervention is DM and worker is in equilibrium at E_1. At E_1 the worker is enjoying OA mount of leisure and his work effort is equal to AD. While, he is earning OL amount of income. Now the government intervenes in the private sector and provides OJ amount of income as a transfer payment. As the transfer payments are independent of work effort, the price line shifts parallel to the right without changing its slope to FP. At this new price line the worker moves to a higher level of welfare at E_2. As there is only an income effect, hence the consumption of both leisure and goods has been increased.

Figure A

Expenditure and tax effects on work effort.



Consequently the work effort falls from AD to BD. Now if the government imposes income tax to finance the transfer payments made to private sector, the price line will tilt from FP to FK. The new equilibrium is now at E_3. Here the government revenue is equal to MP i.e. equal to transfer payment. Work effort further decreases due to income tax from BD to CD.

Hence the total budget effect reduces the work incentive in two ways, (i) the income effect of expenditure policy which is equal to AB and (ii) the net (income and substitution) effect, which is shown by BC. But if the transfer payment is positively related to earnings, the income effect is dominated by the substitution effect. As a result, the net effect will be favourable to work effort and thus leads to increase in income level of the country. So in this case the total benefit will exceed the amount of government expenditures. Similarly, if progressive income tax compels the workers to work hard, the total burden may

fall short of the total revenue. However, we ignore the above mentioned effects of expenditures and taxes on the work effort to simplify our analysis.

3. Demand Effect

Level of output and thus level of income may change due to changes in the level of aggregate demand and employment. An increase in expenditures or decrease in taxes may elevate the aggregate demand and consequently may raise the level of output, income and employment. Alternatively, a decrease in expenditures or increase in taxes may depress the aggregate demand and thus output income and employment.

These above mentioned effects, i.e. excess burden, input and demand effects, make the issue of discerning distributional effect of government fiscal actions, more complicated and lead to inequalities between total burden and tax revenues, and, between the total benefits and the government expenditures. However, to study the distributive effects of government expenditures and taxes in this research work, we ignore the all above mentioned effects and follow the equalities present in the proposition '2' i.e.

Total Revenue	=	Total Burden
Expenditures	=	Total Benefit

4. Time Period Effect

Budget adjustments take time, since consumption habits do not change readily. The consumer will be in a better position to avoid tax in the long run than in the short run. Similar consideration can be applied to the supplier. Indeed, it is even more important here than for demand. Supply cannot be changed in the short run, unless inventories are available, since retooling may be needed and new machinery may have to be acquired. Since both demand and supply become more elastic as the tax base narrowed and more adjustment time is allowed, we cannot generalize who (seller or buyer) will gain in the process.[5]

Different concepts of Incidence

Given above three propositions, we are now in a position to elaborate three different concepts of incidence namely, (1) state incidence, (2) economic incidence (taxes), (3) economic incidence (expenditures), (4) social incidence and (5) fiscal incidence

[5] Musgrave et al. (1989).

State Incidence

It refers to the apparent points where taxes or (and) expenditures of the government fall. In other words, the places that appear to be the points of collection of total tax revenues or (and) points of enjoying the total benefits from the government expenditures, irrespective of the fact, whether or not they are actual and full victim of tax burden or (and) actual and complete beneficiaries of government expenditures. State incidence includes two categories of incidences, namely, 'Statutory incidence' and 'Decision incidence'. The former is related to the taxes while the later deals with government expenditures.

As it is well know that the taxes are not voluntary purchase payments but mandatory liabilities and their payment must be made according to, whatever, tax statute has been legislated. While expenditures benefits do not possess mandatory nature, which means that the benefits recipients have no legal liability to receive the expenditure benefits. And, it is merely the decision of the government about its expenditures, keeping in view the managing and welfare aspects of the country. For example, a government employee must not be penalized if he is not willing to receive his salary. Similarly, the act of a person is not illegal if he is not enjoying the facility of Public Park. Hence it is useful to segregate the state incidence into statutory incidence for taxes, and decision incidence, for government expenditure.

Economic Incidence (Taxes)

To fix and inculcate the idea of economic incidence, it is useful to discern the economic incidences of taxes and government expenditures turn by turn. Let us take the case of taxes first. The incidence of taxes depends upon how it is imposed, what rate structure is used, how the base is defined, and what is the extent of its coverage. But it is only the matter of statutory incidence. As a matter of fact, the taxes are imposed as a function of some aspects of economic behaviour, like, earning income making a sale or a purchase. As these taxes are levied with respect to these economic behaviour, which involve two or more economic units. Among them, each participant of the economic transaction adjusts himself in response to tax levy or the consequences of the tax levy, in a way to shift this tax burden to other transactors or he may reduce or increase other economic behaviour to compensate un-shiftable tax levy.

The extent and the success of their reaction to the tax burden depends upon their set of preferences (their demand), structure of market and the method of price determination. This type of adjustment, which appears as a reaction of tax imposition on an individual or a form, through the variations in the preferences and the shifting of the tax burden, may lead to final distribution quite different from initial distribution, or statutory incidence of tax burden, is termed as "Economic Incidence".

Economic Incidence (expenditures)

Economic incidence of government expenditures involve too much complications and leads to macro-effects on the level of capacity output, employment, prices and growth via increase or decrease in aggregate demand and multiplier effect. For example, increase in output may result due to increase in government expenditures via increase in the aggregate demand and employment.

This type of "Economic Incidence" for government expenditures obviously, leads to violation of our proposition 2 and hence will make us unable to study distributive effects of the government expenditures. Therefore, to show the final resting-place of government expenditures we introduce a new concept of incidence i.e. Social Incidence.

Social Incidence

The people of a country get benefits from the expenditures of government, being the member of the society. Therefore, the social incidence refers to the final resting place of the benefits arising from the government expenditures. For example, with the increase in the level of government expenditures, the overall level of welfare or, being more specific in quantitative term, the incomes of the people will increase. The composition of this increase in welfare level or income level of the people depends upon the composition of government expenditures, purposed to achieve different targets. If the prime goal of the government is to ensure fair distribution of income in the country then the package of government expenditures will be of the sort and so on.

Since the aim of this research programme is to measure the effects of government expenditures and taxes on the overall income distributions in the urban-rural areas of Pakistan, therefore the concept of social incidence is very helpful in conducting the study of this type.

Fiscal Incidence

It considers the changes in household positions if the combined effects of tax and expenditure changes are considered. The income available to particular household for private use will now be affected not only by tax but also by expenditure measures. In the case of transfer programmes, private incomes are added to, just as they are reduced by, taxes. In the case of provision for public services, the necessary purchases (whether of the services of civil servants or products) affect the distribution of private income through their effects on earnings. Thus the expenditure side of the budget has its effects on private incomes as do taxes; and since tax and expenditure effects occur simultaneously, they cannot be separated in this case.

Progressive (Regressive) Taxes and Expenditures

Progressive taxes favour lower income classes, whereas progressive expenditures favour higher income classes. Conversely, the term regressive means a distribution of tax burden or expenditure benefits in which the ratio of taxes or expenditures to income is larger for low-income groups than for higher income groups. Since the progressive (regressive) benefits and burden have opposite effects on low and high income groups, hence, one may find it difficult to interpret the distribution of benefits and burden for different income classes in terms of progressive (or regressive) taxes and expenditures. Therefore it is convenient to replace the progressive taxes and regressive expenditure benefits with the term "pro-poor" and the regressive taxes and progressive benefit with the term "pro-rich".

Being more precise, one may say, a pro-poor system leads to a decrease in income inequality, while the pro-rich system leads to an increase in income inequality. Practically, in the data based studies of redistribution of income by the government programmes, a measure of progressivity (regressivity) is based upon the comparison of the inequality indexes for the pre and post-fiscal income distributions. For example, Musgrave and Thin (1948) purposed a measure of progressivity based on pre and post-fiscal distribution of income. According to them a progressive tax system means decrease in inequality while a regressive tax system ensures an increase in inequality. According to this measure, the degree of progressivity remains constant when post tax income is changed equiproportionately, rather than the tax burden.

Let us distinguish between the concepts of progressivity (or regressivity) and the redistribution of income to show the real situation. For this one has to know about the principle of horizontal and vertical equity. The principle of horizontal equity means that persons or households of equal positions should be treated equally, whereas the principle of vertical equity requires that the individuals or households of different capacities should be treated differently. The concept of progressivity in taxes and regressivity in public expenditures conforms to the concept of vertical equity; that is, both explain the extent to which different individuals or households receive different benefits from public expenditures and pay different rates of taxation, according to their different economic capacities.

On the other hand, principle of horizontal equity, which means that persons in equal positions should be treated equally, conforms to the idea of ranking of the individuals. In other words, two persons with same income and needs must receive same public benefits and (or) pay the same taxes. This principle can be avoided under various circumstances; for example, it is often seen that individuals engaged in business pay less income tax than the salary income persons. These inequalities in taxation and expenditure benefits change the ranking of individual in the post-fiscal distribution of income and thus lead to deviation from apparent post-fiscal distribution of income. Therefore, the researchers should distinguish between progressivity (or regressivity) and the distributive effects of a budget policy. This distinction is important because it shows how the distributive effects of taxes and government expenditures are influenced by changes in the average tax and expenditure rates while progressivity and regressivity remain constant and vice versa. Unfortunately, the empirical literature does not pay much attention on this distinction.

Alternative Definitions of Income Redistribution

One can find a good quantum of literature about the problems that can be encountered in measuring the actual income distribution of a country. But, how the income redistribution should be defined has magnetized the attention of the economist very loosely. This threshold concept for analyzing the government effects on the
distribution of income must be discerned and attended seriously. In this regard four alternative general equilibrium definition of redistribution, each having distinctive counterfactual, will be given little later on.[6]

An analysis of the process of redistribution involves comparing a distribution of income before some fiscal changes with the distribution "after". This requires fixing some threshold point of distribution by defining certain counterfactual. Now the controversy starts, which should be the suitable counterfactual? The four alternative definitions of redistribution will strive for winning the game by proving the effectiveness of their respective counterfactual.

In general, income distribution due to government is the change, which comes about in incomes of the households when the parameters describing the governmental behavior change. Moreover, studies of the benefits and burdens of government by income classes mainly concentrate on answering the question about vertical equity. Keeping in the view the concept of vertical equity, primary income distribution, which arises from the assumed counterfactual, must be a suitable index for ranking household in terms of equals and unequals.

Alternative Definitions

Here, we mention four alternative definitions of income re-distribution corresponding to different definitions for primary distribution by using different counterfactuals. For our convenience we adopt the assumptions that the private market is perfectly competitive. The non-fiscal policies existing in the counterfactual are those suitable for defining equals and unequals. All cases have the same definition of the final distribution. Same non-fiscal policies deal with the final distribution. Assuming a neo- classical system i.e. balanced budgets and constant aggregate output, employment and the price level ignores effects of stabilization policies. The term government will refer to all levels of the government combined on the assumption that vertical and horizontal equity are the national objectives, as migration does not allow the sub-national political jurisdictions to play their role.

In the light of above assumptions, we have decided the same definition for the final distribution in all four cases. Hence, it is the matter of defining primary distribution of income that will be considered as a controversial point in defining four alternative definitions of re-distribution of income, due to government programmes. Following are the four alternative definitions of re-distribution of income keeping in view the

[6] This section is based upon Behrens and Smolensky (1973), and Reynolds and Smolensky (1977).

four different cases of the bench mark or primary distribution of income, which ultimately give rise parallel four different states of re-distribution.

State I

In this state of redistribution, the case of zero government counterfactual suggests a benchmark or primary distribution of income. Since non-fiscal policies are unaffected due to assumptions 2 and 4, therefore this counterfactual — zero government also ensures zero budgets. Only the private sector's distribution of factor incomes is used to defined equals and unequals. Any and all changes in this private sector distribution due to any and all taxes and expenditures of the government is then termed as our state I of the re-distribution. We will consider this definition as Gillespie's re-distribution, since it is almost consistent with his recent approach.

State II

In this state, the definition of primary distribution of income arises from the private sector plus the allocative activities of the government. The primary distribution, which defines the equals and unequals, is similar to the distribution, which arises from the Lindahl equilibrium. Lindahl equilibrium combines the provision of the private goods through the perfectly competitive private market with the provision of collective goods, given a distribution of initial endowments.

Moreover, marginal benefit taxation rule is also adopted by Lindahl equilibrium. Here, the primary distribution is different from which is present in Gillespie's case. Because, although, benefits received by the individuals are balanced by the taxes paid by them, in Lindahl equilibrium factor incomes might have also changed in moving from zero government to Lindahl equilibrium. Hence, Lindahl equilibrium excludes the effects on factor income, which arise due to allocative activities of the government. State II redistribution by government policies would take place through following these three channels. (1) The taxes actually levied to finance purely allocative expenditures of the government may deviate from the benefits received. (2) Government may undertake the exhaustive expenditure not fully justified on efficiency grounds to provide factor income to certain sub-groups of the population. (3) The government may make transfers, either in cash or in kind to certain groups of the population at the expense of other groups

In state II, the Lindahl redistribution, it is important to make distinction between the allocative and the redistributive policies of government. This distinction is missing in the theory of Pareto-optimal redistribution. Hence, the redistribution that is taken place, discerning the taxpayer demand patterns, is undoubtedly in the account of allocative activities of the government and refers to marginal benefit taxation. This type of redistribution generates donor benefits, which are necessary for efficient allocation of resources even if redistribution was not a separate governmental objective. Hence efficient transfers are not considered as the redistributive effects of the government in our state II definition of redistribution, as

their effects are counted in the allocation function and thus are included in primary distribution of income. Which, as a result, contains both recipient and donor benefits.

State III

In state II, we defined the primary distribution that could prevail if only benefit taxation were used. The provision of efficient transfers, however, violates this principle of taxation. Although, donors are taxed according to their marginal benefits, the recipients receive benefits for which they are not taxed. This notion suggests the exclusion of recipient benefits from the primary distribution and including them in the redistribution effects of government. Hence, there are two variants of Lindahl redistribution, which we will name Lindahl I and II. So our state II definition of redistribution can be termed as Lindahl I and state III as Lindahl II.

State IV

This state of redistribution is attributed to the idea of Smolensky-Behrens (S-B) In this case; the primary distribution is an optimal in terms of some social welfare function. Here, the primary distribution identifies equals and unequals, and it does not differ from other three cases. In excess of that, (S-B) also requires making an explicit judgment about vertical equity by using ability to pay criterion. The ranking of equals and unequals may be carried out by discerning the Gillespie or the Lindahl or any other benchmark — the counterfactual, and then altering that on the basis of ability-to-pay criterion to give rise (S-B) counterfactual. Our state IV redistribution is then achieved by the difference between the actual burdens and benefits; the households receive due to some fiscal actions and the distribution pattern, which they face, at some particular optimum.

A comparison of the above definitions

When we compare the Gillespie's notion of redistribution with the two variants of Lindahl, it is evident that the difference between the two is the conception of allocative activities of the government, which are excluded from the primary distribution of the former and are included in primary distribution of the latter. While the prime difference, which separates state IV from both states III and I and also from state I is the tax principle adopted to define primary distribution of income. Whereas states II and III i.e. two variants of Lindahl differ each other due to inclusion of the efficient transfers in the primary distribution of the former and the exclusion of them from the primary distribution of the latter. Evaluating state I redistribution, its primary distribution depends upon two principal rationales. The first is normative i.e. persons should be ranked according to their marginal products. The second is taxonomic i.e. all effects of government activities should be included in defining redistribution.

The above two rationales could not capture the role of the government in providing goods, which the private market fails to provide efficiently. Moreover, if the externalities involve in production or consumption factors would not be paid their marginal social products in the zero-government case, which make the first rationale invalid. Hence, to rank the people according to their marginal products, a counterfactual having the allocative activities of the private as well as public sector will be considered ideal. The second rationale, at first sight, looks attractive but it loses it attraction when asymmetric treatment of the allocative activities of private and public sectors appears on the scene.

To understand this point, let the textile industry disappear. Consequently, the incomes of some factors would be lowered and for some others would rise. Assuming that all demand for textile produce is private. The consequences of the above happening will not be included in Gillespie redistribution. On the other side, consequences of constructing a dame will be counted in Gillespie redistribution; only because its demand is from public sector.

These two, as mentioned above, drawbacks of Gillespie redistribution can be tackled well by introducing any of the two variants of Lindahl. If the allocative role of the government is considered just like the use of income by the individuals to buy collectively consumed goods and services, which are paid for at a "market price", then there is no convincing argument to include the distribution effects of merely allocating resources to the public sector, but to exclude the effects of allocating resources to particular uses in the private sector. These arguments advocate the case in the favour of Lindahl redistribution against the Gillespie's paradigm, provided the individuals are to be ranked by their market incomes.

In addition to previous two rationales, another rational for the use of zero-government counterfactual is the value judgment that persons should be ranked by their private market income, whether or not these are equal to marginal social products. This type of value judgment, of course, cannot be rejected on logical and empirical grounds. Discerning the two variants of Lindahl redistribution, the state II is consistent with a strict ranking of individuals by their marginal products. Pareto-optimal transfers donate benefits to some taxpayers, and the fact that the recipients are not taxed for the benefits, is then irrelevant because they are engaging in a productive activity rather than receiving untaxed benefits from government. For instance, in case of transfer recipients are analogous to children and pets because other individuals demand their services as dependents. It confirms that the income or consumption of some individuals enters in the utility functions of others.

This convincing argument may have a wider acceptance and leads us to prefer state II over state III. So far as the state IV is concerned, it has an advantage over others due to the fact that its state of redistribution can be readily interpreted. Moreover, it has a fiscal system, which is progressive in nature that certainly advocates the connotation of taking from the rich and giving to the poor. This notion shows the tendency of the redistribution goal towards, more or less, egalitarian distribution. And, if the perfect equality were the objective of the redistribution then the progressivity carried far enough could lead to a reversal of economic positions and that is not, undoubtedly, desirable.

The difference between case I counterfactual and cases II and III turn on alternative views of the appropriate ranking of individuals. Whereas case IV counterfactual takes the definition of equals and unequals as given (cases I, II, III or any other counterfactual) and then shows whether the difference between unequals has narrowed, widened or remained unchanged. Hence (S-B) definition of redistribution that takes care of the vertical equity plus progressivity in case IV may confirm a failure by government to redistribute income among rich and poor, until all incomes are exactly equal like an egalitarian case. This is, obviously, a draw back of using case IV redistribution.

Conclusion

From the knowledge of preceding four alternative definitions of redistribution, we can conclude that these definitions undoubtedly exhaust the theoretical possibilities. However, when they are examined within an empirical paradigm, non-of four has much to do with statistical work. All definitions involve the comparison of long run equilibria that are the product of actual government policies and some particular counterfactual. Long run incomes in case of zero government are unknown. A zero government budget is, conceptually, an addle experiment. Because, the pre-fiscal distribution already possesses a number of market adjustments to government programmes. Hence weakness of this definition is self-evident. However, other three definitions have, conceptually, reliable benchmarks. But they have no sound empirical validity.

Whereas cases II and III depends mainly upon knowing demand pattern of millions of individuals. Practically, government ignores the demands of its consumers as a whole, instead, only it responses to charitable demands. Moreover, information about the size and pattern of an efficient government tax and expenditure scheme is unattainable. Hence, what constitutes an optimum distribution or the "best" initial distribution is conceptually unknown and obviously, cannot then have an empirical representation. If this problem had been resolved by now, welfare economics would no more have been a question to investigate.

The purpose of all the above discussion has been only to prove that the conventional method of assigning burdens and benefits to income classes for a given year has less validity in discerning redistribution of income by government. In the subsequent chapters we will show the changes in the size distribution of income over time. Moreover, our calculations may not formally be exact in all dimensions, but must donate an unbiased approximation of the changes in final distribution over time. Measuring changes between years makes fewer demands upon the conventional technique than trying to measure the nature of redistribution in a single year for three reasons. First, it clears away the need for the hypothetical counterfactual. It means that the final distribution of income is observed as a simultaneous outcome of both public and private activities, although, the calculations are done in a stepwise sequence independently. Second, any bias is in the same direction in reply to different years of calculation. Third, the biases are most likely to be of similar magnitudes during relatively short time intervals.

An excellent illustration of the bias resulting from using an accounting period of one year can be borrowed from social security system. In this system, a single year accounting period exaggerates the size of the government redistribution by choosing any of the definitions for redistribution. The burdens and benefits of almost all the public actions vary with different stages of the households in their life cycle. Some exaggerated effects of age distribution in the social security system are as under.

In a single year cash payments are highly concentrated at the bottom of income distribution. Whereas, payroll taxes are roughly proportional over the middle portion of the income distribution and smaller at both tails. Obviously this allocation is very different from what would be viewed in a wealth or permanent income paradigm. However, taking year-to-year differences nullifies much of this bias; because the redistributive effects of the system are approximately equally exaggerated in each year.

Theoretical weakness of the intertemporal comparison of final distributions must be admitted. However, despite our reservation on theoretical ground, we will discuss the redistribution of income due to expenditures and taxes within a year by comparing initial and final income distributions. But, however, our main concern will be to discern the changes in the final distributions of income in the urban-rural areas, over time.

Hunting a Suitable Pre-fiscal Definition of Income

With the enhanced interest in observing the incidence of public policies, in the recent years, on the size distribution of income, a desire to estimate such incidence correctly have also developed among the social scientists. To determine tax burden and benefit received from public expenditure by income brackets, income per household before public expenditure and taxes must be known. There is no agreement on what income would be before budgetary effects or after all such effects have been accounted for (Meerman 1974). Furthermore, studies whose focus is income distribution per se frequently, if not usually, ignore budgetary effects and define a concept of income, which neither includes total taxes as a part of income nor in any way concerns itself with the benefits of government spending.[7]

Given the considerable magnitude of public budgets, such cavalier treatment is a serious defect in many empirical works on income distribution (Meerman 1974). In the present study NNP has been used as the income base to observe effects of government expenditures and taxes on the income distribution. Bishop (1966) argued, in the favour of NNP as the income base, by adopting following style.

> "Imputed items of income being allocated in proportion to some index of the assumed distribution of the benefits of the output involved. This conclusion is drawn on the assumption that it is a useful procedure to attribute the burden of all taxes and the benefits of all government expenditure to individuals or families in their individual capacities [Bishop (1966), 1, pp.388]."

[7] The discussion in this section is based upon Meerman (1974)

However, there have been two types of pivotal approaches in empirical studies of budget incidence, namely.

1. National Income and its allotropic forms, like, Adjusted National Income Approach or Broad Income Concept (Gillespie, 1965) and Corrected National Income Approach (Meerman, 1974).
2. Net National Product Approach (NNP).

National Income and its Allotropic Forms

Many analysts engaged in studying tax or budget incidence have used the invalid concept that defines the income aggregate as National Income, or used an even less defensible approach. For example, Thepthana (1979) used National Income Approach as an income base for judging distributive effects of government expenditures and taxes. He quoted data on the National Income of Thailand for different years from the yearbook of National Accounts statistics (1976, United Nations). The rational, which he has given for the choice of the data, is for the NNP rather than National Income. As he said,

> "However, since this study deals with the distribution of tax burden and expenditure benefits in a broad sense (i.e. nation as a whole), a broader income base which is consistent with taxes and government expenditures had to be chosen. This income base should include benefits from government expenditures, and the burdens of all taxes. That is, all government expenditures for the private sector and taxes should be included in the income base [Thepthana (1979), pp. 43]. "

It is clear from the above paragraph that Thepthana subconsciously wanted to use Net National Product Approach as the income base for his analysis. He treated that the data on National Income, as it was for Net National Product. To clarify these different approaches and concepts at first, we elaborate two allotropic approaches of National Income as follows.

a. Adjusted (Broad) National Income Approach
b. Corrected National Income Approach

a. Adjusted (Broad) National Income Approach

The most systematic use of the Adjusted National Income Approach is that of the United Nations Statistical Commission, which in 1972 published draft, guidelines for empirical country work in compiling data on income distribution. The Adjusted National Income Approach revolves around the central concept

of personal income. The personal income is then increased by those taxes which are assumed to burden factors of production directly i.e. unshifted corporate profit tax, unshifted export taxes, backward shifted portion of the employer's social security contribution and other incomes, like, undistributed profits and capital gains; while decreased by the amount of personal transfer payments.

Different authors as "adjusted income" or "broad income" refer to the resulting augmented magnitude. The central idea of the above procedure is to exclude all taxes, from the aggregate income, which are believed shifted forward to consumers. Unambiguously, all indirect taxes have to be excluded. In addition, such items like part of social security taxes and corporate income taxes, which are assumed to be shifted forward to final consumers. Hence the (money) income of factors, like, corporation shareholders, would increase only by the amount of the unshifted burden. The effects of all taxes, which fall on consumption items, can be estimated by collecting information on how different income brackets or groups use their income to purchase the relevant taxed products.

b. Corrected National Income Approach

It is well-accepted notion that the National Income does provide a measure of total factor incomes. In this measure, the only repairing, which has been carried out by the "Broad Income" concept, is that the taxes other than indirect taxes which fall on consumers of the taxed products, must also be handled, as if, they are indirect. In other words the "forward shifted" corporation income tax and social security contributions are just as indirect in their incidence as an excise or sales tax. Note that neither the shifted nor the unshifted portions of corporate income tax are ever received as income by the shareholders. The difference between the two is that with respect to the unshifted part, elimination of tax presumably would result in shareholder's income increasing, in the unshifted amount.

Where as in the case of the part shifted forward to the consumer, elimination would result in increased real incomes of the consumers. In this perspective, the whole notion that conventionally defined national income is equal to the sum of factor incomes is somewhat looking, misleading. It would be useful to redefine the national income concept in such a fashion to exclude all taxes "shifted forward to consumes". The result might be very close to the "Broad Income Concept". Now if we ignore the treatment of capital gain in the "Broad Income", it would become possible to define a meaningful concept of total factor incomes, or a more valid measure of National Income than the conventional one. This new more valid concept has been termed as "Corrected National Income Approach" by Meerman (1974).

Net National Product Approach

Many researchers have been using NNP[8] as the most relevant concept in developing an aggregate income base for the budget incidence studies. It is obvious that the difference between NNP and

[8] Net National Product.

"Corrected" NI is equal to the amount of "Corrected" indirect taxes (defined to include all taxes, which burden consumption). Since these indirect taxes are paid for out of household disposable incomes, how can they be imputed on the income side? Clearly, this appears to be "double counting" [Bishop (1966) pp.383]. Needless to remind, factor incomes do not sum to the market value of output, but to national income, which must be increased by indirect taxes to get output valued at market prices, i.e. NNP. Hence any size distribution of net final output at market prices (NNP) would exceed factor payments by the "corrected" indirect taxes, in case of using broad or corrected income concepts and by the indirect taxes, as compared to simple national income concept. Therefore, it appears that distributing NNP means distributing "income" which factors would not earn even if taxes and public expenditures disappeared. Furthermore, it is argued that factors do not consume the entire NNP, even after assigning all benefits of public expenditures to them.

To clarify the idea, let us assume that purchases of goods and services are burdened solely by indirect taxes[9]. When that burden is distributed in the process of defining income after payment of taxes, the result is after tax income less than national income by the indirect taxes. Adding to this government outlay, assuming equal to indirect taxes, gives a magnitude less than NNP, once again by the amount of indirect taxes. Similar outcomes are strongly expected when we consider direct taxes, incomes and the corresponding increased public expenditures. Use of the National Income and its allotropic approaches imply a total income concept before taxes, which is already net of indirect taxes or "corrected" indirect taxes. While use of NNP approach in effect includes indirect taxes in the basic pre-tax income. Practical significance of this distinction is to avoid an exaggerated result of average tax burden.

Twisting the angle of vision, the resource claims called indirect taxes represent purchasing power for government. Corresponding to these claims, payments neither made nor can be imputed to the factors of production. However, since the logic of budget incidence analysis requires that all output be distributed to private claimants, NNP becomes the relevant concept precisely because it exceeds factor payments or national income by Indirect taxes, or, by the amount of such resource claims.

Most of the researchers assume that indirect taxes usually reduce incomes of households consuming the taxed items. In this new argument, we observe that factor incomes are already net of indirect taxes and need to be increased to what they would be i.e. NNP, were there no indirect taxes. This involves thinking about incidence very differently from the usual approach, that the pattern of incidence of indirect taxes, which is derived from the pattern of consumption, would be the same pattern implicit in "restoring" factor incomes to NNP to get a conceptually more valid measure of aggregate pre-fiscal income. Bishop, in an earlier article addressed to this topic and defended the NNP approach by arguing in effect that the income base should be NNP.

> "Imputed items of income being allocated in proportion to some index of the assumed distribution of the benefit of the output involved. This conclusion is drawn on the assumption that it is a useful

[9] Here and after indirect taxes means "corrected indirect taxes".

procedure to attribute the burden of all taxes and the benefits of all government expenditures to individuals or families in their individual capacities"[Bishop (1966) pp.388].

A Theoretical Background of the Methodology

At first we consider the tax incidence assumptions necessary to allocate taxes across income brackets. Who actually pays the taxes is the key issue in the analysis of income distribution. It is widely recognized that taxes may be shifted either forward or backward and that accurate quantitative measurement of these shifts is almost impossible.

Generally speaking, the more direct the tax, the more difficult it is to shift to someone else; the more indirect the tax, the easier it is to shift it elsewhere (Schnitzer 1974: pp. 9). Indirect taxes, such as sales and excise taxes, are imposed on suppliers of goods and services, but their ultimate burden must be traced to individual households who pay these taxes in terms of increased prices.

The process of shifting these taxes can be analyzed through the supply and demand mechanism of the taxed commodities. According to Dalton's (1936) law, the proportional shifting of tax on a commodity depends upon price elasticities of demand and supply of the commodity. It can be demonstrated that the more elastic the supply, the more the market price will rise and greater will be the extent of shifting the tax to the buyers. Similarly, if demand of the taxed commodity is elastic, either because the good is not important to the buyers or there are ready substitutes for it, the supplier will find it difficult to shift taxes to the buyer.

Moreover, an increase in tax rate may lead to either more or less work; more work if an income effect dominates i.e. people work harder in order to make up for the loss of disposable income, but, less work if the substitution effect dominates i.e. at the margin it becomes more attractive to substitute leisure for income. Existing empirical studies do not seem to provide conclusive evidence as to which of these two effects dominates. It appears that net effect of taxation on work incentive is slight (see, for example, Break 1957; Barlow, Brazer, and Morgan, 1966). This is probably due to the fact that workers have little control over their work hours.[10] The methodology used to estimate the incidence of government expenditures is more tedious and controversial than the tax incidence itself. In fact, the distributional effect of government expenditures is explored using two approaches:[11]

a. The "Money Flow Approach" that takes into account the recipient of direct payments made by the government without considering the final beneficiaries of the government expenditures.

b. The "Benefit Approach" which concentrates on the final beneficiaries of the government expenditures.

[10] Kakwani (1986), PP. 116-117.
[11] Ghaus (1989).

Most of the studies have chosen benefit approach as quoted by DeWulf (1975).[12] The government raises revenues to finance its expenditures presumably in order to provide certain services. As such the pattern of payment is an intermediate and not a final product. Distributional analysis, therefore ought to focus on distribution of services rendered and not on the flow of money [Bhatia, 1960].

The main task in the expenditure incidence analysis is to distribute benefits among the different income groups of a country. For this, a method of benefit valuation is needed. It leads to many problems. For example, value of benefits from the expenditures is equated to the cost of its production, which shows that resources are allocated efficiently between public and private sectors. Optimal allocation is also assumed across sectors within the public sector. Moreover, the method of assessing benefits from government expenditures poses another problem. There are two approaches in this respect.[13]

a. The "Accounting Approach" that equates the value of government output to the cost of government inputs.

b. The "Behavioral Approach" evaluates the government expenditures according to their appraisal by the beneficiaries.

The second approach may also be called "Willingness to Pay Approach" for valuing benefits. This needs the revelation of preferences and their true valuation. As there is no market transaction mechanism for these public goods, the demand schedules remain unidentified. Hence, this approach is extremely difficult and unexplored. That is why, it is argued that a more practical though less rigorous approach, is to estimate cost incurred on behalf of the beneficiaries of the government expenditure [Hussain 1981]. Here, it is implicitly assumed that the marginal utility of income is constant across different income groups of a country and there is no consumer surplus in case of public goods.

Another problem arises when the total benefit from the government expenditures does not rest with direct beneficiaries, but it extends to others in the form externalities. In this case, valuation of total benefit from the government becomes even much difficult. In such cases it is necessary to identify the proportion of benefit to be allocated to the direct beneficiaries and to the society as a whole. Moreover, it is not clear how intergenerational effects of government expenditures can be taken into account and benefits assigned accordingly.

Furthermore, it is customary to estimate distribution of expenditure benefits in a given time period. This method can correctly allocate expenditures on consumption i.e. current expenditures. But, the development expenditures need some different approach, as they generate benefits in the future. This problem can be avoided, more or less, by substituting revised estimates of the government expenditures.

Finally, the question is whether the effects of government expenditures and taxes should be analyzed in a general or a partial equilibrium framework. Piggott (1983) tried to estimate the economic

[12] Ibid.
[13] Ibid.

incidence of taxes under a general equilibrium model, but it is customary in the distribution studies of this type to use partial equilibrium setup rather than general equilibrium approach, which is a gigantic task to be attempted. . As elaborated by Kakwani (1986) in the following style:

> "It should be emphasized that Dalton's law is based on partial equilibrium analysis, which make no allowance for cross price effects on the overall level of demand, It has, therefore, been suggested to analyze tax incidence within a general equilibrium framework. Piggott (1983) attempted to estimate the economic effects of tax changes under a general equilibrium model of the Australian economy. This model is of the algorithmic type and was first applied to United Kingdom economy by Piggott and Whalley (1981). The policy changes considered were the abolition of the tax on corporate profits and the elimination tax favored treatment of owner-occupied housing. Although this study highlights the dangers of relying on partial equilibrium formulation in analyzing tax incidence, there still remains doubt among economists whether the empirical estimates of redistributive effects generated by general equilibrium tax models of the Piggott-Whalley type are necessarily more reliable than those based on the traditional approach employed in the present study. The proper estimation of redistributive effects of taxes and government transfers, based on a general equilibrium approach, is a gigantic task which cannot as yet be attempted."[Kakwani 1986, PP 116-117].

Hence, general equilibrium approach is not feasible to take care about. This study takes into account the partial equilibrium framework in analyzing incidence of government expenditures and taxes across income ranges of urban-rural areas in Pakistan. After having above-mentioned theoretical background about the incidence of taxes and government expenditures one can infer that in this study 'Benefit (Burden) Approach' has been used rather than the 'Money Flow Approach' and Accounting Approach' has been used instead of 'Behavioral Approach'.

Appendix **B**

DISTRIBUTION OF NNP, EXPENDITURES AND TAXES BETWEEN URBAN-RURAL AREAS

Expenditures on social and community services other than education and health, and all other miscellaneous expenditures have been divided between urban and rural areas by considering their population and income weights. Development subsidies have been treated similar to the development expenditures during their division into urban –rural categories.

Interest on internal debt is only considered as relevant amount for this study in all four years, 1979, 1986- 87, 1992- 93 and 2001- 02.

NNP (1979)

Total population[1] (million)				=	77.86
Urban population[2] (million)				=	21.61
Rural population[3] (million)				=	56.25
Average monthly income (all groups – urban)[4]				=	1345.91
Average monthly income (all groups – rural)[5]				=	835.65
Net National Product (NNP)	=	215480[6] (rupees in million)			
PW_U =Population weight (Urban)	=	21.61 / (56.25 + 21.61)		=	0.28
PW_R =Population weight (Rural)	=	56.25 / (56.25 + 21.61)		=	0.72
IW_U = Income weight (Urban)	=	1345.91 / (835.65 + 1345.91)		=	0.62
IW_R = Income weight (Rural)	=	835.65 / (835.65 + 1345.91)		=	0.38
$(WU)^{NNP}$ = NNP weight (Urban)	=	$(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$			
	=	0.17 / 0.44		=	0.39
$(WR)^{NNP}$ = NNP weight (Rural)	=	$(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$			
	=	0.27 / 0.44		=	0.61
NNP (Urban)	=	(0.17 / 0.44) 215480			
	=	83253.6 (rupees in million)			
NNP (Rural)	=	(0.27 / 0.44) 215480			
	=	132226.4 (rupees in million)			

Expenditures (1979)

Education Expenditures

TG^{Ed} = Total expenditures on education[7] (rupees in million)				=	4153.5
LR_U = Literacy ratio (Urban)[8]				=	41.5
LR_R = Literacy ratio (Rural)[9]				=	14.3
LW_U = Literacy weight (Urban)	=	41.5 / 14.3 + 41.5		=	0.74
LW_R = Literacy weight (Rural)	=	14.3 / 14.3 + 41.5		=	0.26
EE_U = Education exp. weight (Urban)[10]	=	5.61 / 2.29 + 5.61		=	0.71
EE_R = Education exp. weight (Rural)[11]	=	2.29 / 2.29 + 5.61		=	0.29
PW_U = Population weight (Urban)	=	21.61 / 21.61 + 56.25		=	0.28
PW_R = Population weight (Rural)	=	56.25 / 21.61 + 56.25		=	0.72

[1] Economic survey, 1979-80.
[2] Ibid.
[3] Ibid.
[4] Household Income Expenditure Survey (HIES) 1979.
[5] Ibid.
[6] Pakistan Statistical Year-Book, 1984 ; 1985.
[7] Economic Survey, 1980-81.
[8] Ibid.
[9] Ibid.
[10] Household Income Expenditure Survey (HIES) 1979.
[11] Ibid.

$(WU)^{Ed}$ =Education weight (Urban) $= (LW_U)(PW_U)(EE_U)/(LW_U)(PW_U)(EE_U)+(LW_R)(PW_R)(EE_R)$

$= 0.73$

$(WR)^{Ed}$ = Education weight (Rural) $= (LW_U)(PW_U)(EE_U)/(LW_U)(PW_U)(EE_U)+(LW_R)(PW_R)(EE_R)$

$= 0.27$

Education Expenditure (Urban) = (0.73) 4153.5
= 3032.10 (rupees in million)

Education Expenditure (Rural) = (0.27) 4153.5
= 1121.4 (rupees in million)

Health Expenditures

TG^H = Total expenditures on health[12] (rupees in million) = 1378.89
AM/HH = Average members per household (Urban)[13] = 6.4
AM/HH = Average members per household (Rural)[14] = 6.0

DW_U	=Density weight (Urban)	= 6.4 / (6.4 + 6.0)	= 0.52
DW_R	=Density weight (Rural)	= 6.0 / (6.4 + 6.0)	= 0.48
MC_U	= Medical care (Urban)[15]	= 7.16 / (7.16 + 9.37)	= 0.43
MC_R	= Medical care (Rural)[16]	= 9.37 / (7.16 + 9.37)	= 0.57
PW_U	=Population weight (Urban)	= 21.61 / (56.25 + 21.61)	= 0.28
PW_R	=Population weight (Rural)	= 56.25 / (56.25 + 21.61)	= 0.72

$(WU)^H$ = Health weight (Urban) $= (DW_U)(PW_U)(MC_U)/(DW_U)(PW_U)(MC_U)+(DW_R)(PW_R)(MC_R)$

$= 0.24$

$(WR)^H$ = Health weight (Rural) $= (DW_U)(PW_U)(MC_U)/(DW_U)(PW_U)(MC_U)+(DW_R)(PW_R)(MC_R)$

$= 0.76$

Health Expenditure (Urban) = (0.24) 1378.89
= 330.93 (rupees in million)

Health Expenditure (Rural) = (0.76) 1378.89
= 1047.96 (rupees in million)

Defense Expenditures

TG^D	= Total expenditures on defense[17]	= 12655 (rupees in million)	
PW_U	= Population weight (Urban)	= 21.61 / (56.25 + 21.61)	= 0.28
PW_R	= Population weight (Rural)	= 56.25 / (56.25 + 21.61)	= 0.72
IW_U	= Income weight (Urban)	= 1345.91 / (835.65 + 1345.91)	= 0.62
IW_R	= Income weight (Rural)	= 835.65 / (835.65 + 1345.91)	= 0.38

$(WU)^D$ = Defense weight (Urban) $= (IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$

$= 0.17 / 0.44 = 0.39$

[12] Economic Survey, 1990- 91.
[13] Household Income Expenditure Survey (HIES) 1979.
[14] Ibid.
[15] Ibid.
[16] Ibid.
[17] Economic Survey, 1982-83.

$(WR)^D$ = Defense weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.27 / 0.44 = 0.61

Defense Expenditure (Urban) = (0.17 / 0.44) 12655
= 4889.4 (rupees in million)
Defense Expenditure (Rural) = (0.27 /0.44) 12655

= 7765.6 (rupees in million)

General Administration Expenditures

TG^{GA} = Total expenditures[18] (rupees in million) = 3011
IW_U = Income weight (Urban) = 1345.91 / (835.65 + 1345.91) = 0.62
IW_R = Income weight (Rural) = 835.65 / (835.65 + 1345.91) = 0.38
PW_U =Population weight (Urban) = 21.61 / (56.25 + 21.61) = 0.28
PW_R =Population weight (Rural) = 56.25 / (56.25 + 21.61) = 0.72

$(WU)^{GA}$ = General administration weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.17 / 0.44 = 0.386
$(WR)^{GA}$ = General administration weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.27 / 0.44 = 0.614

General administration Expenditure (Urban) = (0.17 / 0.44) 3011
= 1163.34 (rupees in million)
General administration Expenditure (Rural) = (0.27 / 0.44) 3011
= 1847.66 (rupees in million)

Interest expenditures

TG^I = Total expenditures[19] = 5070 (rupees in million)
IW_U = Income weight (Urban) = 1345.91 / (835.65 + 1345.91) = 0.62
IW_R = Income weight (Rural) = 835.65 / (835.65 + 1345.91) = 0.38
VW_U = Volume of deposits wt (Urban)[20] = 8.50 / (7.20 + 8.50) = 0.54
VW_U = Volume of deposits wt (Rural)[21] = 7.20 / (7.20 + 8.50) = 0.46
PW_U =Population weight (Urban) = 21.61 / (56.25 + 21.61) = 0.28
PW_R =Population weight (Rural) = 56.25 / (56.25 + 21.61) = 0.72

$(WU)^I$ = Interest weight (Urban) = $(IW_U)(PW_U)(VW_U) / (IW_U)(PW_U)(VW_U) + (IW_R)(PW_R)(VW_R)$
= 0.43
$(WR)^I$ = Interest weight (Rural) = $(IW_U)(PW_U)(VW_U) / (IW_U)(PW_U)(VW_U) + (IW_R)(PW_R)(VW_R)$
= 0.57

Interest Expenditure (Urban) = (0.43) 2695
= 1158.85 (rupees in million)
Interest Expenditure (Rural) = (0.57) 2695
= 1536.15 (rupees in million)

[18] Economic Survey, 1990- 91.
[19] Ibid.
[20] Household Income Expenditure Survey (HIES) 1979.
[21] Ibid.

Agriculture expenditures

TG^{Ag}	= Total expenditures[22] (rupees in million)	=	3194.25	
AI_U	= Agriculture income weight (Urban)[23]	=	8.09 / (6.80 + 8.09)	= 0.54
AI_R	= Agriculture income weight (Rural)[24]	=	6.80 / (6.80 + 8.09)	= 0.46
PW_U	=Population weight (Urban)	=	21.61 / (56.25 + 21.61)	= 0.28
PW_R	=Population weight (Rural)	=	56.25 / (56.25 + 21.61)	= 0.72
FW_U	= Food weight (Urban)[25]	=	46.4 / (46.4 + 55.0)	= 0.46
FW_R	= Food weight (Rural)[26]	=	55.0 / (46.4 + 55.0)	= 0.54

$(WU)^{Ag}$ = Agriculture weight (Urban) = $(AI_U)(PW_U)(FW_U) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$
= 0.28

$(WR)^{Ag}$ = Agriculture weight (Rural) = $(AI_R)(PW_R)(FW_R) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$
= 0.72

Agriculture Expenditure (Urban)	=	(0.28) 3194.25
	=	894.39 (rupees in million)
Agriculture Expenditure (Rural)	=	(0.72) 3194.25
	=	2299.86 (rupees in million)

Development Expenditures

Total development expenditures[27]	=	20878.36		
PW_U =Population weight (Urban)	=	21.61 / (56.25 + 21.61)	=	0.28
PW_R =Population weight (Rural)	=	56.25 / (56.25 + 21.61)	=	0.72
IW_U = Income weight (Urban)	=	1345.91 / (835.65 + 1345.91)	=	0.62
IW_R = Income weight (Rural)	=	835.65 / (835.65 + 1345.91)	=	0.38
$(WU)^{Dev}$ = Development weight (Urban)	=	$(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$		
	=	0.17 / 0.44	=	0.39
$(WR)^{Dev}$ = Development weight (Rural)	=	$(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$		
	=	0.27 / 0.44	=	0.61
Development Expenditure (Urban)	=	(0.39) 20878.36		
	=	8142.56 (rupees in million)		
Development Expenditure (Rural)	=	(0.61) 20878.36		
	=	12735.80 (rupees in million)		

Current Subsidies

Total current subsidies[28] (rupees in million)	=	3821		
AI_U = Agriculture income weight (Urban)[29]	=	8.09 / (6.80 + 8.09)		= 0.54
AI_R = Agriculture income weight (Rural)[30]	=	6.80 / (6.80 + 8.09)		= 0.46

[22] Planning and Development Division of Pakistan, revised estimates, 1982-83.
[23] Household Income Expenditure Survey (HIES) 1979.
[24] Ibid.
[25] Ibid.
[26] Ibid.
[27] Economic Survey, 1990-91. Smaller value than the reported value is due to inclusion of some of the development expenditures in account of development expenditures of education, health and agriculture expenditures.
[28] Ibid.
[29] Household Income Expenditure Survey (HIES) 1979.

PW_U	=Population weight (Urban)	=	21.61 / (56.25 + 21.61)	= 0.28
PW_R	=Population weight (Rural)	=	56.25 / (56.25 + 21.61)	= 0.72
FW_U	= Food weight (Urban)[31]	=	46.4 / (46.4 + 55.0)	= 0.46
FW_R	= Food weight (Rural)[32]	=	55.0 / (46.4 + 55.0)	= 0.54

$(WU)^{CS}$ = Current subsidy weight (Urban)=$(AI_U)(PW_U)(FW_U) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$
= = 0.28

$(WR^{CS}$ = Current subsidy weight (Rural) = $(AI_R)(PW_R)(FW_R) / (AI_U)(PW_U)(FW_U) - (AI_R)(PW_R)(FW_R)$
= = 0.72

Current Subsidies (Urban) = (0.28) 3821
= 1069.88 (rupees in million)
Current Subsidies (Rural) = (0.72) 3821
= 2751.12 (rupees in million)

NNP (1986- 87)

Total population[33] (million)	=	100.70
Urban population[34] (million)	=	28.50
Rural population[35] (million)	=	72.20
Average monthly income (all groups – urban)[36]	=	2738.69
Average monthly income (all groups – rural)[37]	=	1774.83

Net National Product (NNP)[38] = 517073 (rupees in million)

IW_U	= Income weight (Urban)	=	2738.69 / (1774.83 + 2738.69)	= 0.61
IW_R	= Income weight (Rural)	=	1774.83 / (1774.83 + 2738.69)	= 0.39
PW_U	=Population weight (Urban)	=	28.50 / (72.20 + 28.50)	= 0.28
PW_R	=Population weight (Rural)	=	72.20 / (72.20 + 28.50)	= 0.72

$(WU)^{NNP}$ = NNP weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.17 / 0.45 = 0.38

$(WR)^{NNP}$ = NNP weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.28 / 0.45 = 0.62

NNP (Urban) = (0.17 / 0.45) 517073
= 195338.7 (rupees in million)
NNP (Rural) = (0.28 / 0.45) 517073
= 321734.3 (rupees in million)

[30] Ibid.
[31] Ibid.
[32] Ibid.
[33] Economic Survey, 1986-87
[34] Ibid.
[35] Ibid.
[36] Household Income Expenditure Survey (HIES) 1986- 87.
[37] Ibid.
[38] Pakistan Statistical Year-Book, 1987 ; 1988.

EXPENDITURES (1986-87)

Education Expenditures

TG^{Ed}	= Total expenditures on education[39]	=	14880.8 (rupees in million)	
LR_U	= Literacy ratio (Urban)[40]	=	47.1	
LR_R	= Literacy ratio (Rural)[41]	=	17.3	
LW_U	= Literacy weight (Urban)	=	47.1 / 17.3 + 47.1	= 0.73
LW_R	= Literacy weight (Rural)	=	17.3 / 17.3 + 47.1	= 0.27
EE_U	= Education exp. weight (Urban)[42]	=	2.27 / 2.27 + 0.68	= 0.77
EE_R	= Education exp. weight (Rural)[43]	=	0.68 / 2.27 + 0.68	= 0.23
PW_U	= Population weight (Urban)	=	28.50 / (72.20 + 28.50)	= 0.28
PW_R	= Population weight (Rural)	=	72.20 / (72.20 + 28.50)	= 0.72

$(WU)^{Ed}$ =Education weight (Urban) $= (LW_U)(PW_U)(EE_U)/(LW_U)(PW_U)(EE_U)+(LW_R)(PW_R)(EE_R)$ = 0.80

$(WR)^{Ed}$ = Education weight (Rural) $= (LW_R)(PW_R)(EE_R)/(LW_U)(PW_U)(EE_U)+(LW_R)(PW_R)(EE_R)$ = 0.20

Education Expenditure (Urban)	=	(0.80) 14880.8
	=	11904.64 (rupees in million)
Education Expenditure (Rural)	=	(0.20) 14880.8
	=	2976.16 (rupees in million)

Health Expenditures

TG^{H}	= Total expenditures on health[44] (rupees in million)	=	5885
AM/HH	= Average members per household (Urban)[45]	=	6.79
AM/HH	= Average members per household (Rural)[46]	=	6.32

DW_U	= Density weight (Urban)	=	6.79 / (6.32 + 6.79)	= 0.52
DW_R	=Density weight (Rural)	=	6.32 / (6.32 + 6.79)	= 0.48
MC_U	= Medical care (Urban)[47]	=	18.44 / (18.44 + 16.03)	= 0.54
MC_R	= Medical care (Rural)[48]	=	16.03 / (18.44 + 16.03)	= 0.46
PW_U	= Population weight (Urban)	=	28.50 / (72.20 + 28.50)	= 0.28

[39] Economic Survey, 1988-89.
[40] Ibid.
[41] Ibid.
[42] Household Income Expenditure Survey (HIES) 1986- 87.
[43] Ibid.
[44] Economic Survey, 1988-89.
[45] Household Income Expenditure Survey (HIES) 1986- 87.
[46] Ibid.
[47] Ibid.
[48] Ibid.

PW_R = Population weight (Rural) = 72.20 / (72.20 + 28.50) = 0.72

$(WU)^H$ = Health weight (Urban) = $(DW_U)(PW_U)(MC_U)/(DW_U)(PW_U)(MC_U)+(DW_R)(PW_R)(MC_R)$ = 0.33

$(WR)^H$ = Health weight (Rural) = $(DW_R)(PW_R)(MC_R)/(DW_U)(PW_U)(MC_U)+(DW_R)(PW_R)(MC_R)$ = 0.67

Health Expenditure (Urban) = (0.33) 5885
= 1942.05 (rupees in million)

Health Expenditure (Rural) = (0.67) 5885
= 3942.95 (rupees in million)

Defense Expenditures

TG^D = Total expenditures on defense[49] = 41335 (rupees in million)
IW_U = Income weight (Urban) = 2738.69 / (1774.83 + 2738.69) = 0.61
IW_R = Income weight (Rural) = 1774.83 / (1774.83 + 2738.69) = 0.39
PW_U =Population weight (Urban) = 28.50 / (72.20 + 28.50) = 0.28
PW_R =Population weight (Rural) = 72.20 / (72.20 + 28.50) = 0.72
$(WU)^D$ = Defense weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.17 / 0.45 = 0.38
$(WR)^D$ = Defense weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.28 / 0.45 = 0.62

Defense Expenditure (Urban) = (0.17 / 0.45) 41335
= 15615.4 (rupees in million)

Defense Expenditure (Rural) = (0.28 / 0.45) 41335
= 25719.6

General Administration Expenditures

TG^{GA} = Total expenditures[50] (rupees in million) = 10393

IW_U = Income weight (Urban) = 2738.69 / (1774.83 + 2738.69) = 0.61
IW_R = Income weight (Rural) = 1774.83 / (1774.83 + 2738.69) = 0.39
PW_U =Population weight (Urban) = 28.50 / (72.20 + 28.50) = 0.28
PW_R =Population weight (Rural) = 72.20 / (72.20 + 28.50) = 0.72

$(WU)^{GA}$ = General administration weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.17 / 0.45 = 0.378

$(WR)^{GA}$ = General administration weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.28 / 0.45 = 0.622

General administration Expenditure (Urban) = (0.17 / 0.45) 10393
= 3926.24 (rupees in million)

General administration Expenditure (Rural) = (0.28 / 0.45) 10393

[49] Economic Survey, 1990-91.
[50] Economic Survey, 1989-90.

= 6466.76 (rupees in million)

Interest Expenditures

TG^{I}	= Total expenditures[51]	=	23955 (rupees in million)	
IW_U	= Income weight (Urban)	=	2738.69 / (1774.83 + 2738.69)	= 0.61
IW_R	= Income weight (Rural)	=	1774.83 / (1774.83 + 2738.69)	= 0.39
VW_U	= Volume of deposits wt (Urban)[52]	=	6.53 / (6.53 + 4.78)	= 0.58
VW_U	= Volume of deposits wt (Rural)[53]	=	4.78 / (6.53 + 4.78)	= 0.42
PW_U	=Population weight (Urban)	=	28.50 / (72.20 + 28.50)	= 0.28
PW_R	=Population weight (Rural)	=	72.20 / (72.20 + 28.50)	= 0.72

$(WU)^{I}$ = Interest weight (Urban) = $(IW_U)(PW_U)(VW_U)$ / $(IW_U)(PW_U)(VW_U) + (IW_R)(PW_R)(VW_R)$ = 0.45

$(WR)^{I}$ = Interest weight (Rural) = $(IW_R)(PW_R)(VW_R)$ / $(IW_U)(PW_U)(VW_U) + (IW_R)(PW_R)(VW_R)$ = 0.55

Interest Expenditure (Urban)	=	(0.45) 16790
	=	7555.5 (rupees in million)
Interest Expenditure (Rural)	=	(0.55) 16790
	=	9234.5 (rupees in million)

Agriculture Expenditures

TG^{Ag}	= Total expenditures[54] (rupees in million)	=	3219.15	
AI_U	= Agriculture income weight (Urban)[55]	=	2688.91 / (2688.91 + 1678.39)	= 0.61
AI_R	= Agriculture income weight (Rural)[56]	=	1678.39 / (2688.91 + 1678.39)	= 0.39
PW_U	=Population weight (Urban)	=	28.50 / (72.20 + 28.50)	= 0.28
PW_R	=Population weight (Rural)	=	72.20 / (72.20 + 28.50)	= 0.72
FW_U	= Food weight (Urban)[57]	=	41.21 / (41.21 + 49.66)	= 0.45
FW_R	= Food weight (Rural)[58]	=	49.66 / (41.21 + 49.66)	= 0.55

$(WU)^{Ag}$ = Agriculture weight (Urban) = $(AI_U)(PW_U)(FW_U)$ / $(AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$ = 0.33

$(WR)^{Ag}$ = Agriculture weight (Rural) = $(AI_R)(PW_R)(FW_R)$ / $(AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$ = 0.67

Agriculture Expenditure (Urban)	=	(0.33) 3219.15
	=	1062.32 (rupees in million)

[51] Economic Survey, 1990- 91.
[52] Household Income Expenditure Survey (HIES) 1986- 87.
[53] Ibid.
[54] Planning and Development Division of Pakistan, revised estimates, 1988-89.
[55] Household Income Expenditure Survey (HIES) 1986- 87.
[56] Ibid.
[57] Ibid.
[58] Ibid.

Agriculture Expenditure (Rural) = (0.67) 3219.15
= 2156.83 (rupees in million)

Development Expenditures

Total development expenditures[59] = 33228.05

IW_U = Income weight (Urban) = 2738.69 / (1774.83 + 2738.69) = 0.61

IW_R = Income weight (Rural) = 1774.83 / (1774.83 + 2738.69) = 0.39

PW_U =Population weight (Urban) = 28.50 / (72.20 + 28.50) = 0.28

PW_R =Population weight (Rural) = 72.20 / (72.20 + 28.50) = 0.72

$(WU)^{Dev}$ = Development weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.17 / 0.45 = 0.38

$(WR)^{Dev}$ = Development weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.28 / 0.45 = 0.62

Development Expenditure (Urban) = (0.38) 33228.05
= 12626.66 (rupees in million)

Development Expenditure (Rural) = (0.62) 33228.05
= 20601.39 (rupees in million)

Current Subsidies

Total current subsidies[60] = 5809 (rupees in million)

AI_U = Agriculture income weight (Urban)[61] = 2688.91 / (2688.91 + 1678.39) = 0.61

AI_R = Agriculture income weight (Rural)[62] = 1678.39 / (2688.91 + 1678.39) = 0.39

PW_U =Population weight (Urban) = 28.50 / (72.20 + 28.50) = 0.28

PW_R =Population weight (Rural) = 72.20 / (72.20 + 28.50) = 0.72

FW_U = Food weight (Urban)[63] = 41.21 / (41.21 + 49.66) = 0.45

FW_R = Food weight (Rural)[64] = 49.66 / (41.21 + 49.66) = 0.55

$(WU)^{CS}$ = Current subsidy weight (Urban)=$(AI_U)(PW_U)(FW_U) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$ = 0.33

$(WR)^{CS}$= Current subsidy weight (Rural) = $(AI_R)(PW_R)(FW_R) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$ = 0.67

Current Subsidies (Urban) = (0.33) 5809
= 1916.97 (rupees in million)

Current Subsidies (Rural) = (0.67) 5809
= 3892.03 (rupees in million)

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[59] Economic Survey, 1995-96. Smaller value than the reported value is due to inclusion of some of the development expenditures in account of development expenditures of education, health and agriculture expenditures.

[60] Ibid.

[61] Household Income Expenditure Survey (HIES) 1986- 87.

[62] Ibid.

[63] Ibid.

[64] Ibid.

NNP (1992-93)

Total population[65] (million)	=	120.83	
Urban population[66] (million)	=	38.06	
Rural population[67] (million)	=	82.77	
Average monthly income (all groups – urban)[68]	=	4976	
Average monthly income (all groups – rural)[69]	=	3070	
Net National Product (NNP)[70]	=	1123355 (rupees in million)	
IW_U = Income weight (Urban)	=	4976 / (3070 + 4976)	= 0.62
IW_R = Income weight (Rural)	=	3070 / (3070 + 4976)	= 0.38
PW_U =Population weight (Urban)	=	38.06 / (82.77 + 38.06)	= 0.315
PW_R =Population weight (Rural)	=	82.77 / (82.77 + 38.06)	= 0.685
$(WU)^{NNP}$ = NNP weight (Urban)	=	$(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$	
	=	0.195 / 0.455	= 0.43
$(WR)^{NNP}$ = NNP weight (Rural)	=	$(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$	
	=	0.260 / 0.455	= 0.57
NNP (Urban)	=	(0.195 / 0.455) 1123355	
	=	481437.9 (rupees in million)	
NNP (Rural)	=	(0.260 / 0.455) 1123355	
	=	641917.1 (rupees in million)	

EPENDITURES (1992-93)

Education Expenditures

TG^{Ed} = Total expenditures on education[71]	=	29980 (rupees in million)	
LR_U = Literacy ratio (Urban)[72]	=	47.1	
LR_R = Literacy ratio (Rural)[73]	=	17.3	
LW_U = Literacy weight (Urban)	=	47.1 / (47.1+ 17.3)	= 0.73
LW_R = Literacy weight (Rural)	=	17.3 / (47.1 + 17.3)	= 0.27
EE_U = Education exp. weight (Urban)[74]	=	2.29 / 2.29 + 0.95	= 0.71
EE_R = Education exp. weight (Rural)[75]	=	0.95 / 2.29 + 0.95	= 0.29
PW_U = Population weight (Urban)	=	38.06 / (82.77 + 38.06)	= 0.315

[65] Ibid.
[66] Ibid.
[67] Ibid.
[68] Household Integrated Economic Survey (HIES) 1992- 93.
[69] Ibid.
[70] Pakistan Statistical Year-Book, 1993 ; 1994.
[71] Economic Survey, 1994-95.
[72] Economic Survey, 1992-93.
[73] Ibid.
[74] Household Integrated Economic Survey (HIES) 1992- 93.
[75] Ibid.

PW_R = Population weight (Rural) = 82.77 (82.77 + 38.06) = 0.685

$(WU)^{Ed}$ = Education weight (Urban) = $(LW_U)(PW_U)(EE_U)/(LW_U)(PW_U)(EE_U)+(LW_R)(PW_R)(EE_R)$ = 0.77

$(WR)^{Ed}$ = Education weight (Rural) = $(LW_R)(PW_R)(EE_R)/(LW_U)(PW_U)(EE_U)+(LW_R)(PW_R)(EE_R)$ = 0.23

Education Expenditure (Urban) = (0.77) 29980
= 23084.6 (rupees in million)
Education Expenditure (Rural) = (0.23) 29980
= 6895.4 (rupees in million)

Health Expenditures

TG^H = Total expenditures on health[76] (rupees in million) = 9604
AM/HH = Average members per household (Urban)[77] = 6.66
AM/HH = Average members per household (Rural)[78] = 6.30

MC_U = Medical care (Urban)[79] = 24.20 / (24.20 + 28.56) = 0.46
MC_R = Medical care (Rural)[80] = 28.56 / (24.20 + 28.56) = 0.54

DW_U = Density weight (Urban) = 6.66 / (6.30 + 6.66) = 0.514
DW_R = Density weight (Rural) = 6.30 / (6.30 + 6.66) = 0.486

PW_U = Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R = Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685

$(WU)^H$ = Health weight (Urban) = $(DW_U)(PW_U)(MC_U)/(DW_U)(PW_U)(MC_U)+(DW_R)(PW_R)(MC_R)$ = 0.31

$(WR)^H$ = Health weight (Rural) = $(DW_R)(PW_R)(MC_R)/(DW_U)(PW_U)(MC_U)+(DW_R)(PW_R)(MC_R)$ = 0.69

Health Benefit (Urban) = (0.31) 9604
= 2977.24 (rupees in million)
Health Benefit (Rural) = (0.69) 9604
= 6626.76 (rupees in million)

Defense Expenditures

TG^D = Total expenditures on defense[81] = 87461 (rupees in million)
IW_U = Income weight (Urban) = 4976 / (3070 + 4976) = 0.62
IW_R = Income weight (Rural) = 3070 / (3070 + 4976) = 0.38
PW_U = Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R = Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685

[76] Economic Survey, 1994-95.
[77] Household Integrated Economic Survey (HIES) 1992- 93.
[78] Ibid.
[79] Ibid.
[80] Ibid.
[81] Economic Survey, 1995-96.

$(WU)^D$ = Defense weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.195 / 0.455 = 0.43

$(WR)^D$ = Defense weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.260 / 0.455 = 0.57

Defense Expenditure (Urban) = (0.195 / 0.455) 87461
= 37483.29 (rupees in million)

Defense Expenditure (Rural) = (0.260 / 0.455) 87461
= 49977.71

General Administration Expenditures

TG^{GA} = Total expenditures[82] = 20305 (rupees in million)

IW_U = Income weight (Urban) = 4976 / (3070 + 4976) = 0.62
IW_R = Income weight (Rural) = 3070 / (3070 + 4976) = 0.38
PW_U =Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R =Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685

$(WU)^{GA}$ = General administration weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.195 / 0.455 = 0.429

$(WR)^{GA}$ = General administration weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.260 / 0.455 = 0.571

General administration Expenditure (Urban) = (0.195 / 0.455) 20305
= 8702.14 (rupees in million)

General administration Expenditure (Rural) = (0.260 / 0.455) 20305
= 11602.86

Interest Expenditures

TG^I = Total expenditures[83] = 66005 (rupees in million)
IW_U = Income weight (Urban) = 4976 / (3070 + 4976) = 0.62
IW_R = Income weight (Rural) = 3070 / (3070 + 4976) = 0.38
VW_U = Volume of deposits wt (Urban)[84] = 2.49 / (2.49 + 1.55) = 0.62
VW_U = Volume of deposits wt (Rural)[85] = 1.55 / (2.49 + 1.55) = 0.38
PW_U =Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R =Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685

$(WU)^I$ = Interest weight (Urban) = $(IW_U)(PW_U)(VW_U) / (IW_U)(PW_U)(VW_U) + (IW_R)(PW_R)(VW_R)$
= 0.55

$(WR)^I$ = Interest weight (Rural) = $(IW_R)(PW_R)(VW_R) / (IW_U)(PW_U)(VW_U) + (IW_R)(PW_R)(VW_R)$
= 0.45

Interest Expenditure (Urban) = (0.55) 66005
= 36302.75 (rupees in million)

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[82] Ibid.
[83] Economic Survey, 1995-96.
[84] Household Integrated Economic Survey (HIES) 1992- 93.
[85] Ibid.

Interest Expenditure (Rural) = (0.45) 66005
= 29702.25 (rupees in million)

Agriculture Expenditures

TG^{Ag} = Total expenditures[86] = 3105.96 (rupees in million)
AI_U = Agriculture income weight (Urban)[87] = 1514.13 / (1514.13 + 1075.14) = 0.58
AI_R = Agriculture income weight (Rural)[88] = 1075.14/ (1514.13 + 1075.14) = 0.42
PW_U =Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R =Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685
FW_U = Food weight (Urban)[89] = 42.73 / (51.70 + 42.73) = 0.452
FW_R = Food weight (Rural)[90] = 51.70 / (51.70 + 42.73) = 0.548

$(WU)^{Ag}$ = Agriculture weight (Urban) = $(AI_U)(PW_U)(FW_U) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$ = 0.33

$(WR)^{Ag}$ = Agriculture weight (Rural) = $(AI_R)(PW_R)(FW_R) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$ = 0.67

Agriculture Expenditure (Urban) = (0.33) 3105.96
= 1024.97 (rupees in million)
Agriculture Expenditure (Rural) = (0.67) 3105.96
= 2081.0 (rupees in million)

Development Expenditures

Total development expenditures[91] = 76196

IW_U = Income weight (Urban) = 4976 / (3070 + 4976) = 0.62
IW_R = Income weight (Rural) = 3070 / (3070 + 4976) = 0.38
PW_U =Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R =Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685

$(WU)^{Dev}$ = Development weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.195 / 0.455 = 0.43

$(WR)^{Dev}$ = Development weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.260 / 0.455 = 0.57

Development Expenditure (Urban) = (0.43) 76196
= 32764.28 (rupees in million)
Development Expenditures (Rural) = (0.57) 76196
= 43431.72 (rupees in million)

[86] Planning and Development Division of Pakistan, revised estimates, 1994-95.
[87] Household Integrated Economic Survey (HIES) 1992- 93.
[88] Ibid.
[89] Ibid.
[90] Ibid.
[91] Economic Survey 1995- 96.

Current Subsidies

Total current subsidies[92] = 7269

AI_U	= Agriculture income weight (Urban)[93]	=	1514.13 / (1514.13 + 1075.14)	= 0.58
AI_R	= Agriculture income weight (Rural)[94]	=	1075.14 (1514.13 + 1075.14)	= 0.42
PW_U	=Population weight (Urban)	=	38.06 / (82.77 + 38.06)	= 0.315
PW_R	=Population weight (Rural)	=	82.77 / (82.77 + 38.06)	= 0.685
FW_U	= Food weight (Urban)[95]	=	42.73 / (51.70 + 42.73)	= 0.452
FW_R	= Food weight (Rural)[96]	=	51.70 / (51.70 + 42.73)	= 0.548

$(WU)^{CS}$ = Current subsidy weight (Urban)=$(AI_U)(PW_U)(FW_U) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$ = 0.33

$(WR)^{CS}$ =Current subsidy weight (Rural)= $(AI_R)(PW_R)(FW_R) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$ = 0.67

Current Subsidies (Urban)	=	(0.33) 7269
	=	2398.77 (rupees in million)
Current Subsidies (Rural)	=	(0.67) 7269
	=	4870.23 (rupees in million)

NNP (2001-02)

Total population[97] (million)		=	145.96
Urban population[98] (million)		=	47.44
Rural population[99] (million)		=	98.52
Average monthly income (all groups – urban)[100]		=	7696
Average monthly income (all groups – rural)[101]		=	3811
Net National Product (NNP)[102]	=	3163616 (rupees in million)	
IW_U = Income weight (Urban)	=	7696 / (3811 + 7696)	= 0.67
IW_R = Income weight (Rural)	=	3811 / (3811 + 7696)	= 0.33
PW_U =Population weight (Urban)	=	47.44 / (98.52 + 47.44)	= 0.325
PW_R =Population weight (Rural)	=	98.52 / (98.52 + 47.44)	= 0.675

[92] Economic Survey 1995- 96.
[93] Household Integrated Economic Survey (HIES) 1992- 93.
[94] Ibid.
[95] Ibid.
[96] Ibid.
[97] Ibid.
[98] Ibid.
[99] Ibid.
[100] Household Integrated Economic Survey (HIES) 1992- 93.
[101] Ibid.
[102] Pakistan Statistical Year-Book, 1993 ; 1994.

$(WU)^{NNP}$ = NNP weight (Urban) = $(IW_U)(PW_U)$ / $(IW_U)(PW_U) + (IW_R)(PW_R)$
= = 0.494
$(WR)^{NNP}$ = NNP weight (Rural) = $(IW_R)(PW_R)$ / $(IW_U)(PW_U) + (IW_R)(PW_R)$
= = 0.506

NNP (Urban) = (0.494) 3163616
= 1562826.3 (rupees in million)
NNP (Rural) = (0.506) 3163616
= 1600789.7 (rupees in million)

EPENDITURES (2001- 02)

Education Expenditures

TG^{Ed} = Total expenditures on education[103] = 66022 (rupees in million)
LR_U = Literacy ratio (Urban)[104] = 0.70
LR_R = Literacy ratio (Rural)[105] = 0.30
LW_U = Literacy weight (Urban) = 0.70 / (0.70+ 0.30) = 0.70
LW_R = Literacy weight (Rural) = 0.30 / (0.70 + 0.30) = 0.30

EE_U = Education exp. weight (Urban)[106] = 453 / 453 + 134 = 0.77
EE_R = Education exp. weight (Rural)[107] = 453 / 453 + 134 = 0.23
PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675

$(WU)^{Ed}$ =Education weight (Urban) = $(LW_U)(PW_U)(EE_U)/(LW_U)(PW_U)(EE_U)+(LW_R)(PW_R)(EE_R)$
= 0.79
$(WR)^{Ed}$ = Education weight (Rural) = $(LW_R)(PW_R)(EE_R)/(LW_U)(PW_U)(EE_U)+(LW_R)(PW_R)(EE_R)$

= 0.21

Education Expenditure (Urban) = (0.79) 66022
= 52157.4 (rupees in million)
Education Expenditure (Rural) = (0.21) 66022
= 13864.6 (rupees in million)

Health Expenditures

TG^{H} = Total expenditures on health[108] (rupees in million) = 25405
AM/HH = Average members per household (Urban)[109] = 6.87
AM/HH = Average members per household (Rural)[110] = 7.00

[103] Economic Survey, 2003- 04.
[104] Economic Survey, 2001- 02.
[105] Ibid.
[106] Household Integrated Economic Survey (HIES) 2001- 02.
[107] Ibid.
[108] Economic Survey, 2003- 04.
[109] Household Integrated Economic Survey (HIES) 2001- 02.

MC_U = Medical care (Urban)[111] = 326/ (272 + 326) = 0.55
MC_R = Medical care (Rural)[112] = 272/ (272 + 326) = 0.45

DW_U = Density weight (Urban) = 6.87 / (6.87 + 7) = 0.495
DW_R =Density weight (Rural) = 7/ (6.87 + 7) = 0.505

PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675

$(WU)^H$ = Health weight (Urban) = $(DW_U)(PW_U)(MC_U)/(DW_U)(PW_U)(MC_U)+(DW_R)(PW_R)(MC_R)$ = 0.37

$(WR)^H$ = Health weight (Rural) = $(DW_R)(PW_R)(MC_R)/(DW_U)(PW_U)(MC_U)+(DW_R)(PW_R)(MC_R)$ = 0.63

Health Benefit (Urban) = (0.37) 25405
= 9399.9 (rupees in million)
Health Benefit (Rural) = (0.63) 25405
= 16005.1 (rupees in million)

Defense Expenditures

TG^D = Total expenditures on defense[113] = 149254 (rupees in million)
IW_U = Income weight (Urban) = 7696 / (3811 + 7696) = 0.67
IW_R = Income weight (Rural) = 3811 / (3811 + 7696) = 0.33
PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675

$(WU)^D$ = Defense weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.494
$(WR)^D$ = Defense weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.506

Defense Expenditure (Urban) = (0.494) 149254
= 73731.5 (rupees in million)
Defense Expenditure (Rural) = (0.506) 149254
= 75522.5

General Administration Expenditures

TG^{GA} = Total expenditures[114] on G.A. = 91024 (rupees in million)

IW_U = Income weight (Urban) = 7696 / (3811 + 7696) = 0.67
IW_R = Income weight (Rural) = 3811 / (3811 + 7696) = 0.33
PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675

[110] Ibid.
[111] Ibid.
[112] Ibid.
[113] Economic Survey, 2003- 04.
[114] Ibid.

$(WU)^{GA}$ = General administration weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= = 0.494

$(WR)^{GA}$ = General administration weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= = 0.506

General administration Expenditure (Urban) = (0.494) 91024
= 44965.9 (rupees in million)

General administration Expenditure (Rural) = (0.506) 91024
= 46058.1

Interest Expenditures

TG^I = Total expenditures[115] on interest = 213194 (rupees in million)
IW_U = Income weight (Urban) = 7696 / (3811 + 7696) = 0.67
IW_R = Income weight (Rural) = 3811 / (3811 + 7696) = 0.33
VW_U = Volume of deposits wt (Urban)[116] = 1310 / (1310 +499) = 72.4
VW_U = Volume of deposits wt (Rural)[117] = 499 / (1310 + 499) = 27.6
PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675

$(WU)^I$ = Interest weight (Urban) = $(IW_U)(PW_U)(VW_U) / (IW_U)(PW_U)(VW_U) + (IW_R)(PW_R)(VW_R)$
= 0.719

$(WR)^I$ = Interest weight (Rural) = $(IW_R)(PW_R)(VW_R) / (IW_U)(PW_U)(VW_U) + (IW_R)(PW_R)(VW_R)$
= 0.281

Interest Expenditure (Urban) = (0.719) 213194
= 153286.5 (rupees in million)

Interest Expenditure (Rural) = (0.281) 213194
= 59907.5 (rupees in million)

Agriculture Expenditures

TG^{Ag} = Total expenditures[118] = 168 (rupees in million)
AI_U = Agriculture income weight (Urban)[119] = 3218 / (3218 + 2019) = 0.61
AI_R = Agriculture income weight (Rural)[120] = 2019 / (3218 + 2019) = 0.39
PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675
FW_U = Food weight (Urban)[121] = 524.30 / (475.36 + 524.30) = 0.520
FW_R = Food weight (Rural)[122] = 475.36/ (475.36 + 524.30) = 0.480

$(WU)^{Ag}$ = Agriculture weight (Urban) = $(AI_U)(PW_U)(FW_U) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$
= 0.45

$(WR)^{Ag}$ = Agriculture weight (Rural) = $(AI_R)(PW_R)(FW_R) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$

[115] Ibid (Interest on foreign debt has been excluded).
[116] Household Integrated Economic Survey (HIES) 2001- 02.
[117] Ibid.
[118] Statistical Supplement Economic Survey 2002- 03.
[119] Household Integrated Economic Survey (HIES) 2001- 02.
[120] Ibid.
[121] Ibid.
[122] Ibid.

= 0.55

Agriculture Expenditure (Urban) = (0.45) 168
= 75.6 (rupees in million)
Agriculture Expenditure (Rural) = (0.55) 168
= 92.4 (rupees in million)

Development Expenditures

Total development expenditures[123] = 34505

IW_U = Income weight (Urban) = 7696 / (3811 + 7696) = 0.67
IW_R = Income weight (Rural) = 3811 / (3811 + 7696) = 0.33
PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675

$(WU)^{Dev}$ = Development weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.494
$(WR)^{Dev}$ = Development weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.506

Development Expenditure (Urban) = (0.494) 34505
= 17045.5 (rupees in million)
Development Expenditures (Rural) = (0.506) 34505
= 17459.5 (rupees in million)

Current Subsidies

Total current subsidies[124] = 29221

AI_U = Agriculture income weight (Urban)[125] = 3218 / (3218 + 2019) = 0.61
AI_R = Agriculture income weight (Rural)[126] = 2019 / (3218 + 2019) = 0.39
PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675
FW_U = Food weight (Urban)[127] = 524.30 / (475.36 + 524.30) = 0.520
FW_R = Food weight (Rural)[128] = 475.36/ (475.36 + 524.30) = 0.480

$(WU)^{CS}$ = Current subsidy weight (Urban)=$(AI_U)(PW_U)(FW_U) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$
= 0.45
$(WR)^{CS}$ =Current subsidy weight (Rural)= $(AI_R)(PW_R)(FW_R) / (AI_U)(PW_U)(FW_U) + (AI_R)(PW_R)(FW_R)$
= 0.55

Current Subsidies (Urban) = (0.45) 29221
= 13149.5 (rupees in million)

[123] Economic Survey 2003- 04.
[124] Ibid.
[125] Household Integrated Economic Survey (HIES) 2001- 02.
[126] Ibid.
[127] Ibid.
[128] Ibid.

Current Subsidies (Rural)	=	(0.55) 29221
	=	16071.5 (rupees in million)

Taxes (Urban-Rural) 1979

Direct Taxes

TT^{IN}	=	Income and corporate tax[129]	=	5177 (rupees in million)	
$(WU)^{IN}$	=	Income tax weight (Urban)[130]	=	0.30 / 0.30	= 1.00
$(WR)^{IN}$	=	Income tax weight (Rural)[131]	=	0.00 / 0.30	= 0.00
		Income tax (Urban) [rupees in million]	=	[0.30 / 0.30] 5177	= 5177
		Income tax (Rural) [rupees in million]	=	[0.00 / 0.30] 5177	= 0.00
TT^{P}	=	Taxes on property[132]	=	327 (rupees in million)	
$(WU)^{P}$	=	Property tax weight (Urban)[133]	=	0.10 / 0.10	= 1.00
$(WR)^{P}$	=	Property tax weight (Rural)[134]	=	0.00 / 0.10	= 0.00
		Property tax (Urban) [rupees in million]	=	[0.10 / 0.10] 327	= 327
		Property tax (Rural) [rupees in million]	=	[0.00 / 0.10] 327	= 0.00

Sales Tax and Excise Duty

Total population[135] (million)	=	77.86
Urban population[136] (million)	=	21.61
Rural population[137] (million)	=	56.25

TT^{SE}	= Total sales tax and excise duty[138]	=	12888 (rupees in million)	
PW_U	=Population weight (Urban)	=	21.61 / (56.25 + 21.61)	= 0.28
PW_R	=Population weight (Rural)	=	56.25 / (56.25 + 21.61)	= 0.72
CW_U	= Consumption weight (Urban)[139]	=	1188.29 / (1188.29 + 803.34)	= 0.60
CW_R	= Consumption weight (Rural)[140]	=	803.34 / (1188.29 + 803.34)	= 0.40
$(WU)^{SE}$	= Sales and excise weight (Urban)	=	$(PW_U)(CW_U) / (PW_U)(CW_U) + (PW_R)(CW_R)$	
		=	0.168 / 0.456	= 0.37
$(WR)^{SE}$	= Sales and excise weight (Rural	=	$(PW_R)(CW_R) / (PW_U)(CW_U) + (PW_R)(CW_R)$	

[129] Economic Survey, 1985-86.
[130] Household Income Expenditure Survey (HIES) 1979.
[131] Ibid.
[132] Economic Survey, 1995-96.
[133] Household Income Expenditure Survey (HIES) 1979.
[134] Ibid.
[135] Economic survey, 1979-80.
[136] Ibid.
[137] Ibid.
[138] Economic Survey, 1990- 91.
[139] Household Income Expenditure Survey (HIES) 1979.
[140] Ibid.

= 0.288 / 0.456 = 0.63

sales tax and excise duty (Urban) = (0.37) 12888
= 4768.56 (rupees in million)

sales tax and excise duty (Rural) = (0.63) 12888
= 8119.44 (rupees in million)

Import Duties

TT^M = Total import duties[141] = 12126 (rupees in million)
PW_U = Population weight (Urban) = 21.61 / (56.25 + 21.61) = 0.28
PW_R = Population weight (Rural) = 56.25 / (56.25 + 21.61) = 0.72
EW_U = Expenditure weight (Urban)[142] = 1201.40 / (805.19 + 1201.40) = 0.599
EW_R = Expenditure weight (Rural)[143] = 805.19 / (805.19 + 1201.40) = 0.401

$(WU)^M$ = Import duty weight (Urban) = $(PW_U)(EW_U) / (PW_U)(EW_U) + (PW_R)(EW_R)$
= 0.168 / 0.457 = 0.368

$(WR)^M$ = Import duty weight (Rural) = $(PW_R)(EW_R) / (PW_U)(EW_U) + (PW_R)(EW_R)$
= 0.289 / 0.457 = 0.632

Import duty (Urban) = (0.168 / 0.457) 12126
= 4457.7 (rupees in million)

Import duty (Rural) = (0.289 / 0.457) 12126
= 7668.3 (rupees in million)

Export Duty

TT^X = Total export duty[144] = 446 (rupees in million)

PW_U = Population weight (Urban) = 21.61 / (56.25 + 21.61) = 0.28
PW_R = Population weight (Rural) = 56.25 / (56.25 + 21.61) = 0.72
IW_U = Income weight (Urban) = 1345.91 / (835.65 + 1345.91) = 0.62
IW_R = Income weight (Rural) = 835.65 / (835.65 + 1345.91) = 0.38

$(WU)^X$ = Export duty weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.174 / 0.448 = 0.39

$(WR)^X$ = Export duty weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.274 / 0.448 = 0.61

Export duty (Urban) = (0.174 / 0.448) 446
= 173.22 (rupees in million)

Export duty (Rural) = (0.274 / 0.448) 446
= 272.78 (rupees in million)

[141] Economic Survey, 1984-85.
[142] Household Income Expenditure Survey (HIES) 1979.
[143] Ibid.
[144] Economic Survey, 1985-86.

Motor Vehicle Tax

TT^{Veh} = Total motor vehicle tax[145] = 325 (rupees in million)

PW_U = Population weight (Urban) = 21.61 / (56.25 + 21.61) = 0.28
PW_R = Population weight (Rural) = 56.25 / (56.25 + 21.61) = 0.72
WW_U = Vehicle weight (Urban)[146] = 0.71 / (0.71 + 0.29) = 0.71
WW_R = Vehicle weight (Rural)[147] = 0.29 / (0.71 + 0.29) = 0.29

$(WU)^{Veh}$ = Motor vehicle weight (Urban) $= (WW_U)(PW_U) / (WW_U)(PW_U) + (WW_R)(PW_R)$
$= 0.49$

$(WR)^{Veh}$ = Motor vehicle weight (Rural) $= (WW_R)(PW_R) / (WW_U)(PW_U) + (WW_R)(PW_R)$
$= 0.51$

Motor vehicle tax (Urban) = (0.49) 325
= 159.25 (rupees in million)

Motor vehicle tax (Rural) = (0.51) 325
= 165.75 (rupees in million)

TAXES (URBAN-RURAL) 1986-87

Direct Taxes

TT^{IN} = Income and corporate tax[148] = 10354 (rupees in million)
$(WU)^{IN}$ = Income tax weight (Urban)[149] = 0.59 / 0.60 = 0.98

$(WR)^{IN}$ = Income tax weight (Rural)[150] = 0.01 / 0.60 = 0.02

Income tax (Urban) = [0.59 / 0.60] 10354
= 10181.43 (rupees in million)

Income tax (Rural) = [0.01 / 0.60] 10354
= 172.57 (rupees in million)

TT^{P} = Taxes on property[151] = 751 (rupees in million)
$(WU)^{P}$ = Property tax weight (Urban)[152] = 0.12 / 0.13 = 0.92
$(WR)^{P}$ = Property tax weight (Rural)[153] = 0.01 / 0.13 = 0.08
$(TW)^{P}$ = Total weight (Urban-Rural)

Property tax (Urban) = [0.12 / 0.13] 751

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[145] Economic Survey, 1990- 91.
[146] Household Income Expenditure Survey (HIES) 1979.
[147] Ibid.
[148] Economic Survey, 1990-91.
[149] Household Income Expenditure Survey (HIES) 1986- 87.
[150] Ibid.
[151] Economic Survey, 1990-91.
[152] Household Income Expenditure Survey (HIES) 1986- 87.
[153] Ibid.

	=	693.23 (rupees in million)
Property tax (Rural)	=	[0.01 / 0.13] 751
	=	57.77 (rupees in million)

Sales Tax and Excise Duty

Total population[154]	=	100.70 (million)
Urban population[155]	=	28.50 (million)
Rural population[156]	=	72.20 (million)

TT^{SE} = Total sales tax and excise duty[157]	=	21912 (rupees in million)
PW_U =Population weight (Urban)	=	28.50 / (72.20 + 28.50) = 0.28
PW_R =Population weight (Rural)	=	72.20 / (72.20 + 28.50) = 0.72
CW_U = Consumption weight (Urban)[158]	=	2601.9 / (1709.8 + 2601.9) = 0.60
CW_R = Consumption weight (Rural)[159]	=	1709.8 / (1709.8 + 2601.9) = 0.40
$(WU)^{SE}$ = Sales and excise weight (Urban)	=	$(PW_U)(CW_U) / (PW_U)(CW_U) + (PW_R)(CW_R)$
	=	0.168 / 0.456 = 0.37
$(WR)^{SE}$ = Sales and excise weight (Rural	=	$(PW_R)(CW_R) / (PW_U)(CW_U) + (PW_R)(CW_R)$
	=	0.288 / 0.456 = 0.63

Sales tax and excise duty (Urban)	=	(0.37) 21912
	=	8107.44 (rupees in million)
Sales tax and excise duty (Rural)	=	(0.63) 21912
	=	13804.56 (rupees in million)

Import Duties

TT^{M} = Total import duties[160]	=	28519 (rupees in million)
PW_U =Population weight (Urban)	=	28.50 / (72.20 + 28.50) = 0.28
PW_R =Population weight (Rural)	=	72.20 / (72.20 + 28.50) = 0.72
EW_U = Expenditure weight (Urban)[161]	=	2612.2/ (2612.2 + 1710.5) = 0.604
EW_R = Expenditure weight (Rural)[162]	=	1710.5 / (1710.5 + 2612.2) = 0.396
$(WU)^{M}$ = Import duty weight (Urban)	=	$(PW_U)(EW_U) / (PW_U)(EW_U) + (PW_R)(EW_R)$
	=	0.169 / 0.454 = 0.372
$(WR)^{M}$ = Import duty weight (Rural)	=	$(PW_R)(EW_R) / (PW_U)(EW_U) + (PW_R)(EW_R)$
	=	0.285 / 0.454 = 0.628

Import duty (Urban)	=	(0.169 / 0.454) 28519
	=	10616.10 (rupees in million)
Import duty (Rural)	=	(0.285 / 0.454) 28519

[154] Economic Survey, 1986-87.
[155] Ibid.
[156] Ibid.
[157] Economic Survey, 1995- 96.
[158] Household Income Expenditure Survey (HIES) 1986- 87.
[159] Ibid.
[160] Economic Survey, 1990-91.
[161] Household Income Expenditure Survey (HIES) 1986- 87.
[162] Ibid.

= 17902.90 (rupees in million)

Export Duty

TT^X	= Total export duty[163]	=	275 (rupees in million)	
IW_U	= Income weight (Urban)	=	2738.69 / (1774.83 + 2738.69)	= 0.61
IW_R	= Income weight (Rural)	=	1774.83 / (1774.83 + 2738.69)	= 0.39
PW_U	=Population weight (Urban)	=	28.50 / (72.20 + 28.50)	= 0.28
PW_R	=Population weight (Rural)	=	72.20 / (72.20 + 28.50)	= 0.72
$(WU)^X$	= Export duty weight (Urban)	=	$(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$	
		=	0.1708 / 0.4516	= 0.38
$(WR)^X$	= Export duty weight (Rural)	=	$(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$	
		=	0.2808 / 0.4516	= 0.62
	Export duty (Urban)	=	(0.1708 / 0.4516) 275	
		=	104.01(rupees in million)	
	Export duty (Rural)	=	(0.2808 / 0.4516) 275	
		=	170.99 (rupees in million)	

Motor Vehicle Tax

TT^{Veh}	= Total motor vehicle tax[164]	=	814 (rupees in million)	
PW_U	=Population weight (Urban)	=	28.50 / (72.20 + 28.50)	= 0.28
PW_R	=Population weight (Rural)	=	72.20 / (72.20 + 28.50)	= 0.72
WW_U	= Vehicle weight (Urban)[165]	=	0.63 / (0.63 + 0.37)	= 0.63
WW_R	= Vehicle weight (Rural)[166]	=	0.37 / (0.63 + 0.37)	= 0.37
$(WU)^{Veh}$	= Motor vehicle weight (Urban)	=	$(WW_U)(PW_U) / (WW_U)(PW_U) + (WW_R)(PW_R)$	
		=	=	0.40
$(WR)^{Veh}$	= Motor vehicle weight (Rural)	=	$(WW_R)(PW_R) / (WW_U)(PW_U) + (WW_R)(PW_R)$	
			=	0.60
	Motor vehicle tax (Urban)	=	(0.40) 814	
		=	325.60 (rupees in million)	
	Motor vehicle tax (Rural)	=	(0.60) 814	
		=	488.40 (rupees in million)	

Tax on Natural Gas

TT^{Gas}	= Total natural gas tax[167]	=	1975 (rupees in million)	
PW_U	=Population weight (Urban)	=	28.50 / (72.20 + 28.50)	= 0.28
PW_R	=Population weight (Rural)	=	72.20 / (72.20 + 28.50)	= 0.72

[163] Economic Survey, 1990-91.
[164] Economic Survey, 1995- 96.
[165] Household Income Expenditure Survey (HIES) 1986- 87.
[166] Ibid.
[167] Economic Survey, 1995- 96.

GW_U = Gas weight (Urban)[168] = 0.96 / (0.96 + 0.04) = 0.96
GW_R = Gas weight (Rural)[169] = 0.04 / (0.96 + 0.04) = 0.04

$(WU)^{Gas}$ = Natural gas weight (Urban) = $(GW_U)(PW_U) / (GW_U)(PW_U) + (GW_R)(PW_R)$
= = 0.90

$(WR)^{Gas}$ = Natural gas weight (Rural) = $(GW_R)(PW_R) / (GW_U)(PW_U) + (GW_R)(PW_R)$
= 0.10

Tax on natural gas (Urban) = (0.90) 1975
= 1777.5 (rupees in million)
Tax on natural gas (Rural) = (0.10) 1975
= 197.5 (rupees in million)

Tax on Petroleum

TT^{Pet} = Total tax on petroleum[170] = 11272 (rupees in million)

PW_U =Population weight (Urban) = 28.50 / (72.20 + 28.50) = 0.28
PW_R =Population weight (Rural) = 72.20 / (72.20 + 28.50) = 0.72
TW_U = Transport and traveling weight (Urban)[171] = 0.64 / (0.64 + 0.36) = 0.64
TW_R = Transport and traveling weight (Rural)[172] = 0.36 / (0.64 + 0.36) = 0.36

$(WU)^{Pet}$ = Petroleum weight (Urban) = $(TW_U)(PW_U) / (TW_U)(PW_U) + (TW_R)(PW_R)$
= = 0.41

$(WR)^{Pet}$ = Petroleum weight (Rural) = $(TW_R)(PW_R) / (TW_U)(PW_U) + (TW_R)(PW_R)$
= 0.59

Tax on petroleum(Urban) = (0.41) 11272.
= 4621.52 (rupees in million)
Tax on petroleum (Rural) = (0.59) 11272
= 6650.48 (rupees in million)

Taxes (Urban-Rural) 1992-93

Direct Taxes

TT^{IN} = Income and corporate tax[173] = 35018 (rupees in million)
$(WU)^{IN}$ = Income tax weight (Urban)[174] = 1.27 / 1.33 = 0.955
$(WR)^{IN}$ = Income tax weight (Rural)[175] = 0.06 / 1.33 = 0.045

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[168] Household Income Expenditure Survey (HIES) 1986- 87.
[169] Ibid.
[170] Economic Survey, 1995- 96.
[171] Household Income Expenditure Survey (HIES) 1986- 87.
[172] Ibid.
[173] Economic Survey, 1995-96.
[174] Calculated by averaging out the trend in the percentage of total monthly expenditures on income tax across the income brackets in urban areas given in HIES of 1979-80, 1984-85, 1985-86, 1986-87, 1987-88 and then taking out the average trend of all groups.

Income tax (Urban) = [1.27 / 1.33] 35018
= 33438.24 (rupees in million)

Income tax (Rural) = [0.06 / 1.33] 35018
= 1579.76 (rupees in million)

TT^P = Taxes on property[176] = 2785 (rupees in million)
$(WU)^P$ = Property tax weight (Urban)[177] = 1.01 / 1.09 = 0.927
$(WR)^P$ = Property tax weight (Rural)[178] = 0.08 / 1.09 = 0.073

Property tax (Urban) = [1.01 / 1.09] 2785
= 2580.60 (rupees in million)

Property tax (Rural) = [0.08 / 1.09] 2785
= 204.40 (rupees in million)

Sales Tax and Excise Duty

Total population[179] = 120.83 (million)
Urban population[180] = 38.06 (million)
Rural population[181] = 82.77 (million)

TT^{SE} = Total sales tax and excise duty[182] = 59131 (rupees in million)

PW_U = Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R = Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685
CW_U = Consumption weight (Urban)[183] = 4542 / (4542 + 3088) = 0.595
CW_R = Consumption weight (Rural)[184] = 3088 / (4542 + 3088) = 0.405

$(WU)^{SE}$ = Sales and excise weight (Urban) = $(PW_U)(CW_U) / (PW_U)(CW_U) + (PW_R)(CW_R$
= 0.187 / 0.464 = 0.403

$(WR)^{SE}$ = Sales and excise weight (Rural) = $(PW_R)(CW_R) / (PW_U)(CW_U) - (PW_R)(CW_R)$
= 0.277 / 0.464 = 0.597

Sales tax and excise duty (Urban) = (0.40) 59131
= 23652.4 (rupees in million)

Sales tax and excise duty (Rural) = (0.60) 59131
= 35478.6 (rupees in million)

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[175] Calculated by averaging out the trend in the percentage of total monthly expenditures on income tax across the income brackets in rural areas given in HIESs of 1979-80, 1984-85, 1985-86, 1986-87, 1987-88 and then taking out the average trend of all groups.

[176] Economic Survey, 1994-95.

[177] Household Integrated Economic Survey (HIES) 1992- 93.
[178] Ibid.
[179] Economic Survey, 1995-96.
[180] Ibid.
[181] Ibid.
[182] Economic Survey, 1995-96.
[183] Household Integrated Economic Survey (HIES) 1992- 93.
[184] Ibid.

Import Duties

TT^M = Total import duties[185] = 62360 (rupees in million)

PW_U = Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R = Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685
EW_U = Expenditure weight (Urban)[186] = 4554 / (4554 + 3127) = 0.593
EW_R = Expenditure weight (Rural)[187] = 3127 / (4554 + 3127) = 0.407

$(WU)^M$ = Import duty weight (Urban) = $(PW_U)(EW_U) / (PW_U)(EW_U) + (PW_R)(EW_R)$
= 0.187 / 0.466 = 0.40

$(WR)^M$ = Import duty weight (Rural) = $(PW_R)(EW_R) / (PW_U)(EW_U) + (PW_R)(EW_R)$
= 0.279 / 0.466 = 0.60

Import duty (Urban) = (0.187 / 0.466) 62360
= 25024.29 (rupees in million)

Import duty (Rural) = (0.279 / 0.466) 62360
= 37335.71 (rupees in million)

Export Duty

TT^X = Total export duty[188] = 865 (rupees in million)

IW_U = Income weight (Urban)[189] = 4976 / (4976 + 3070) = 0.62
IW_R = Income weight (Rural)[190] = 3070 / (4976 + 3070) = 0.38
PW_U = Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R = Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685

$(WU)^X$ = Export duty weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.195 / 0.455 = 0.429

$(WR)^X$ = Export duty weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= 0.260 / 0.455 = 0.571

Export duty (Urban) = (0.195 / 0.455) 865
= 370.71 (rupees in million)

Export duty (Rural) = (0.260 / 0.455) 865
= 494.29 (rupees in million)

Motor Vehicle Tax

TT^{Veh} = Total motor vehicle tax[191] = 1306 (rupees in million)

PW_U = Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R = Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685

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[185] Economic Survey, 1994-95.
[186] Household Integrated Economic Survey (HIES) 1992- 93.
[187] Ibid.
[188] Economic Survey, 1994 -95
[189] Household Integrated Economic Survey (HIES) 1992- 93.
[190] Ibid.
[191] Economic Survey, 1995- 96.

WW_U = Vehicle weight (Urban)[192] = 2.07 / (2.07 + 0.95) = 0.69
WW_R = Vehicle weight (Rural)[193] = 0.95 / (2.07 + 0.95)
= 0.31

$(WU)^{Veh}$ = Motor vehicle weight (Urban) = $(WW_U)(PW_U) / (WW_U)(PW_U) + (WW_R)(PW_R)$
= = 0.51
$(WR)^{Veh}$ = Motor vehicle weight (Rural) = $(WW_R)(PW_R) / (WW_U)(PW_U) + (WW_R)(PW_R)$
= 0.49

Motor vehicle tax (Urban) = (0.51) 1306
= 666.06 (rupees in million)
Motor vehicle tax (Rural) = (0.49) 1306
= 639.94 (rupees in million)

Tax on Natural Gas

TT^{Gas} = Total natural gas tax[194] = 6549 (rupees in million)

PW_U = Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R = Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685
GW_U = Gas weight (Urban)[195] = 19.33 / (19.33 + 0.34) = 0.98
GW_R = Gas weight (Rural)[196] = 0.34 / (19.33 + 0.34) = 0.02

$(WU)^{Gas}$ = Natural gas weight (Urban) = $(GW_U)(PW_U) / (GW_U)(PW_U) + (GW_R)(PW_R)$
= = 0.97
$(WR)^{Gas}$ = Natural gas weight (Rural) = $(GW_R)(PW_R) / (GW_U)(PW_U) + (GW_R)(PW_R)$
= 0.03

Tax on natural gas (Urban) = (0.97) 6549
= 6352.53 (rupees in million)
Tax on natural gas (Rural) = (0.03) 6549
= 196.47 (rupees in million)

Tax on Petroleum

TT^{Pet} = Total tax on petroleum[197] = 5663 (rupees in million)

PW_U = Population weight (Urban) = 38.06 / (82.77 + 38.06) = 0.315
PW_R = Population weight (Rural) = 82.77 / (82.77 + 38.06) = 0.685

TW_U = Transport and traveling weight (Urban)[198] = 2.60 / (2.60 + 0.98) = 0.73
TW_R = Transport and traveling weight (Rural)[199] = 0.98 / (2.60 + 0.98) = 0.27

$(WU)^{Pet}$ = Petroleum weight (Urban) = $(TW_U)(PW_U) / (TW_U)(PW_U) + (TW_R)(PW_R)$

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[192] Household Integrated Economic Survey (HIES) 1992- 93.
[193] Ibid.
[194] Economic Survey, 1995- 96.
[195] Household Integrated Economic Survey (HIES) 1992- 93.
[196] Ibid.
[197] Economic Survey, 1995- 96.
[198] Household Integrated Economic Survey (HIES) 1992- 93.
[199] Ibid.

$(WR)^{Pet}$ = Petroleum weight (Rural) = $(TW_R)(PW_R) / (TW_U)(PW_U) + (TW_R)(PW_R)$ = 0.56 = 0.44

Tax on petroleum(Urban) = (0.56) 5663.
= 3171.28 (rupees in million)
Tax on petroleum (Rural) = (0.44) 5663
= 2491.72 (rupees in million)

Taxes (Urban-Rural) 2001- 02

Direct Taxes

TT^{IN} = Income and corporate tax[200] = 142505 (rupees in million)
$(WU)^{IN}$ = Income tax weight (Urban)[201] = 23.5 / 23.5 + 9.2 = 0.72
$(WR)^{IN}$ = Income tax weight (Rural)[202] = 9.2 / 23.5 + 9.2 = 0.28

Income tax (Urban) = [0.72] 142505
= 102603.6 (rupees in million)
Income tax (Rural) = [0.28] 142505
= 39901.4 (rupees in million)

TT^{P} = Taxes on property[203] = 4898 (rupees in million)
$(WU)^{P}$ = Property tax weight (Urban)[204] = 786.8 / (786.8 + 441.6) = 0.64
$(WR)^{P}$ = Property tax weight (Rural)[205] = 441.6 / (786.8 + 441.6) =0.36

Property tax (Urban) = [0.64]4898
= 3134.7 (rupees in million)
Property tax (Rural) = [0.36] 4898
= 1763.3 (rupees in million)

Sales Tax and Excise Duty

Total population[206] = 145.96 (million)
Urban population[207] = 47.44 (million)

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[200] Economic Survey, 2003- 04.
[201] Calculated by averaging out the trend in the percentage of total monthly expenditures on income tax across the income brackets in urban areas given in HIESs of 1979-80, 1984-85, 1985-86, 1986-87, 1987-88 and that of imputed values of 1992-93 and then taking out the average trend of all groups.
[202] Calculated by averaging out the trend in the percentage of total monthly expenditures on income tax across the income brackets in rural areas given in HIES of 1979-80, 1984-85, 1985-86, 1986-87, 1987-88 and then taking out the average trend of all groups.

[203] Economic Survey, 2003- 04. (Total direct taxes – Total income taxes)

[204] Household Integrated Economic Survey (HIES) 2001- 02.
[205] Ibid.
[206] Economic Survey, 2001- 02.
[207] Ibid.

Rural population[208] = 98.52 (million)

TT^{SE} = Total sales tax and excise duty[209] = 200625 (rupees in million)

PW_U	=Population weight (Urban)	= 47.44 / (98.52 + 47.44)	= 0.325
PW_R	=Population weight (Rural)	= 98.52 / (98.52 + 47.44)	= 0.675
CW_U	= Consumption weight (Urban)[210]	= 698 / (698 + 308)	= 0.690
CW_R	= Consumption weight (Rural)[211]	= 308 / (698 + 308)	= 0.310

$(WU)^{SE}$ = Sales and excise weight (Urban) $= (PW_U)(CW_U) / (PW_U)(CW_U) + (PW_R)(CW_R$
$= 0.52$

$(WR)^{SE}$ = Sales and excise weight (Rural) $= (PW_R)(CW_R) / (PW_U)(CW_U) + (PW_R)(CW_R)$
$= 0.48$

Sales tax and excise duty (Urban) = (0.52) 200625
= 104325 (rupees in million)
Sales tax and excise duty (Rural) = (0.48) 200625
= 96300 (rupees in million)

Import Duties

TT^{M} = Total import duties[212] = 73237 (rupees in million)

PW_U	=Population weight (Urban)	= 47.44 / (98.52 + 47.44)	= 0.325
PW_R	=Population weight (Rural)	= 98.52 / (98.52 + 47.44)	= 0.675
EW_U	= Expenditure weight (Urban)[213]	= 719 / (719 + 466)	= 0.61
EW_R	= Expenditure weight (Rural)[214]	= 466 / (719 + 466)	= 0.39

$(WU)^{M}$ = Import duty weight (Urban) $= (PW_U)(EW_U) / (PW_U)(EW_U) + (PW_R)(EW_R)$
$= 0.43$

$(WR)^{M}$ = Import duty weight (Rural) $= (PW_R)(EW_R) / (PW_U)(EW_U) + (PW_R)(EW_R)$
$= 0.57$

Import duty (Urban) = (0.43) 73237
= 31492 (rupees in million)
Import duty (Rural) = (0.57) 73237
= 41745 (rupees in million)

Export Duty

TT^{X}	= Total export duty[215]	= 21 (rupees in million)	
IW_U	= Income weight (Urban)	= 7696 / (3811 + 7696)	= 0.67
IW_R	= Income weight (Rural)	= 3811 / (3811 + 7696)	= 0.33

[208] Ibid.
[209] Economic Survey, 2003- 04.
[210] Household Integrated Economic Survey (HIES) 2001- 02.
[211] Ibid.
[212] CBR year book 2002- 03.
[213] Household Integrated Economic Survey (HIES) 2001- 02.
[214] Ibid.
[215] CBR year book 2002- 03.

PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675

$(WU)^X$ = Export duty weight (Urban) = $(IW_U)(PW_U) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= = 0.494
$(WR)^X$ = Export duty weight (Rural) = $(IW_R)(PW_R) / (IW_U)(PW_U) + (IW_R)(PW_R)$
= = 0.506

Export duty (Urban) = (0.494) 21
= 10.4 (rupees in million)
Export duty (Rural) = (0.506) 21
= 10.6 (rupees in million)

Motor Vehicle Tax

TT^{Veh} = Total motor vehicle tax[216] = 3195 (rupees in million)

PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675
WW_U = Vehicle weight (Urban)[217] = 80.7 / (80.7 + 30.6) = 0.73
WW_R = Vehicle weight (Rural)[218] = 30.6 / (80.7 + 30.6) = 0.27

$(WU)^{Veh}$ = Motor vehicle weight (Urban) = $(WW_U)(PW_U) / (WW_U)(PW_U) + (WW_R)(PW_R)$
= = 0.57
$(WR)^{Veh}$ = Motor vehicle weight (Rural) = $(WW_R)(PW_R) / (WW_U)(PW_U) + (WW_R)(PW_R)$
= 0.43

Motor vehicle tax (Urban) = (0.57) 3195
= 1821 (rupees in million)
Motor vehicle tax (Rural) = (0.43) 3195
= 1374 (rupees in million)

Tax on Natural Gas

TT^{Gas} = Total natural gas tax[219] = 18867 (rupees in million)

PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675
GW_U = Gas weight (Urban)[220] = 19.33 / (19.33 + 0.34) = 0.95
GW_R = Gas weight (Rural)[221] = 0.34 / (19.33 + 0.34) = 0.05

$(WU)^{Gas}$ = Natural gas weight (Urban) = $(GW_U)(PW_U) / (GW_U)(PW_U) + (GW_R)(PW_R)$
= = 0.90
$(WR)^{Gas}$ = Natural gas weight (Rural) = $(GW_R)(PW_R) / (GW_U)(PW_U) + (GW_R)(PW_R)$
= 0.10

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[216] Economic Survey, 2003- 04.
[217] Household Integrated Economic Survey (HIES) 2001-02.
[218] Ibid.
[219] Economic Survey, 2003- 04.
[220] Household Integrated Economic Survey (HIES) 2001- 02.
[221] Ibid.

Tax on natural gas (Urban) = (0.90) 18867
= 16980.3 (rupees in million)
Tax on natural gas (Rural) = (0.10) 18867
= 1886.7 (rupees in million)

Tax on Petroleum

TT^{Pet} = Total tax on petroleum[222] = 35987 (rupees in million)

PW_U =Population weight (Urban) = 47.44 / (98.52 + 47.44) = 0.325
PW_R =Population weight (Rural) = 98.52 / (98.52 + 47.44) = 0.675

TW_U = Transport and traveling weight (Urban)[223] = 352.8 / (352.8 + 192.6) = 0.647
TW_R = Transport and traveling weight (Rural)[224] = 192.6 / (352.8 + 192.6) = 0.353

$(WU)^{Pet}$ = Petroleum weight (Urban) = $(TW_U)(PW_U) / (TW_U)(PW_U) + (TW_R)(PW_R)$
= 0.469
$(WR)^{Pet}$ = Petroleum weight (Rural) = $(TW_R)(PW_R) / (TW_U)(PW_U) + (TW_R)(PW_R)$
= 0.531

Tax on petroleum(Urban) = (0.469) 35987.
= 16878 (rupees in million)
Tax on petroleum (Rural) = (0.531) 35987
= 19109 (rupees in million)

[222] Economic Survey, 2003- 04.
[223] Household Integrated Economic Survey (HIES) 2001- 02.
[224] Ibid.

Appendix C

DISTRIBUTORS FOR GOVERNMENT EXPENDITURES

Sources: Household Income Expenditure Survey (HIES): 1979; 1986- 87; for tables C-1 to C-4: Household Integrated Economic Survey (HIES): 1992-93; 2001-02 for tables C-5 to C-8.

Medical care: Expenditures on medical care.

Interest expenditures have been distributed in 1979, 1986-87 and 1992-93 along the income groups according to deposits in the financial institutions. While, in 2001-02 they have been distributed according to interest earned by households along the income groups.

Average values have been taken for the expenditure distributors except the income of the households generally in 1979, 1986-87 and 1992-93 and particularly in 2001-02.

Table C-1: Percentage of distributors for government expenditures (urban) 1979.

Income Groups	Number of households	Income of the households	Expenditure of the households on education	Medical care	Deposits (interest earned) in the financial institutions	Agriculture income
Total	100.00	100.00	100.00	100.00	100.00	100.00
Up to 300	1.80	0.30	6.31	19.04	5.57	0.18
301 - 400	3.99	1.10	2.04	13.39	17.88	0.27
401 - 500	7.31	2.50	4.05	11.21	2.68	0.38
501 - 600	8.40	3.50	4.24	9.82	4.39	2.06
601 - 800	17.01	9.03	5.28	8.08	4.07	10.03
801 - 1000	15.80	10.70	7.28	7.85	3.53	14.30
1001 - 1500	22.19	20.40	10.24	6.83	6.64	12.41
1501 - 2000	10.00	12.80	10.64	5.61	9.96	10.27
2001 - 2500	4.91	8.19	12.87	5.00	13.17	7.92
2501 - 3000	2.49	5.20	13.48	4.21	5.46	7.05
3001 - 3500	1.69	4.20	13.89	5.43	12.85	5.64
3501 and above	4.41	22.09	9.67	3.53	13.81	29.49

Table C-2: Percentage of distributors for government expenditures (rural) 1979.

Income Groups	Number of households	Income of the households	Expenditure of the households on education	Medical care	Deposits (interest earned) in the financial institutions	Agriculture income
Total	100.00	100.00	100.00	100.00	100.00	100.00
Up to 300	5.12	1.50	3.24	15.99	2.36	1.09
301 - 400	8.96	3.80	3.63	11.84	3.64	2.00
401 - 500	12.26	6.70	4.09	9.85	8.67	2.11
501 - 600	13.97	9.20	3.95	9.31	4.71	7.36
601 - 800	22.60	18.80	5.30	8.60	5.57	3.29
801 - 1000	14.39	15.50	6.44	7.03	6.85	25.77
1001 - 1500	14.71	21.00	9.75	7.40	7.60	16.03
1501 - 2000	4.26	8.70	13.03	7.83	7.82	11.69
2001 - 2500	1.71	4.60	15.09	6.80	11.46	7.72
2501 - 3000	0.64	1.90	16.45	7.36	11.03	5.35
3001 - 3500	0.43	1.50	8.15	4.50	12.63	2.83
3501 and above	0.96	6.80	10.86	3.50	17.67	14.76

Table C-3: Percentage of distributors for government expenditures (urban) 1986- 87.

Income Groups	Number of households	Income of the households	Expenditure of the households on education	Medical care	Deposits (interest earned) in the financial institutions	Agriculture income
Total	100.00	100.00	100.00	100.00	100.00	100.00
Up to - 600	1.26	0.22	3.76	13.78	4.49	0.13
601 - 700	1.07	0.26	0.51	13.05	4.60	0.15
701 - 800	1.38	0.39	2.83	8.75	4.22	0.30
801 - 1000	5.57	1.89	2.98	10.63	3.64	0.81
1001 - 1500	19.88	9.30	4.42	8.87	4.29	5.52
1501 - 2000	20.05	12.98	7.41	8.07	5.83	8.69
2001 - 2500	13.81	11.44	9.83	6.85	7.59	8.91
2501 - 3000	9.52	9.73	10.75	7.10	8.34	10.19
3001 - 3500	6.43	7.66	13.37	5.94	9.55	7.74
3501 - 4000	5.00	6.77	12.65	5.89	11.24	6.12
4001 - 4500	3.57	5.46	15.02	6.68	11.65	3.60
4501 and above	12.45	33.90	16.46	4.38	24.55	47.83

Table C-4: Percentage of distributors for government expenditures (rural) 1986- 87.

Income Groups	Number of households	Income of the households	Expenditure of the households on education	Medical care	Deposits (interest earned) in the financial institutions	Agriculture income
Total	100.00	100.00	100.00	100.00	100.00	100.00
Up to - 600	3.99	1.08	2.97	8.90	3.38	0.51
601 - 700	2.94	1.09	2.07	11.62	3.16	0.64
701 - 800	4.08	1.75	2.58	12.14	3.82	1.17
801 - 1000	11.03	5.62	4.01	10.46	3.11	3.37
1001 - 1500	30.39	21.38	5.81	9.08	4.16	19.27
1501 - 2000	20.75	20.13	7.62	8.65	4.90	20.60
2001 - 2500	11.13	13.95	10.34	6.75	6.98	14.22
2501 - 3000	6.06	9.29	10.59	6.11	8.45	10.44
3001 - 3500	3.54	6.45	13.05	6.38	11.60	6.50
3501 - 4000	2.06	4.35	10.47	6.34	11.76	5.36
4001 - 4500	1.08	2.57	16.54	8.88	18.89	2.49
4501 and above	2.95	12.34	13.95	4.67	19.81	15.42

Table C-5: Percentage of distributors for government expenditures (urban) 1992- 93.

Income Groups	Number of households	Income of the households	Expenditure of the households on education	Medical care	Deposits (interest earned) in the financial institutions	Agriculture income
Total	100.00	100.00	100.00	100.00	100.00	100.00
Up to - 1000	2.62	0.36	7.09	10.61	17.95	0.23
1001 - 1500	4.72	1.22	4.92	9.95	36.29	0.64
1501 - 2000	9.44	3.41	3.47	13.42	4.94	1.95
2001 - 2500	11.36	5.21	5.83	9.83	4.73	2.96
2501 - 3000	9.97	5.54	8.29	9.81	3.54	2.90
3001 - 3500	9.62	6.36	9.85	8.23	2.08	4.85
3501 - 4000	8.57	6.39	11.16	8.87	3.04	4.78
4001 - 5000	12.59	11.38	10.95	8.41	6.82	10.51
5001 - 6000	8.39	9.26	10.95	7.61	6.43	8.38
6001 - 7000	6.29	8.32	11.41	8.28	4.41	7.16
7001 - and above	16.43	42.55	16.08	4.97	9.76	55.63

Table C-6: Percentage of distributors for government expenditures (rural) 1992- 93.

Income Groups	Number of households	Income of the households	Expenditure of the households on education	Medical care	Deposits (interest earned) in the financial institutions	Agriculture income
Total	100.00	100.00	100.00	100.00	100.00	100.00
Up to - 1000	6.85	1.47	4.63	9.70	12.36	0.86
1001 - 1500	12.94	5.40	4.44	12.73	5.30	4.06
1501 - 2000	18.65	10.73	4.73	10.67	6.84	7.43
2001 - 2500	16.06	11.74	6.37	9.94	3.59	10.07
2501 - 3000	10.96	9.84	7.24	10.15	5.13	8.25
3001 - 3500	8.83	9.35	8.59	9.60	5.75	9.05
3501 - 4000	5.71	6.99	9.94	8.65	6.27	7.50
4001 - 5000	8.14	11.71	11.68	8.31	10.37	14.94
5001 - 6000	4.03	7.13	12.55	7.19	17.61	9.35
6001 - 7000	2.21	4.58	12.26	8.65	13.90	5.73
7001 - and above	5.63	21.06	17.57	4.42	12.88	22.78

Table C-7: Percentage of distributors for government expenditures (urban) 2001- 02.

Income Groups	Number of households	Income of the households	Expenditure of the households on education	Medical care	Deposits (interest earned) in the financial institutions	Agriculture income
Total	100.00	100.00	100.00	100.00	100.00	100.00
1- 1000	2.79	0.20	4.27	5.95	5.36	18.65
1001- 1500	1.25	0.22	1.95	7.88	4.92	15.37
1501- 2000	2.95	0.70	2.36	3.94	16.38	15.27
2001- 3000	9.80	3.38	2.29	4.73	14.84	5.08
3001- 4000	13.57	6.40	3.40	4.56	3.85	1.52
4001- 5000	13.35	8.12	5.22	6.15	2.69	1.70
5001- 6500	15.45	11.78	6.86	6.65	7.57	2.17
6501- 8000	10.93	10.53	9.22	9.11	5.98	0.86
8001- 9500	6.61	7.56	9.64	8.90	8.14	1.75
9501- 11000	5.97	8.04	11.95	9.08	2.61	2.34
11001- 12500	4.28	6.69	16.39	13.76	0.40	7.45
12501- above	13.06	36.37	26.45	19.29	27.28	27.84

Table C-8: Percentage of distributors for government expenditures (rural) 2001- 02.

Income Groups	Number of households	Income of the households	Expenditure of the households on education	Medical care	Deposits (interest earned) in the financial institutions	Agriculture income
1- 1000	21.37	2.50	2.84	5.75	9.27	8.69
1001- 1500	6.75	2.31	2.36	5.83	2.01	11.31
1501- 2000	8.29	3.95	2.51	5.87	0.00	10.33
2001- 3000	17.14	11.61	2.67	5.91	2.51	6.56
3001- 4000	13.32	12.45	3.88	6.50	0.00	4.79
4001- 5000	9.88	11.80	5.70	6.81	20.47	8.15
5001- 6500	8.78	13.18	6.99	8.32	15.02	7.43
6501- 8000	4.92	9.39	8.46	10.24	5.62	5.68
8001- 9500	3.10	7.12	10.18	9.21	7.30	11.94
9501- 11000	2.09	5.59	13.87	9.75	2.31	8.48
11001- 12500	1.30	4.03	15.90	9.55	13.94	7.27
12501- above	3.05	16.07	24.65	16.26	21.54	9.37

Appendix D

DISTRIBUTORS FOR TAXES

Sources: Household Income Expenditure Survey (HIES): 1979; 1986- 87, for tables D-1 to D-4: Household Integrated Economic Survey (HIES): 1992-93; 2001-02 for tables D-5 to D-8.

Distributions of income tax and corporate tax along income groups have not been reported separately; therefore income and corporate tax have been distributed according to distribution of income tax along the income groups in all four years.

Distributions for income tax have not been reported in Household Integrated Surveys (HIESs) of 1992-93 and 2001-02, therefore, past trends have been averaged out to carry out the analysis.

Table D-1: Percentage of distributors for government taxes (urban) 1979.

Income Group	Income tax paid	Property tax paid	Household income	Household total consumption	Household total expenditures	Expenditures on natural Gas	Expenditure on transport and traveling	Expenditures on vehicles (durables)
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Up to 300	-	-	0.30	1.67	1.65	3.16	4.30	-
301 - 400	-	-	1.10	2.11	2.10	1.96	6.74	5.62
401 - 500	-	-	2.50	2.62	2.63	2.75	7.95	1.20
501 - 600	-	-	3.50	3.17	3.16	3.65	8.40	1.60
601 - 800	-	-	9.03	3.99	3.97	5.08	7.64	2.54
801 - 1000	-	-	10.70	5.00	4.96	7.19	8.55	7.36
1001 - 1500	-	8.33	20.40	6.57	6.52	10.92	9.14	5.80
1501 - 2000	3.85	8.33	12.80	8.84	8.76	14.88	8.91	1.83
2001 - 2500	7.69	16.67	8.19	10.82	10.87	2.29	9.01	4.50
2501 - 3000	7.69	8.33	5.20	13.80	13.71	2.99	6.85	23.27
3001 - 3500	15.38	25.00	4.20	15.70	15.71	20.80	10.28	20.20
3501 and above	65.38	33.33	22.09	25.71	25.96	24.32	12.23	26.08

Table D-2: Percentage of distributors for government taxes (rural) 1979.

Income Group	Income tax paid	Property tax paid	Household income	Household total consumption	Household total expenditures	Expenditures on natural Gas	Expenditure on transport and traveling	Expenditures on vehicles (durables)
Total	-	-[1]	100.00	100.00	100.00	100.00	100.00	100.00
Up to 300	-	-	1.50	1.69	1.69	6.27	6.54	0.67
301 - 400	-	-	3.80	2.36	2.36	4.64	7.36	2.72
401 - 500	-	-	6.70	2.86	2.86	4.01	8.39	2.00
501 - 600	-	-	9.20	3.40	3.39	0.75	8.66	1.39
601 - 800	-	-	18.80	4.18	4.17	3.26	7.87	2.56
801 - 1000	-	-	15.50	5.27	5.26	2.51	13.60	2.56
1001 - 1500	-	-	21.00	6.63	6.64	2.01	8.09	3.28
1501 - 2000	-	-	8.70	9.01	9.00	1.00	7.11	6.39
2001 - 2500	-	-	4.60	10.77	10.76	1.38	7.15	2.33
2501 - 3000	-	-	1.90	13.00	12.99	0.00	5.93	21.56
3001 - 3500	-	-	1.50	14.66	14.61	12.03	5.19	27.61
3501 and above	-	-	6.80	26.14	26.26	62.16	14.10	26.94

[1] Equal to zero.

Table D-3: Percentage of distributors for government taxes (urban) 1986- 87.

Income Group	Income tax paid	Property tax paid	Household income	Household total consumption	Household total expenditures	Expenditures on natural Gas	Expenditure on transport and traveling	Expenditures on vehicles (durables)
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Up to - 600	-	2.41	0.22	1.96	1.96	0.84	2.37	1.36
601 - 700	-	4.82	0.26	2.42	2.41	1.11	5.01	0.28
701 - 800	-	1.20	0.39	2.77	2.76	2.12	4.47	4.08
801 - 1000	-	4.82	1.89	3.34	3.33	3.14	4.03	1.60
1001 - 1500	-	2.41	9.30	4.57	4.56	4.91	5.30	1.28
1501 - 2000	-	3.61	12.98	6.33	6.31	7.14	6.54	2.08
2001 - 2500	1.69	4.82	11.44	7.86	7.84	10.42	7.25	6.40
2501 - 3000	1.69	9.64	9.73	9.52	9.51	10.78	10.24	5.32
3001 - 3500	3.39	8.43	7.66	11.11	11.10	12.63	10.22	2.68
3501 - 4000	8.47	9.64	6.77	12.57	12.56	14.88	11.45	16.39
4001 - 4500	11.86	15.66	5.46	14.02	14.02	15.51	13.11	20.11
4501 and above	72.88	32.53	33.90	23.53	23.64	16.51	20.00	38.42

Table D-4: Percentage of distributors for government taxes (rural) 1986- 87.

Income Group	Income tax paid	Property tax paid	Household income	Household total consumption	Household total expenditures	Expenditures on natural Gas	Expenditure on transport and traveling	Expenditures on vehicles (durables)
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Up to - 600	-	-	1.08	2.16	2.16	-	4.32	0.07
601 - 700	-	-	1.09	2.71	2.71	-	5.11	0.88
701 - 800	-	11.11	1.75	3.00	3.00	1.03	4.94	2.64
801 - 1000	-	0.00	5.62	3.52	3.52	2.26	6.41	2.77
1001 - 1500	-	11.11	21.38	4.75	4.75	2.98	6.62	1.76
1501 - 2000	-	11.11	20.13	6.38	6.38	7.19	7.01	3.45
2001 - 2500	-	22.22	13.95	8.09	8.09	10.47	7.61	2.84
2501 - 3000	-	11.11	9.29	9.86	9.86	7.49	8.02	4.26
3001 - 3500	100.00	22.22	6.45	11.06	11.06	16.63	9.29	4.66
3501 - 4000	-	0.00	4.35	13.09	13.09	14.48	9.29	8.31
4001 - 4500	-	0.00	2.57	14.07	14.07	12.22	11.50	33.04
4501 and above	-	11.11	12.34	21.29	21.29	25.26	19.89	35.34

Table D-5: Percentage of distributors for government taxes (urban) 1992- 93.

Income Group	Income tax paid	Property tax paid	Household income	Household total consumption	Household total expenditures	Expenditures on natural Gas	Expenditure on transport and traveling	Expenditures on vehicles (durables)
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Up to - 1000	-	2.68	0.36	4.70	4.70	7.14	3.64	0.17
1001 - 1500	-	4.36	1.22	3.98	3.96	5.43	4.32	0.08
1501 - 2000	-	1.01	3.41	4.88	4.85	5.12	4.43	1.50
2001 - 2500	-	2.35	5.21	5.67	5.63	6.53	3.21	0.83
2501 - 3000	-	2.68	5.54	6.60	6.55	6.75	4.11	1.91
3001 - 3500	0.92	4.36	6.36	7.57	7.98	8.31	4.27	8.23
3501 - 4000	4.32	7.80	6.39	8.18	8.12	9.64	4.27	6.77
4001 - 5000	6.74	9.31	11.38	10.01	9.96	10.93	6.80	7.15
5001 - 6000	10.55	12.33	9.26	11.74	11.73	13.03	8.32	16.54
6001 - 7000	17.98	19.63	8.32	13.77	13.76	12.46	10.70	21.65
7001 - and above	59.48	33.47	42.55	22.91	22.77	14.64	45.94	35.19

Table D-6: Percentage of distributors for government taxes (rural) 1992- 93.

Income Group	Income tax paid	Property tax paid	Household income	Household total consumption	Household total expenditures	Expenditures on natural Gas	Expenditure on transport and traveling	Expenditures on vehicles (durables)
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Up to - 1000	-	-	1.47	4.31	4.10	9.47	2.17	0.16
1001 - 1500	-	-	5.40	4.65	4.42	3.88	4.67	0.32
1501 - 2000	-	8.45	10.73	5.66	5.37	1.70	4.01	1.19
2001 - 2500	-	8.45	11.74	6.48	6.16	7.04	5.26	3.65
2501 - 3000	-	0.00	9.84	7.49	7.14	5.58	6.43	8.58
3001 - 3500	-	8.45	9.35	8.95	8.54	5.58	6.43	3.10
3501 - 4000	-	12.68	6.99	9.44	8.95	17.23	7.76	3.18
4001 - 5000	6.40	8.45	11.71	10.77	10.33	13.35	9.18	3.02
5001 - 6000	12.00	11.27	7.13	11.59	15.41	8.50	14.11	25.50
6001 - 7000	12.00	0.00	4.58	12.70	12.29	9.71	7.85	4.29
7001 - and above	69.61	42.27	21.06	17.96	17.30	17.96	32.14	47.02

Table D-7: Percentage of distributors for government taxes (urban) 2001- 02.

Income Group	Income tax paid	Property tax paid	Household income	Household total consumption	Household total expenditures	Expenditures on natural Gas	Expenditure on transport and traveling	Expenditures on vehicles (durables)
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1- 1000	-	0.72	0.20	1.70	1.74	1.13	1.19	2.30
1001- 1500	-	0.16	0.22	0.66	0.67	0.55	0.39	0.82
1501- 2000	-	0.48	0.70	1.53	1.52	2.00	0.85	0.03
2001- 3000	-	2.24	3.38	5.22	5.12	4.70	3.12	6.65
3001- 4000	-	5.96	6.40	8.14	7.97	7.93	5.86	1.64
4001- 5000	-	6.34	8.12	9.16	9.69	12.36	7.50	6.41
5001- 6500	0.87	9.13	11.78	12.29	12.82	13.98	13.09	5.49
6501- 8000	3.29	8.83	10.53	11.29	11.04	12.53	10.08	2.82
8001- 9500	5.94	8.46	7.56	7.55	7.37	8.45	7.02	1.83
9501- 11000	8.90	12.79	8.04	7.45	7.26	7.83	7.77	6.02
11001- 12500	15.07	8.83	6.69	5.86	6.05	5.84	8.22	7.14
12501- above	65.91	36.07	36.37	29.14	28.76	22.71	34.92	58.86

Table D-8: Percentage of distributors for government taxes (rural) 2001- 02.

Income Group	Income tax paid	Property tax paid	Household income	Household total consumption	Household total expenditures	Expenditures on natural Gas	Expenditure on transport and traveling	Expenditures on vehicles (durables)
Total	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1- 1000	-	14.40	2.50	21.24	18.55	5.82	14.68	10.68
1001- 1500	-	4.40	2.31	5.58	5.32	2.22	4.19	0.68
1501- 2000	-	5.33	3.95	6.09	6.52	2.66	4.82	8.08
2001- 3000	-	10.76	11.61	11.56	13.55	10.15	12.44	14.48
3001- 4000	-	9.29	12.45	14.70	12.30	19.75	12.43	10.61
4001- 5000	-	9.16	11.80	10.96	10.41	17.83	10.91	10.12
5001- 6500	-	9.12	13.18	10.54	10.28	8.04	11.45	8.43
6501- 8000	-	10.88	9.39	6.15	6.27	7.60	7.18	4.54
8001- 9500	7.1	7.60	7.12	3.54	4.49	3.43	4.88	2.20
9501- 11000	12.3	4.21	5.59	4.00	3.39	6.31	5.39	0.30
11001- 12500	14.2	1.98	4.03	2.43	2.16	3.87	2.04	3.41
12501- above	66.4	12.87	16.07	3.23	6.77	12.33	9.60	26.47

Appendix **E**

NUMBER OF HOUSEHOLDS, IMPUTED EXPENDITURES AND TAXES, PRE- AND POST- FISCAL INCOMES

1. Number of households in urban- rural areas in all three years has been taken from table 4.1 and then distributed among the different income groups according to the percentage distribution of households by income groups and area given in HIESs of 1979, 1986-87, 1992-93 and 2001-02.
2. Government expenditures and taxes imputed to different income groups in urban- rural areas in each year have been found out by using different weights explained in appendix B. They, then, have been distributed along the income groups by using incidence assumptions for government expenditures and taxes given in table 4.3 and 4.4 respectively.
3. Pre- fiscal incomes in urban- rural areas in each year have been found out by using NNP weights for urban- rural areas explained in appendix B. These imputed values of NNP (urban) and NNP (rural) have been distributed along the income groups according to percentage distribution of incomes by income groups and area given in HIESs of 1979, 1986- 87, 1992- 93 and 2001-02.
4. Post- fiscal distributions of income in urban- rural areas in four years have been got by adding imputed net expenditures of each income group to their respective pre- fiscal incomes.

Table E-1: Size distribution of households (million), imputed taxes, expenditures, net expenditures and, pre and post-fiscal incomes (rupees in million), (Urban) 1979.

Income Groups	Number of Households	Expenditures	Taxes	Net Expenditures	Pre-fiscal Incomes	Post-fiscal Incomes
Up to 300	0.061	559.00	46.78	512.22	248.13	760.35
301 - 400	0.135	857.09	136.84	720.25	909.8	1630.05
401 - 500	0.247	1198.57	290.38	908.19	2067.74	2975.93
501 - 600	0.284	1405.75	402.50	1003.25	2894.83	3898.08
601 - 800	0.575	2766.84	1016.52	1750.32	7473.85	9224.17
801 - 1000	0.534	2760.86	1188.98	1571.88	8849.92	10421.80
1001 - 1500	0.75	3969.67	2207.57	1762.10	16872.74	18634.84
1501 - 2000	0.338	2215.93	1551.77	664.16	10586.82	11250.98
2001 - 2500	0.166	1509.45	1268.07	241.38	6772.18	7013.56
2501 - 3000	0.084	1029.36	991.14	38.21	4300.89	4339.10
3001 - 3500	0.057	985.81	1327.29	-341.48	3473.8	3132.32
Up to 300	0.149	1985.19	5275.37	-3290.17	18278.8	14988.63
Total	**3.38**	**21243.52**	**15703.21**	**5540.31**	**82729.5**	**88269.81**

Table E-2: Size distribution of households (million), imputed taxes, expenditures, net expenditures and, pre and post-fiscal incomes (rupees in million), (Rural) 1979.

Income Groups	Number of Households	Expenditures	Taxes	Net Expenditures	Pre-fiscal Incomes	Post-fiscal Incomes
Up to 300	0.48	1359.33	314.97	1044.36	1991.56	3035.92
301 - 400	0.84	2242.83	766.41	1476.42	5045.28	6521.70
401 - 500	1.15	3105.76	1266.37	1839.39	8895.62	10735.01
501 - 600	1.31	3631.63	1711.36	1920.27	12214.89	14135.16
601 - 800	2.12	5731.86	3401.16	2330.70	24960.85	27291.55
801 - 1000	1.35	4524.37	2735.81	1788.57	20579.43	22368.00
1001 - 1500	1.38	4657.16	3525.70	1131.46	27881.81	29013.27
1501 - 2000	0.4	1917.47	1412.18	505.29	11551.03	12056.32
2001 - 2500	0.16	1174.51	690.67	483.85	6107.44	6591.29
2501 - 3000	0.06	784.01	365.59	418.43	2522.64	2941.07
3001 - 3500	0.04	560.44	305.36	255.08	1991.56	2246.64
Up to 300	0.09	1321.11	1013.23	307.89	9028.39	9336.28
Total	**9.38**	**31010.48**	**17508.79**	**13501.69**	**132770.5**	**146272.19**

Table E-3: Size distribution of households (million), imputed taxes, expenditures, net expenditures and, pre and post-fiscal incomes (rupees in million), (Urban) 1986-87.

Income Groups	Number of Households	Expenditures	Taxes	Net Expenditures	Pre-fiscal Incomes	Post-fiscal Incomes
Up to - 600	0.053	1440.16	116.10	1324.05	431.48	1755.53
601 - 700	0.045	998.36	235.95	762.40	509.94	1272.34
701 - 800	0.058	1266.49	234.26	1032.23	764.91	1797.14
801 - 1000	0.234	2643.06	652.75	1990.31	3706.87	5697.18
1001 - 1500	0.835	7777.62	2784.14	4993.48	18240.18	23233.66
1501 - 2000	0.842	8718.43	3856.92	4861.51	25457.8	30319.31
2001 - 2500	0.58	7170.48	3526.09	3644.39	22437.38	26081.77
2501 - 3000	0.4	5949.88	3091.09	2858.79	19083.54	21942.33
3001 - 3500	0.27	5191.53	2630.19	2561.34	15023.63	17584.97
3501 - 4000	0.21	4707.13	2969.83	1737.30	13278.06	15015.36
4001 - 4500	0.15	4453.48	3015.36	1438.12	10708.8	12146.92
4501 and above	0.523	11728.79	16397.34	-4668.55	66488.41	61819.86
Total	**4.2**	**62045.41**	**39510.03**	**22535.38**	**196131**	**218666.38**

Table E-4: Size distribution of households (million), imputed taxes, expenditures, net expenditures and, pre and post-fiscal incomes (rupees in million), (Rural) 1986-87.

Income Groups	Number of Households	Expenditures	Taxes	Net Expenditures	Pre-fiscal Incomes	Pos-fiscal Incomes
Up to - 600	0.456	2815.90	700.45	2115.44	3466.17	5581.61
601 - 700	0.336	2391.03	662.59	1728.44	3498.27	5226.71
701 - 800	0.466	3149.12	941.10	2208.02	5616.49	7824.51
801 - 1000	1.26	7037.68	2853.13	4184.55	18036.94	22221.49
1001 - 1500	3.47	19345.67	10152.92	9192.76	68617.4	77810.16
1501 - 2000	2.37	14775.73	9211.17	5564.56	64605.62	70170.18
2001 - 2500	1.271	9234.61	6144.05	3090.56	44771.41	47861.97
2501 - 3000	0.692	6069.18	3885.42	2183.76	29815.51	31999.27
3001 - 3500	0.404	4665.87	2619.09	2046.78	20700.76	22747.54
3501 - 4000	0.235	3512.51	1413.33	2099.18	13960.98	16060.16
4001 - 4500	0.123	3606.38	764.45	2841.93	8248.21	11090.14
4501 and above	0.337	6379.90	4069.26	2310.64	39604.24	41914.88
Total	**11.42**	**82983.59**	**43416.97**	**39566.62**	**320942**	**360508.62**

Table E-5: Size distribution of households (million), imputed taxes, expenditures, net expenditures and, pre and post-fiscal Incomes (rupees in million), (Urban) 1992-93.

Income Groups	Number of Households	Expenditures	Taxes	Net Expenditures	Pre-fiscal Incomes	Post-fiscal Incomes
Up to - 1000	0.15	10435.10	1094.90	9340.19	1733.18	11073.37
1001 - 1500	0.27	18298.22	1324.35	16973.88	5873.54	22847.42
1501 - 2000	0.54	10658.50	2819.21	7839.30	16417.03	24256.33
2001 - 2500	0.65	12838.38	3830.78	9007.60	25082.92	34090.52
2501 - 3000	0.57	12051.50	3930.73	8120.78	26671.66	34792.44
3001 - 3500	0.55	11834.54	4752.33	7082.22	30619.45	37701.67
3501 - 4000	0.49	11713.78	5723.09	5990.70	30763.88	36754.58
4001 - 5000	0.72	17283.76	9736.83	7546.93	54787.63	62334.56
5001 - 6000	0.48	13529.22	10254.26	3274.96	44581.15	47856.11
6001 - 7000	0.36	11172.23	11536.40	-364.17	40055.63	39691.46
7001 - and above	0.94	30682.02	42921.49	-12239.47	204851.8	192612.36
Total	**5.72**	**160497.26**	**97924.36**	**62572.90**	**481437.9**	**544010.80**

Table E-6: Size distribution of households (million), imputed taxes, expenditures, net expenditures and, pre and post-fiscal Incomes (rupees in million), (Rural) 1992-93.

Income Groups	Number of Households	Expenditures	Taxes	Net Expenditures	Pre-fiscal Incomes	Post-fiscal Incomes
Up to - 1000	0.9	11689.21	2875.84	8813.37	9436.18	18249.55
1001 - 1500	1.7	17000.42	6180.41	10820.01	34663.52	45483.53
1501 - 2000	2.45	24643.93	10957.21	13686.72	68877.71	82564.43
2001 - 2500	2.11	21720.30	10775.53	10944.77	75361.07	86305.84
2501 - 3000	1.44	16699.35	8442.51	8256.84	63164.64	71421.48
3001 - 3500	1.16	14763.25	7963.90	6799.35	60019.25	66818.60
3501 - 4000	0.75	11162.18	5245.97	5916.21	44870.01	50786.22
4001 - 5000	1.07	16658.17	9123.26	7534.91	75168.49	82703.40
5001 - 6000	0.53	13149.89	4890.75	8259.14	45768.69	54027.83
6001 - 7000	0.29	9377.51	2242.10	7135.41	29399.8	36535.21
7001 - and above	0.74	18491.52	11769.17	6722.35	135187.7	141910.09
Total	**13.14**	**175355.74**	**80466.64**	**94889.10**	**641917.1**	**736806.19**

Table E-7: Size distribution of households (million), imputed taxes, expenditures, net expenditures and, pre and post-fiscal Incomes (rupees in million), (Urban) 2001-02.

Income Groups	Number of Households	Expenditures	Taxes	Net Expenditures	Pre-fiscal Incomes	Post-fiscal Incomes
1- 1000	0.19	19186.2	2783.0	16403.2	3109.99	19513.19
1001- 1500	0.09	14828.8	1075.5	13753.3	3411.73	17165.06
1501- 2000	0.20	34643.4	2571.6	32071.8	11009.23	43081.03
2001- 3000	0.68	40196.6	8579.4	31617.2	52844.30	84461.50
3001- 4000	0.94	30014.7	13549.2	16465.6	100083.90	116549.45
4001- 5000	0.92	30503.0	16293.6	14209.4	126906.38	141115.77
5001- 6500	1.07	44491.1	22719.1	21772.0	184154.37	205926.34
6501- 8000	0.76	36732.9	22787.5	13945.4	164537.92	178483.35
8001- 9500	0.46	32869.4	19209.1	13660.3	118099.00	131759.30
9501- 11000	0.41	25367.2	22351.3	3015.9	125705.37	128721.29
11001- 12500	0.30	22883.6	26273.5	-3389.9	104487.59	101097.67
12501- above	0.90	109558.0	119052.4	-9494.4	568476.53	558982.13
Total	**6.91**	**441274.8**	**277245.0**	**164029.8**	**1562826.30**	**1726856.08**

Table E-8: Size distribution of households (million), imputed taxes, expenditures, net expenditures and, pre and post-fiscal Incomes (rupees in million), (Rural) 2001-02.

Income Groups	Number of Households	Expenditures	Taxes	Net Expenditures	Pre-fiscal Incomes	Post-fiscal Incomes
1- 1000	3.01	37703.3	31512.5	6190.8	40062.91	46253.72
1001- 1500	0.95	16034.7	8526.7	7508.0	36954.58	44462.54
1501- 2000	1.17	17790.3	9761.7	8028.6	63202.70	71231.34
2001- 3000	2.41	35291.9	19743.1	15548.8	185809.03	201357.86
3001- 4000	1.87	29534.3	22349.8	7184.5	199278.46	206462.98
4001- 5000	1.39	38377.4	17619.5	20757.9	188917.36	209675.31
5001- 6500	1.23	35091.0	17056.6	18034.4	211021.04	229055.45
6501- 8000	0.69	21610.7	10308.3	11302.4	150235.93	161538.30
8001- 9500	0.44	20494.0	9278.3	11215.7	113972.08	125187.76
9501- 11000	0.29	14563.8	11400.5	3163.3	89450.82	92614.11
11001- 12500	0.18	19178.0	9448.5	9729.5	64584.18	74313.69
12501- above	0.43	38655.7	35084.4	3571.2	257300.61	260871.84
Total	**14.07**	**324325.2**	**202090.0**	**122235.2**	**1600789.70**	**1723024.90**

Appendix **F**

DATA ON *ZAKAH* AND *USHR*

1. Appendix F has been constructed to elaborate the analyses carried out in chapter 7 about the effects *zakah* and *ushr* on the distribution of income.
2. To carry out the regression, Gini and concentration ratios analyses the basic data on *zakah* and *ushr* has been given from tables F-1 to F-5.
3. The explanation about the procedure of using this basic data on *zakah* and *ushr* has been given at the end.

Table F-1: Percentage distribution and collection of *zakah-ushr* by income groups (urban-rural) in 1986-87

Income groups	Distribution	Collection
Pakistan	100.0	100.00
Urban		
Up to - 600	3.30	0.04
601- 700	1.83	0.11
700 - 800	0.86	0.09
801 - 1000	4.38	0.49
1001 - 1500	14.65	3.14
1501 - 2000	9.50	5.33
2001 - 2500	2.42	4.71
2501 - 3000	2.57	4.37
3001 - 3500	1.65	4.21
3501 - 4000	1.53	3.96
4001 - 4500	0.88	3.04
4501 and above	0.96	29.07
Rural		
Up to - 600	7.39	0.35
601 - 700	1.70	0.45
701 - 800	3.67	0.63
801 - 1000	4.02	2.01
1001 - 1500	14.98	9.67
1501 - 2000	11.91	7.57
2001 - 2500	6.91	5.37
2501 - 3000	4.46	4.52
3001 - 3500	0.11	2.17
3501 - 4000	0.17	1.76
4001 - 4500	0.09	1.11
4501 and above	0.09	5.82

Source: Household Income Expenditure Survey (HIES), 1986 - 87.

Table F-2: Percentage distribution and collection of *zakah-ushr* by income groups (urban-rural) in 1992-93

Income groups	Distribution	Collection
Pakistan	100.0	100.00
Urban		
Up to - 1000	1.95	0.27
1001 - 1500	2.34	1.17
1501 - 2000	5.82	1.36
2001 - 2500	0.91	0.94
2501 - 3000	1.11	0.93
3001 - 3500	1.64	2.08
3501 - 4000	0.01	1.84
4001 - 5000	0.44	3.35
5001 - 6000	0.42	2.71
6001 - 7000	0.00	2.42
7001 - and above	0.38	15.62
Rural		
Up to - 1000	8.03	3.93
1001 - 1500	33.47	4.39
1501 - 2000	17.39	5.01
2001 - 2500	16.66	7.02
2501 - 3000	7.75	5.54
3001 - 3500	0.59	4.84
3501 - 4000	0.31	4.40
4001 - 5000	0.13	7.66
5001 - 6000	0.09	4.54
6001 - 7000	0.33	3.49
7001 - and above	0.22	16.49

Source: Household Integrated Expenditure Survey (HIES), 1992–93.

Table F-3: Percentage distribution and collection of *zakah-ushr* by income groups (urban-rural) in 2001-02.

Urban		
Income groups	Distribution	Collection
1- 1000	5.37	1.45
1001- 1500	5.95	0.91
1501- 2000	9.52	0.78
2001- 3000	10.71	1.40
3001- 4000	22.97	3.11
4001- 5000	14.16	5.54
5001- 6500	19.11	9.54
6501- 8000	5.54	8.92
8001- 9500	0.00	5.40
9501- 11000	5.79	6.22
11001- 12500	0.80	6.76
12501- above	0.08	49.97
Total	100.00	100.00
Rural		
Income groups	Distribution	Collection
1- 1000	11.64	20.16
1001- 1500	7.10	4.86
1501- 2000	7.73	3.65
2001- 3000	23.30	8.73
3001- 4000	16.70	7.14
4001- 5000	6.13	8.89
5001- 6500	5.66	7.08
6501- 8000	9.22	6.75
8001- 9500	0.55	7.14
9501- 11000	9.86	6.07
11001- 12500	0.02	2.87
12501- above	2.09	16.64
Total	100.00	100.00

Source: Household Integrated Expenditure Survey (HIES) , 2001- 02.

Table F-4: Year wise collection and disbursement of *zakah* in Pakistan (rupees in million)

Year	Collection	Disbursement
1980–81	844.25	750.00
1981–82	798.51	500.00
1982–83	855.19	751.44
1983–84	1011.33	751.52
1984–85	1230.86	1007.24
1985–86	1439.01	1105.82
1986–87	1513.66	1215.59
1987–88	1944.19	1448.18
1988–89	2190.01	1175.68
1989–90	2444.03	981.91
1990–91	2705.53	1304.26
1991–92	2612.06	2183.66
1992–93	2558.15	3349.86
1993–94	2619.75	2688.28
2001–02	3900.30	5695.656

Source: Central Zakat Administration, Ministry of Finance, Government of Pakistan.

Table F-5: Assessment and collection of *ushr* in Pakistan (rupees in million)

Year	Assessment	Collection	Percent of assessment
1982–83	179.62	179.32	99.78
1983–84	262.40	258.71	98.59
1984–85	271.47	261.04	96.16
1985–86	264.38	246.40	93.19
1986–87	251.48	229.61	89.64
1987–88	273.58	239.88	87.68
1988–89	245.86	177.04	72.00
1989–90	237.11	107.57	45.37
1990–91	207.88	121.65	56.29
1991–92	58.82	12.66	21.50
1992–93	67.65	10.61	17.60
1993–94	0.21	0.20	95.20
2001–02	-	5.974	-

Source: Central Zakat Administration, Zakat and Ushr System in Pakistan, Government of Pakistan.

Table F-6: Calculation of post- *zakah- ushr* incomes along the income groups (urban) 1986- 87.

Income Groups	Distribution of Zakah-Ushr	Collection of Zakah-Ushr	Net of Zakah-Ushr	Post- Fiscal Incomes	Post- Zakah-Ushr Incomes
Up to - 600	40.54	0.61	39.93	1755.53	1795.46
601 - 700	22.48	1.68	20.80	1272.34	1293.14
701 - 800	10.56	1.37	9.19	1797.14	1806.33
801 - 1000	53.81	7.47	46.33	5697.18	5743.51
1001 - 1500	179.97	47.89	132.08	23233.66	23365.74
1501 - 2000	116.70	81.28	35.42	30319.31	30354.73
2001 - 2500	29.73	71.83	-42.10	26081.77	26039.67
2501 - 3000	31.57	66.64	-35.07	21942.33	21907.26
3001 - 3500	20.27	64.20	-43.93	17584.97	17541.03
3501 - 4000	18.79	60.39	-41.60	15015.36	14973.77
4001 - 4500	10.81	46.36	-35.55	12146.92	12111.37
4501 and above	11.79	443.33	-431.53	61819.86	61388.32
Total	**547.02**	**893.06**	**-346.04**	**218666.38**	**218320.34**

Table F-7: Calculation of post- *zakah- ushr* incomes along the income groups (rural) 1986- 87.

Income Groups	Distribution of Zakah-Ushr	Collection of Zakah-Ushr	Net of Zakah-Ushr	Post- Fiscal Incomes	Post- Zakah-Ushr Incomes
Up to - 600	89.02	5.24	83.78	5581.61	5665.39
601 - 700	20.48	6.74	13.74	5226.71	5240.45
701 - 800	44.21	9.44	34.77	7824.51	7859.29
801 - 1000	48.43	30.11	18.32	22221.49	22239.81
1001 - 1500	180.45	144.85	35.60	77810.16	77845.76
1501 - 2000	143.47	113.39	30.08	70170.18	70200.26
2001 - 2500	83.24	80.44	2.80	47861.97	47864.77
2501 - 3000	53.73	67.71	-13.98	31999.27	31985.29
3001 - 3500	1.33	32.51	-31.18	22747.54	22716.36
3501 - 4000	2.05	26.36	-24.32	16060.16	16035.84
4001 - 4500	1.08	16.63	-15.54	11090.14	11074.59
4501 and above	1.08	87.18	-86.10	41914.88	41828.79
Total	**668.57**	**620.60**	**47.97**	**360508.62**	**360556.59**

Table F-8: Calculation of post- *zakah- ushr* incomes along the income groups (urban) 1992- 93.

Income Groups	Distribution of Zakah-Ushr	Collection of Zakah-Ushr	Net of Zakah-Ushr	Post- Fiscal Incomes	Post- Zakah-Ushr Incomes
Up to - 1000	65.24	6.97	58.26	11073.37	11131.64
1001 - 1500	78.28	30.21	48.07	22847.42	22895.48
1501 - 2000	194.70	35.12	159.58	24256.33	24415.91
2001 - 2500	30.44	24.27	6.17	34090.52	34096.69
2501 - 3000	37.13	24.02	13.12	34792.44	34805.56
3001 - 3500	54.86	53.71	1.15	37701.67	37702.82
3501 - 4000	0.33	47.52	-47.18	36754.58	36707.40
4001 - 5000	14.72	86.51	-71.79	62334.56	62262.77
5001 - 6000	14.05	69.98	-55.93	47856.11	47800.17
6001 - 7000	0.00	62.49	-62.49	39691.46	39628.96
7001 - and above	12.71	403.37	-390.66	192612.36	192221.70
Total	**502.48**	**844.19**	**-341.71**	**544010.80**	**543669.09**

Table F-9: Calculation of post- *zakah- ushr* incomes along the income groups (rural) 1992- 93.

Income Groups	Distribution of Zakah-Ushr	Collection of Zakah-Ushr	Net of Zakah-Ushr	Post- Fiscal Incomes	Post- Zakah-Ushr Incomes
Up to - 1000	269.09	100.07	169.02	18249.55	18418.57
1001 - 1500	1121.59	111.79	1009.81	45483.53	46493.34
1501 - 2000	582.75	127.57	455.17	82564.43	83019.60
2001 - 2500	558.28	178.76	379.53	86305.84	86685.37
2501 - 3000	259.71	141.07	118.64	71421.48	71540.11
3001 - 3500	19.77	123.24	-103.47	66818.60	66715.13
3501 - 4000	10.39	112.04	-101.65	50786.22	50684.57
4001 - 5000	4.36	195.05	-190.70	82703.40	82512.71
5001 - 6000	3.02	115.61	-112.59	54027.83	53915.24
6001 - 7000	11.06	88.87	-77.81	36535.21	36457.40
7001 - and above	7.37	419.90	-412.52	141910.09	141497.57
Total	**2847.38**	**1713.96**	**1133.42**	**736806.19**	**737939.61**

Table F-10: Calculation of post- *zakah- ushr* incomes along the income groups (urban) 2001-02.

Income Groups	Distribution of Zakah-Ushr	Collection of Zakah-Ushr	Net of Zakah-Ushr	Post- Fiscal Incomes	Post- Zakah-Ushr Incomes
1- 1000	64.35	23.25	41.10	19513.19	19554.29
1001- 1500	71.29	14.50	56.79	17165.06	17221.85
1501- 2000	114.00	12.51	101.49	43081.03	43182.51
2001- 3000	128.23	22.49	105.74	84461.50	84567.24
3001- 4000	274.99	49.76	225.24	116549.45	116774.68
4001- 5000	169.54	88.74	80.80	141115.77	141196.57
5001- 6500	228.78	152.73	76.05	205926.34	206002.39
6501- 8000	66.28	142.82	-76.54	178483.35	178406.81
8001- 9500	0.00	86.52	-86.52	131759.30	131672.78
9501- 11000	69.29	99.68	-30.39	128721.29	128690.89
11001- 12500	9.54	108.30	-98.76	101097.67	100998.91
12501- above	1.00	800.29	-799.29	558982.13	558182.84
Total	**1197.30**	**1601.60**	**-404.30**	**1726856.08**	**1726451.78**

Table F-11: Calculation of post- *zakah- ushr* incomes along the income groups (rural) 2001-02.

Income Groups	Distribution of Zakah-Ushr	Collection of Zakah-Ushr	Net of Zakah-Ushr	Post- Fiscal Incomes	Post- Zakah-Ushr Incomes
1- 1000	524.41	464.74	59.67	46253.72	46313.39
1001- 1500	319.88	112.10	207.78	44462.54	44670.32
1501- 2000	347.99	84.17	263.82	71231.34	71495.16
2001- 3000	1049.31	201.14	848.17	201357.86	202206.04
3001- 4000	752.21	164.60	587.62	206462.98	207050.59
4001- 5000	276.03	204.94	71.09	209675.31	209746.40
5001- 6500	254.81	163.27	91.54	229055.45	229146.99
6501- 8000	415.30	155.48	259.83	161538.30	161798.13
8001- 9500	24.96	164.61	-139.66	125187.76	125048.10
9501- 11000	444.09	139.95	304.14	92614.11	92918.25
11001- 12500	0.99	66.19	-65.19	74313.69	74248.50
12501- above	94.30	383.51	-289.21	260871.84	260582.63
Total	**4504.30**	**2304.70**	**2199.60**	**1723024.90**	**1725224.50**

Explanation

Table F-12: Collection and disbursement of zakah and ushr in 1986–87, 1992–93 and 2001-02

Year	Collection	Disbursement[1]
1986– 87	1743.27	1445.20
1992-- 93	2568.76	3360.47
2001-02	3906.27	5701.63

Sources: Tables F-4 and F-5

1. For our convenience, we have given in table F-12 the total collection and disbursement of *zakah* and *ushr* in the three selected years.

2. We have distributed the collection and disbursement of *zakah* and *ushr* given in table F-12 in 1986-87, 1992-93 and 2001-02 according to percentage distribution and collection of *zakah-ushr* by income groups of urban-rural areas in the three selected years given in tables F-1, F-2 and F-3.

3. The distributions of collection and disbursement of *zakah* and *ushr* among the income groups of urban-rural areas in the three selected years have been added to the imputed taxes and expenditures, respectively, by income groups of urban-rural areas in 1986-87, 1992-93 and 2001-02 given in Appendix E. In this way, we have acquired expenditures, taxes and net expenditures or net benefits with *zakah* and *ushr*, which can be used to run regressions with *zakah* and *ushr* for urban-rural areas in the three selected years (chapter 7).

4. The net expenditures with *zakah* and *ushr* for urban-rural income groups in the three selected years have been added to post-fiscal distributions of income (pre-*zakah* and *ushr* distributions of income) by income groups and area given in Appendix E in 1986-87, 1992-93 and 2001-02. In this way, we have got post- *zakah* and *ushr* distributions of income for urban-rural areas in the three selected years.

5. We have used, above mentioned, pre-*zakah* and *ushr* (post- fiscal) and post-*zakah* and *ushr* distributions of income by income groups and area to compute pre- and post *zakah* and *ushr* Gini and concentration ratios respectively, for urban-rural areas in all three years (chapter 7).

6. Pre-, post-fiscal and post- *zakah-ushr* Lorenz and concentration curves for urban-rural areas in 1986-87, 1992-93 and 2001-02 have been depicted by using pre-, post-fiscal and post- *zakah-ushr* distributions of income for these areas in the three selected years (chapter 7).

[1] In table F-5 disbursement of *ushr* has not been reported, therefore we have added data on the collection of *ushr* in 1986-87, 1992-93 and 2001-02 to the disbursement of *zakah* given in table F-4 to get disbursement of *zakah* and *ushr* in these three years.

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