Public Expenditure Benefit Incidence on Health: Selective Evidence from India

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Abstract

Effectiveness of public spending still remains relatively an elusive empirical issue. This preliminary analysis is an attempt on the topic, using benefit incidence methodology, at the subnational government level in health sector of India. The results revealed public health system is 'seemingly' more equitable in a few States, while a regressivity in pattern of utilization of public health care services is observed in other States. Both these evidences were to be considered with caution, as the underdeveloped market for private inpatient care in some states might be the factor for disproportionate crowding-in of inpatients, which made the public health care system looked 'seemingly' more equitable. However, the 'voting with feet' to better private services seems evident only for the affordable higher income quintiles. Results also suggest that polarization is distinctly evident in the public provisioning of heath care services, more related to the in-patient services than the ambulatory services.

Keywords: effectiveness of public spending, benefit incidence
JEL codes: H51, H75, I14.

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Effectiveness of public spending is an elusive empirical issue. It has direct bearings on accountability. There is a growing recognition to analyse the distributional impacts of public spending. Public policy stance for the provision of basic services rests on both efficiency and equity grounds. Pure *public goods*, the goods that are non-excludable and non-rival, usually call for full public financing. However, there are certain goods – merit goods -which may be subject to significant external benefits or costs, and thus merit some form of government intervention. The education and health are the prime examples of merit goods. Literature often engages in analysing the benefit incidence of merit goods. Since expenditures on health and education are expected to have a redistributive impact, it is important to analyse whether public spending is progressive, that is, whether it improves the distribution of welfare, proxied by household income or expenditure.

Against the backdrop of the rule-based fiscal policy measures and/or austerity measures and in turn the declining or stagnant share of social spending in the budgets of many countries, the analysis of the effectiveness of public spending on merit goods stands significant. However higher public spending on merit goods per se does not ensure the budget as pro-poor. It is equally important to ensure that the poor receive an appropriate share of the increased allocation. But how does one ascertain the extent to which either the increased allocation or the existing allocation is reaching the poor?

Benefit incidence analysis (hereafter BIA) is a methodology that addresses this question. It brings together the elements of the supply of and demand for public services and can provide valuable information on the inefficiencies and inequities in government allocation of resources for social services and on the public utilization of these services (Davoodi et al 2003). BIA estimates the distributional impact of public expenditure across different demographic and socioeconomic groups.

The genesis of this approach lies in the works by Meerman (1979) on Malaysia and Selowsky (1979) on Colombia. BIA involves allocating *unit cost* according to individual utilization rates of public services. BIA can identify how well public services are targeted to certain groups in the population, across gender, social groups, income quintiles and geographical units. The effectiveness of public expenditure on merit goods is a matter of urgent concern. Does a disproportionate share of the public expenditure on health benefits the elites in the urban areas? Does the major part of health spending by the government benefits the schooling of boys rather than girls? The answer to these questions contains significant policy implications in terms of access and utilization of the public service provisioning of merit goods.

This paper attempts to analyse the benefit incidence of health spending in the context of India. There is a rare gamut of empirical literature in India, with the notable exceptions like Mahal, et al (2001) and Mahal (2005) on the topic. The paper is organised into six sections. *Section 1* explores the analytical framework of benefit incidence while *section II* deals with the methodology to derive benefit incidence. *Section III* engages in a selective review of literature on benefit incidence while *section IV* explores the data. Section V delves to empirical analysis of the public expenditure benefit incidence of health sector in India at national and selectively at subnational levels, while *section VI* concludes.

I. The Analytical Framework of Benefit Incidence

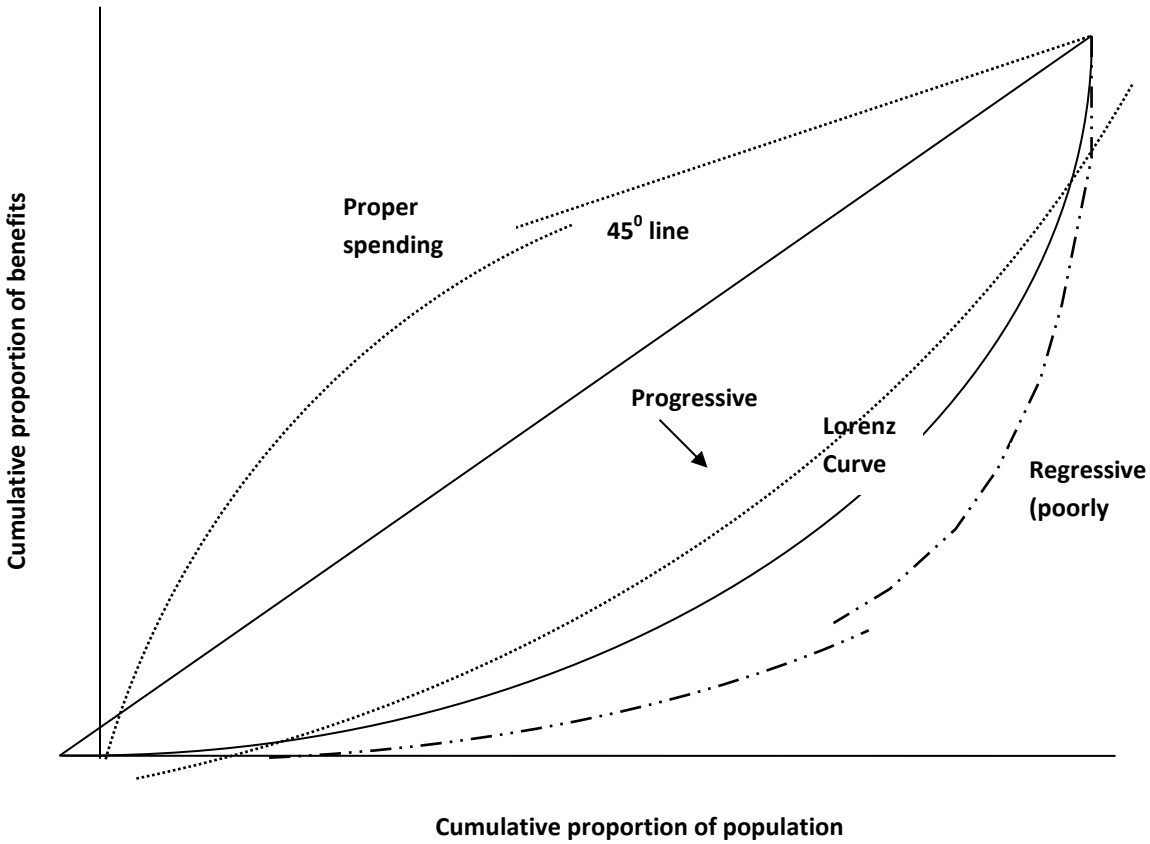
Davoodi et al (2003) provides a theoretical framework for the public expenditure benefit incidence analysis and targeting using the concentration curves. A concentration curve is derived by the cumulative plots of net fiscal incidence on the y-axis against the cumulative plots of per capita consumption-based population quintiles on the x-axis. The progressivity or regressivity of a public spending is deciphered by comparing the benefit concentration curve with the 45-degree diagonal as well as the benchmark curve based on income/consumption (Figure 1). The neutrality in the benefit incidence is what the diagonal line. It captures the perfect equality in the distribution of benefits. If the benefit concentration curve lies is above the 45-degree line, the benefits from the public provisioning of the service are said to be propoor (Milanovic (1995), Sahn and Younger (1999 and 2000), and Demery (2000), Davoodi et al (2003)). Such a concentration curve is concave rather than convex. As interpreted by Davoodi et al (2003), an implication of the concavity for quintiles is that Q1 exceeds Q5 and that Q1 is larger than 20 percent, that is, the benefits of public spending disproportionately go to the bottom quintile in absolute terms and relative to their share in the population. Similarly, the benefits are said to be *prorich* if Q1 is less than Q5 or when the concentration curve for the benefits lies below the 45-degree line.

Analysing the benefit incidence thus is in relative to the issues of targeting of public spending as well as the progressivity. Against the rule-based fiscal framework (Fiscal Responsibility and Management framework), there is a growing recognition for targeting, a tool to concentrate the benefits of public spending to the poorest segments of the population, thereby reducing or keeping constant the amount spent on merit goods. Coady, Grosh and Hoddinott (2004) interpreted targeting as a means of increasing the efficiency of the spending by increasing the benefits that the poor can get with a fixed program budget. Prima facie, a well-targeted program, will appear to be the one which achieves minimum leakage to the non-poor, so that any given resource transfer will have maximum impact on poor households (Mateus, 1983, Grosh, 1992). Cornia and Stewart (1993) pointed out that this may be incorrect for a number of reasons, including administrative and efficiency costs, political factors and other general equilibrium effects as well as the errors of targeting. Why the criterion of minimizing leakage may not be the right one lies in the existence of two errors - errors of omission of the poor from the scheme (type I), as well as errors of inclusion of the non-poor (type II). These errors which co-exist with the targeting cannot be captured through Benefit Incidence analysis.

Davoodi, et al (2003) also cautioned that it is problematic to conclude that targeting that is more propoor is also better; for instance, spending a small amount only

on the poorest user is the most propoor targeting possible, but it might not be preferred to a more even distribution of benefits. Moreover, universal health care or universal public education is preferred over all alternatives, despite the fact that it is not propoor. It is not reasonable to conclude that the larger than proportionate share of spending the better the targeting (Davoodi, et al 2003). Along these lines, a less extreme benchmark than targeting is progressivity.

Figure 1: Concentration Curves and Public Expenditure Benefit Incidence



Source: Davoodi , *et. al* (2003)

Figure 1 provides three possible concentration curves, the line of equality (45 degree line) and the benchmark curve of income or consumption. The benefits from public spending are said to be progressive if the concentration curve for these benefits is above the benchmark curve for income or consumption, but below the 45-degree line. A concentration curve that satisfies this criterion can be either convex or concave. A falling trend from Q1 to Q5 (the quintile shares of benefit to the poorest and richest) can be unambiguously taken as evidence of progressivity.

On the other hand, the public provisioning of a service is regressive when benefits from the service are distributed less equally than either income or consumption.

However, a rising trend from Q1 to Q5 (the quintile shares of benefit) cannot unambiguously be taken as evidence of regressivity. In this case additional information is needed on either the Lorenz curve of income or consumption or the income/consumption share of each quintile. However prima facie, the public spending is said to be regressive if spending on Q1 is less than spending on Q5 when each is expressed as fraction of income or consumption, or when the concentration curve for the benefits lies below the benchmark curve for income or consumption. The theoretical framework of benefit incidence has lacunae as the results of benefit incidence represents an "equilibrium" outcome of government and household decisions and does not specify a model underlying the behaviour of either government or households(see Davoodi et al , 2003 for details).

II. The Methodology to derive Benefit Incidence

Following Demery (2000), there are four basic steps towards calculating benefit incidence: (i) estimating unit cost, (ii) identifying the users, (iii) aggregating users into groups, and (iv) calculating the benefit incidence as product of unit cost and unit utilised.

II.1 Estimating Unit Cost

The unit cost of a publicly provided good is estimated by dividing the total expenditure on that particular publicly provided good by the total number of users of that good. This is synonymous to the notion of per capita expenditure, but the denominator is confined to the subset of population who are the users of the public good. For instance, the unit cost of the elementary education sector is total primary education spending per primary enrollment, while the unit cost of the health sector could be total outpatient hospital spending per outpatient visit.

II.2: Identifying the Users

Usually the information on the users of publicly-provided goods are obtained from household surveys with the standard dichotomy of data into poor and non-poor, male and female headed households, rural and urban, and so on.

II.3: Aggregating Users into Groups

It is important to aggregate individuals or households into groups to estimate how the benefits from public spending are distributed across the population. Empirical evidence has shown that the most frequent method of grouping is based on income quintiles or monthly per capita expenditure (mpce) quintiles. The aggregation of users based on income or mpce quintiles could reveal whether the distribution of public expenditure is progressive or regressive. The spatial differentials in the public expenditure delivery though cannot be fully captured through the rural-urban dichotomy, it can provide broad policy pointers with regard to the distributional impact of publicly provided goods across rural and urban India. Yet another significant grouping is based on gender and social groups, after or before categorizing the unit utilized based on geographical units. The grouping of users based on gender or social groups is often ignored in studies on benefit incidence analysis.

II.4: Calculating the Benefit Incidence

Benefit incidence is computed by combining information about the *unit costs* of providing the publicly-provided good with information on the *use* of these goods.

Mathematically, benefit incidence is estimated by the following formula:

$$X_j \equiv \sum_i U_{ij} (S_i/U_i) \equiv \sum_i (U_{ij}/U_i) S_i \equiv \sum_i e_{ij} S_i$$

where X_j = sector specific subsidy enjoyed by group j;
U_{ij} = utilization of service i by group j;
U_i = utilization of service i by all groups combined;
S_i = government net expenditure on service i; and
e_{ij} = group j's share of utilization of service i.

III. Selective Review of Literature on Benefit Incidence

Theoretically, there are two approaches to analyze the distributional impacts of public expenditure in social sector- in particular, education and health sector: benefit incidence studies and behavioral approaches. The behavioral approach is based on the notion that a rationed publicly provided good or service should be evaluated at the individual's own valuation of the good, which Demery (2000) called a 'virtual price'. Such prices will vary from individual to individual. This approach emphasizes the measurement of individual preferences for the publicly provided goods. The methodological complications in the valuation of revealed preferences based on the microeconomic theory and the paucity of unit record data related to the knowledge of the underlying demand functions of individuals or households led to less practicability of the behavioral approaches in estimating the distributional impact of public expenditure. The second approach, benefit incidence analysis (BIA), is a relatively simple and practical method for estimating distributional impact of public expenditure across different demographic and socioeconomic categories. The earliest examples of analyses of the benefit incidence of public spending on merit goods are studies by Gillespie (1965) on Canada and the United States (1965). Four useful surveys on the benefit incidence literature were carried out by McClure (1974), Selden and Wasylenko, 1992) and more recently by Demery (2000) and Younger (2002).

The literature on benefit incidence revealed that it has been applied mainly to merit goods, in particular health and education. The domain of BIA has been mainly confined to the IMF and World Bank, in particular the studies by Davoodi et al (2003), Demery (2000), Castro-Leal et al (1999) and Lanjouw and Ravallion (1998). Davoodi et. al. (2003) and recently Davoodi et al (2010) compile a large data set on the unit cost and unit utilised of the health and education spending for 56 countries between 1960 and 2000, to conduct BIA. The study found that, among other things, overall education and health spending are poorly targeted. The benefits from primary education and primary health care go disproportionately to the middle class, particularly in sub-Saharan Africa, HIPCs (Heavily Indebted Poor Countries) and the transition economies; but targeting has improved in the 1990s. Second, simple measures of association show that countries with a more propoor incidence of education and health spending tend to have better education and health outcomes, good governance, high per capita income, and wider accessibility

to information. Another important methodological lesson of this paper is that future BIA should pay more attention to recording incidence data and various breakdowns of the data (e.g., by region, gender, and ethnicity) and the necessary auxiliary identifiers that are essential for a proper analysis, which this paper intends to do in the context of India.
Demery (2000) compares the public spending on education across quintiles in the context of Colombia, Côte d'Ivoire and Indonesia. Her results revealed that the poorest quintile gained just 15 percent of the total education subsidy in Indonesia, only 13 percent in Côte d'Ivoire, and 23 percent in Colombia. Three factors determine these shares. First is the supply side determinant, which is the public spending on education across the various levels of schooling. In Indonesia, the government allocated 62 percent of total education subsidies to primary education, while in Côte d'Ivoire the share was under 50 percent. The Ivorian government spent relatively more on tertiary schooling (18 percent) compared with just 9 percent in Indonesia. Colombia's allocations were quite different, with a much lower share being allocated to primary schooling (just 41 percent) and a much higher share to tertiary education (26 percent). But surprisingly, the low allocation of the education subsidy to primary schooling in Colombia does not seem to have led to a lower share going to the poorer quintiles. Why is this? The answer, Demery (2000) argues, lies in the main with the second set of factors determining benefit incidence – the household behaviour, the demand side factors. Differences in household behavior are reflected in the quintile shares of the subsidy at each level of education. Primary enrollments and therefore the primary subsidy in the poorest quintile represented 22 percent of total primary enrollments subsidy in Indonesia, just 19 percent in Côte d'Ivoire, and 39 percent in Colombia. It is the combined influence of these enrollment shares and the allocation of government subsidies across the levels of education that yields the overall benefit incidence from education spending accruing to each of the quintiles. A third factor explaining the differences in benefit incidence is the way the quintiles were defined. For Colombia they were defined across households rather than individuals, and this makes the benefit incidence patterns not comparable with Indonesia and Côte d'Ivoire. With total household expenditure *per capita* as the welfare measure, poorer households will generally be larger (Lanjouw and Ravallion, 1994). This means that when quintiles are defined for households, there will usually be more individuals in the poorer quintiles than the richer quintiles. And this can distort benefit incidence results, making it appear that the poorer quintiles gain more, relative to the rich.

In Côte d'Ivoire (as well as in Guinea, Madagascar, South Africa, Tanzania and Uganda), the poorest 20 percent gain about 20 percent of the primary education subsidy, about 10 percent of the secondary education subsidy and a minimal percent of the tertiary level subsidy (Castro-Leal and others 1999). In their estimation of benefit incidence in a set of African countries, they obtained that the government subsidies in education and health care are generally progressive but are poorly targeted to the poor and favour those who are better-off. Based on their analysis the authors then suggest that unless better-off groups can be encouraged to use private service providers, especially at the secondary and tertiary levels, it is difficult to envisage how government education subsidies can be better targeted to the poor. Another research by Li, Steele and Glewwe (1999) provided similar results. In that study, in Côte d'Ivoire, Nepal, Nicaragua and Vietnam, the richest 20 percent of the population receive more than 30 percent of all public education expenditure.

Lanjouw and Ravallion (1999) introduced the distinction between average and marginal benefit in the benefit incidence analysis. They used cross section data to assess the extent to which the marginal benefit incidence of primary school spending differs from

average incidence. They regress the 'odds of enrollment' (defined as the ratio of the quintile specific enrollment rate to that of the population as a whole) against the instrumented mean enrollment ratio (the instrument being the average enrollment rate without the quintile in question). The estimated coefficient is termed as 'benefit capture', which indicates the extent to which there is early capture by the rich of primary schools. Under the circumstance, any increase in the average enrollment rate is likely to come from proportionately greater increases in enrollment among the poorer quintiles. That would lead to higher marginal gains to the poor from additional primary school spending than the gains indicated by the existing enrollments across the quintiles. Whereas the poorest quintile gains just 14 percent of the existing primary education subsidy in rural India, they would most likely receive 22 percent of any additional spending. This result suggested that caution is needed in drawing policy conclusions from average benefit incidence results. The distributional impact depends on how the money is actually spent.
In a recent study on benefit incidence analysis on education in the Philippines by Manasan et. al. (2007), the results indicated that the distribution of education spending is progressive at the elementary and secondary level, using national averages. On the contrary, it is regressive for the intermediate and college- level. Extending the analysis to the local government units (LGUs), yields that the urban areas usually attract higher subsidies compared to the rural areas. In the context of India, a major study on the benefit incidence analysis in health sector has been carried out by Mahal et al (2001). A broad finding by Mahal et al (2001) was that the publicly financed health services in India continues to represent the best method for providing critical services for the poor and that some subnational governments in India are able to ensure that public financing is not skewed to the rich. This paper takes forward the literature on benefit incidence of health spending in India.

IV. The Data

BIA as mentioned in section III involves per unit cost of public expenditure and the unit utilization rates of public provisioning of services. The data for estimating per unit expenditure is the finance accounts by the national/subnational governments. The net fiscal incidence is usually arrived at by applying the net government spending to the unit utilization rates per quintiles. The net public expenditure is derived by deducting the revenue from cost recovery from the aggregate public spending. The next step is identifying the users of the public provisioning which is almost always based on data obtained through macro household surveys. The main classifier used to group households is either income or total household expenditure. The data so obtained is then used to compute the benefit concentration curves. The benefit incidence is computed on the basis of these unit utilized and the unit costs derived.

In this paper, the unit utilized data has been obtained from the 'Morbidity, Health Care and the Condition of the Aged' rounds of the National Sample Survey (NSS), Centre for Statistical Organisation, Government of India. The study used 52nd round (July 1995-June 96) for intertemporal comparison; and primarily the results are based on the recent available 60th round (January-June 2004, Schedule 25). The data spans both national and subnational government units.

The unit utilized is primarily based on the morbidity rates per quintiles, in particular the hospitalization data as per the in-patient and out-patient statistics. The data on out-patients is selectively used to understand the quintile wise pattern of ambulatory services. The grouping is done on the basis of mpce (monthly per capita consumption expenditure) quintiles. The database comprises auxiliary identifiers as well, as follows.

IV.1: The Quintile Share of Benefits Covering Q1, Q2, Q3, Q4, and Q5 (by Gender, Geography and Ethnicity)

The ethnicity, gender and geographical dimensions of quintile shares in the data set (the latter referring mostly to an urban-rural dichotomy) are incorporated for all subnational government units for the analysis. Due to inadequate data units, ethnicity is not analysed in most of the subnational units. The ethnicity is broadly captured by the data on 'social groups' provided by National Sample Survey Organisation (NSSO), especially disaggregated as Scheduled Caste, Scheduled Tribe, Other Backward Classes (OBC), however lack of adequate data units thwarts the analysis on ethnicity. One of the major lacunae of the previous studies on BIA is the lack of disaggregation of benefit incidence by gender, geography and ethnicity.

IV.2: Type and Coverage of Health Spending (i.e., Disaggregate Components of Health Spending, Budget Estimates/Revised Estimates versus Actual, and Revenue Expenditure versus Capital Expenditure on Health)

The data on revenue account and capital account are used for the analysis, in actual expenditure rather than budget estimate or revised estimate for the corresponding year of the unit utilized data. Wherever actual expenditure is not available, Budget Estimate or Revised Estimate is used. Under revenue account, the appropriate budget heads under 2210 (Medical and Public Health) and 2211 (Family Welfare) have been used. Under Capital account, appropriate budget heads under 4210 (Capital outlay on Medical and Public health) and 4211 (Capital outlay on Family Welfare) have been used. In addition, the plan (including the Centrally Sponsored Schemes (CSS) and Central Schemes (CS) and non-plan under each budget heads is utilised for the analysis. The data is inclusive of public spending on allopathy and other systems of medicine. The spending data can be further disaggregated into urban health services and rural health services. The public spending data on rural health services incorporates the expenditure on health centres and subsidiary health centres, primary health centers, community health centres, hospitals and dispensaries etc. As it is difficult to track the unit utilised as per these budget heads from the NSSO rounds, ideally one can use the plausible public spending categories and then deduct it for the recoveries to arrive at the net fiscal incidence.

As highlighted by Davoodi et al (2010), as the inputs for the health sector have multiple uses, it is much harder to demarcate one category of health spending from another. In addition, cross-country diversity in institutional arrangements for health service delivery significantly contributes to blurring of the demarcation line. In BIA methodology, usually the cost recoveries are deducted to obtain the net spending. The broad practice of netting out the out of pocket expenditure by households on health obtained from household surveys to calculate the "subsidy" element has also not been followed in this paper. The notion of the net spending (total expenditure minus cost recoveries) could be defined as 'subsidies' is a controversial area, which is beyond the scope of this paper, and thus unattempted. The scope of this paper is limited to analysing

the incidence of public spending - rather than 'subsidies' across gender, ethnicity, geography, income quintiles at subnational levels, wherever possible and its implications in terms of public policy.

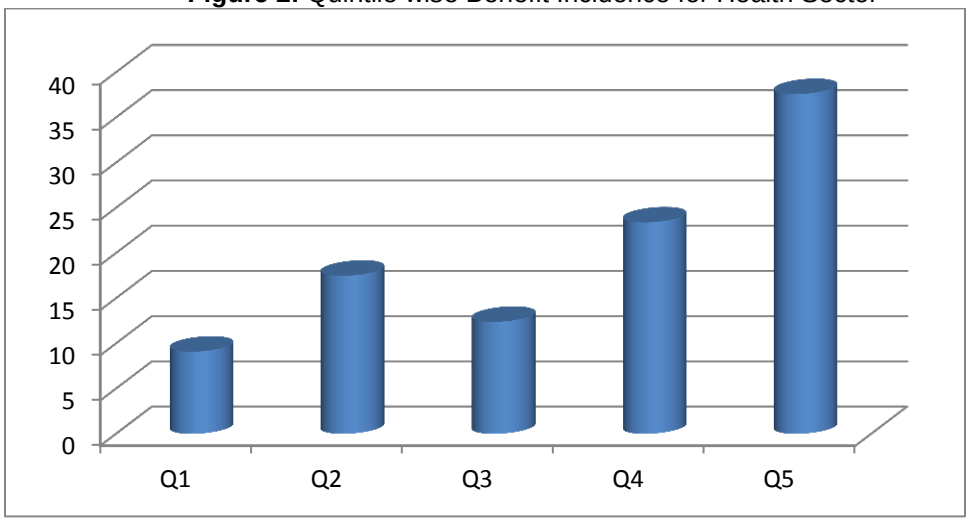
IV.3: The Choice of Measure for Unit Utilisation across Quintiles

Demery (2000) and Lanjouw and Ravallion (1994) pointed out that, if both individual and household quintile shares were reported, individual share data were preferred to household share data. They have pointed out households of poorer quintiles will generally be larger implying that there will usually be more individuals in the poorer quintiles, when quintiles are defined for households. To take care of the demographic effect, quintiles are defined in terms of individuals. The geographical analysis utilised separate quintiles for rural and urban areas. The analysis is confined to the major States of India.

V: Empirical Evidence on Benefit Incidence in Health Sector in India

Using the Central Statistical Organisation's (CSO)National Sample Survey data for units utilized and the budget data for expenditure in health sector, the benefit incidence of health sector expenditure is calculated for both inpatient and out-patient services. Figure 2 shows the relative share of the public expenditure captured across different income quintiles in inpatient and out-patient services in public sector. The analysis revealed that the poorest quintile (poorest 20 percent of the population) captured around 9 percent of the total net public expenditure on health sector. The richest income quintile benefited around 40 percent of the total net public expenditure in health sector. The combined analysis of in-patient and out-patient services revealed that public expenditure on health sector is highly regressive; it is pro-Q5 in distribution. In other words, the public expenditure on health sector is highly inequitable.

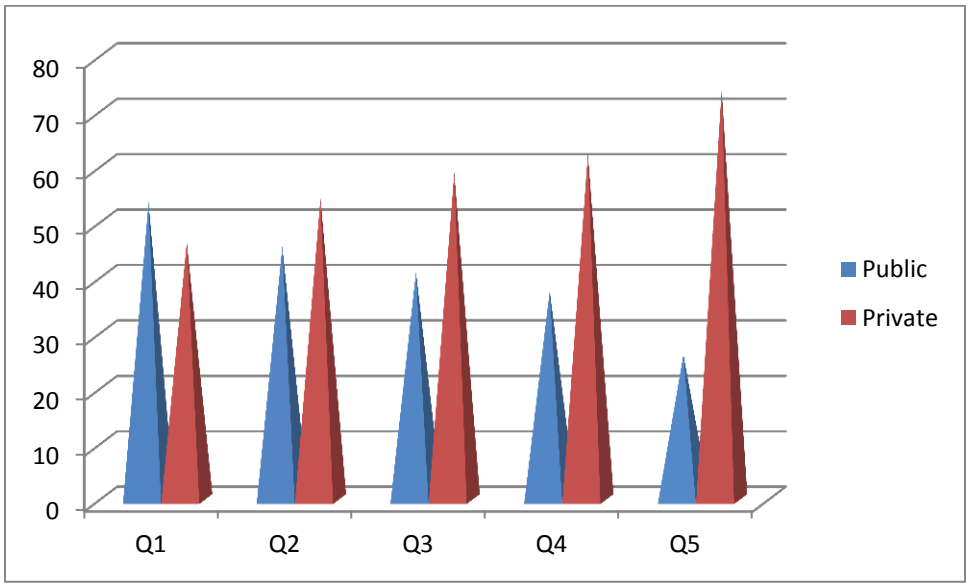
Figure 2: Quintile wise Benefit Incidence for Health Sector



Source: CSO, NSSO 60th round: Jan-June 2004, Schedule 25: Morbidity, Health Care and the Condition of the Aged.

When the utilisation rates of hospitalization were dichotomized for public and private sector, the regressive pattern emerged more prominent (Figure 3). The data on the rates of hospitalization in the private and public sectors by income quintiles revealed that the rate of private hospitalization increases with income; and it is vice versa for public sector hospitalization. Yet another significant point to be noted as measured by the share of the public sector for hospitalizations is that poor population within the quintile Q1 has strong reliance on public hospitals. Around 50 percent of the poor within Q1 utilized the public hospital services. Quite contrary to that, the richest population that belongs to Q5 utilized only 20 percent (Figure 3).

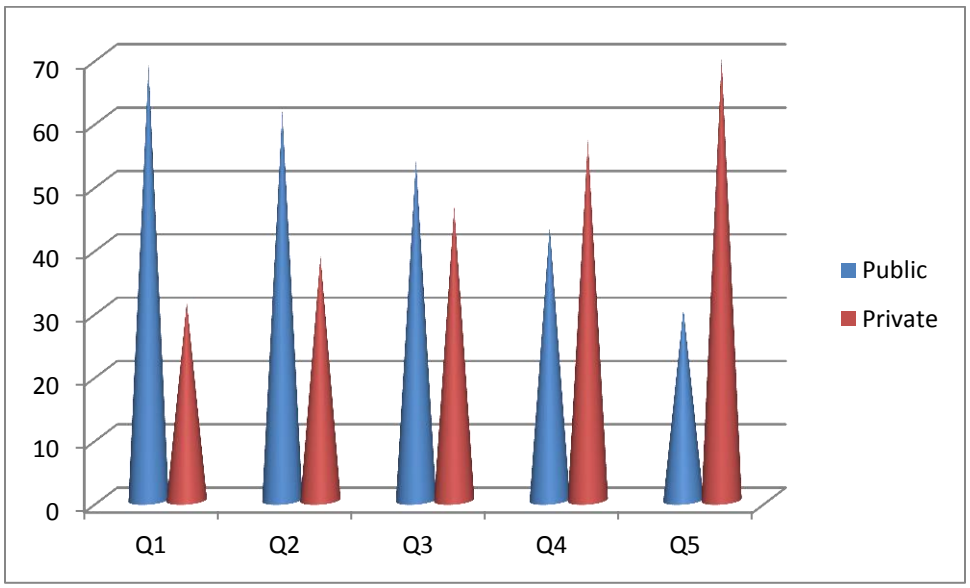
Figure 3: Public and Private Health Sector Utilisation Rates by Income Quintiles



Source: *Ibid.*

In case of institutional deliveries, the data analysis revealed that the rate of utilization of public sector services monotonically declines as the income increases (figure 4). While around 70 percent of Q5 availed the private sector health services for delivery, the poorest quintile (Q1) availed only around 30 percent of private sector services. On the contrary, around 68 percent of the poor in the lowest quintile (Q1) availed the public sector for institutional delivery (figure 4).

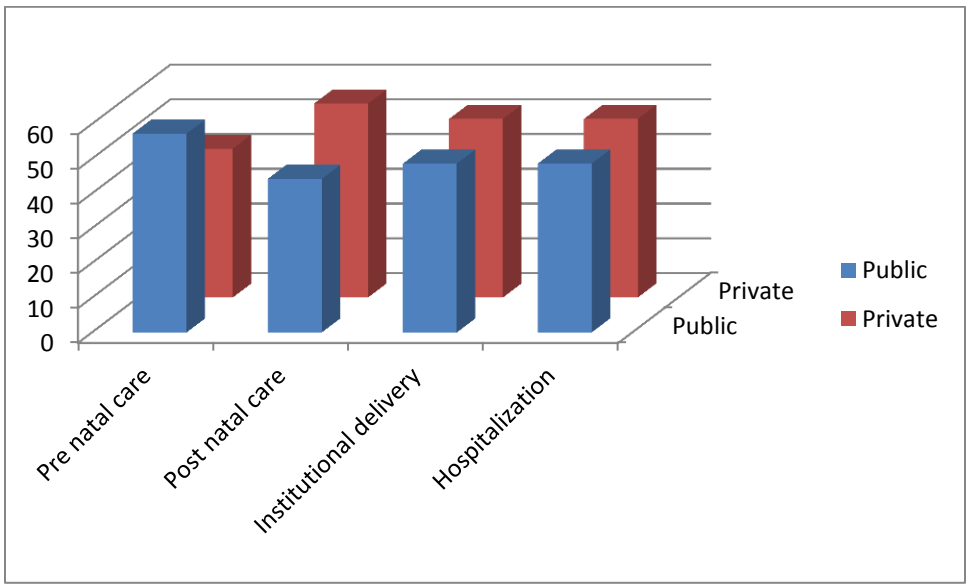
Figure 4: Quintile wise Distribution (%) of Institutional Deliveries in Public and Private Sector



Source: *Ibid.*

The analysis of sectoral shares in the preventive and curative health service delivery revealed that around 60 percent of poor utilized the services of public sector for prenatal care, while around 40 percent availed the public sector for post natal care (figure 5). The hospitalizations and institutional deliveries are shown similar share for public sector, both at around 50 percent.

Figure 5: Distribution (%) of Public and Private Sector Shares in Preventive and Curative Health Service Delivery



Source: *Ibid.*

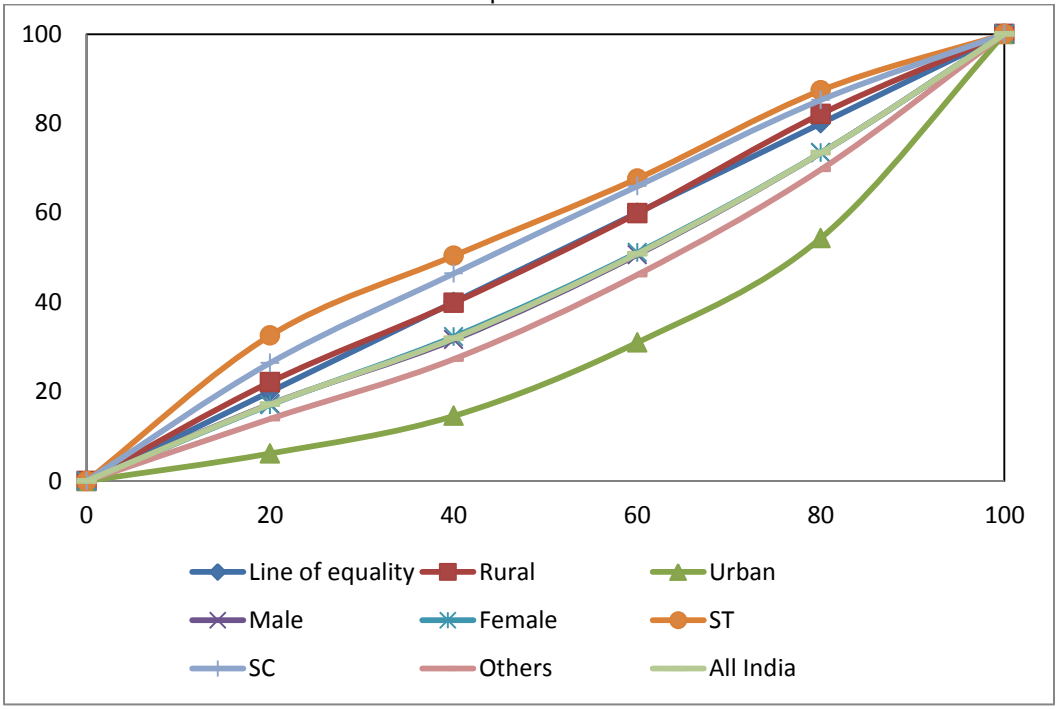
V.1: Incidence of Public Spending on Health: In-patient Services

Getting to the numbers (NSSO rounds) in the in-patient treatment alone, one could see that majority of poor, inspite of everything, uses public health care system in India. It was not a matter to take pride by the government especially when the out of pocket spending (oops) on health care is catastrophic, and in turn this oops incurred by the poor determines this behaviour of health care access in the public sector. On the contrary, comparatively less percent of out- patients across quintiles get treated in public medical hospitals may be a case of people exercising their 'exit' options to private health care provisioning. The reason may be that the personal ambulatory service (defined as the personal care services on an outpatient basis) is the most pluralistic and competitive segment of the health care system in India. Different systems of medicine along with a wide range of providers with a variety of quality exist side by side and it is possible for patients to 'shop around' (Chakraborty and Mukherjee, 2003). This makes the personal ambulatory care part of the health system the least amenable to improvement solely from expanding public provision and therefor it is high time that the government could step in with required institutional structure to regulate the personal ambulatory health service market.

Against this backdrop, the benefit incidence of public expenditure is analysed by the depiction of concentration curves (Figure 6) for aggregate as well as disaggregated categories in the in-patient category. The auxiliary identifiers used for the analysis are gender, geography and ethnic groups. It is clearly revealed from the concentration curves that people in the quintiles Q1 and Q2 especially in the rural areas are utilizing the public provisioning of health care disproportionately than the upper income quintiles. It also showed that in case of most ethnic groups (Scheduled Caste (SC) and Scheduled Tribes (ST)) and women, more people are accessing the public sector health services across all

mpce (monthly per capita consumption expenditure) quintiles (Figure 6). The seemingly regressive pattern of incidence for the urban sector may be reflecting the utilization of private sector health care facilities.

Figure 6: Incidence of Public Spending on Health in India: Aggregate versus Distribution of In-patient Care



***Source*:** (Basic Data), NSSO 60th health Rounds, 2004-05.

Both these evidences were to be considered with caution. This may be because of two reasons. One, the seemingly regressive pattern of utilisation in urban areas is due to the 'voting with feet' phenomenon, people exiting to better private services especially from the higher income quintiles. Secondly, the exorbitantly high out of pocket spending by the poor on the health care might be the factor for disproportionate crowding-in of inpatients in public sector, which made the public health care system looked 'seemingly' more equitable, especially among the lowest income quintiles (*Table 1*).

The out of pocket spending (oops) by the households is as high as 71.13 percent as per the recent National Health Accounts of India. The public expenditure on health constitutes only around 20 percent of total; of which Central government forms only 6.78 percent. Among the three tiers of federal set up, States spent relatively more money on health, which is around 12 percent of total health expenditure in India. However this is insignificant when compared to the out of pocket spending (oops) by the households.

Table 1: Health Sector Financing in India

Source of Funds	In percent
Central Government	6.78
State Government	11.97
Local Bodies	0.92
Total : Public Funds	**19.67**
Households	71.13
Social Insurance Funds	1.13
Firms	5.73
NGOs	0.07
Total-Private	**78.05**
Central Government	1.56
State Government	0.24
NGOs	0.47
Total-External Flows	**2.28**
Grand Total	**100.00**

Source: Ministry of Health & Family Welfare, Government of India , National Health Accounts, 2004-05

V.2*:* Spatial Benefit Incidence Analysis of Public Spending on Health: Subnational Units

The methodology followed in this section on spatial benefit incidence analysis of public spending on health is the concentration curves methodology suggested by Davoodi et al. (2003). Davoodi et al (2003) suggested a methodology consisting of comparing the resulting distribution of benefits with benchmark distributions, in order to derive useful policy recommendations, by using concentration curves. If the concentration curve is above the benchmark curve - but below the 45° line, it is considered progressive; otherwise we can say that public spending is regressive. Why progressive, Davoodi et al (2003) explained that it is because the proportion of the benefits from public spending for lower-income groups is larger than their participation in the total income, which is expected to have a redistributive effect. When benefits from public spending are pro-poor, they are also progressive, but progressiveness does not imply pro-poor spending. The point to be noted is that although BIA is not sufficient to engage in required pro-poor public expenditure reforms, however it is still a useful methodology in order to know the distributional impacts of public spending among different categories of population, whether it is gender differentials or geographic differentials or by ethnicity.

V.2.1: Data Driven Categorization of Subnational Units Based on Concentration Curve

The unit of analysis in this section is subnational governments for in-patient heath care, and the analysis is confined only to States/Provinces. The state-wise incidence of public spending on health is attempted with the aid of concentration curves. The states are categorized based on the pattern of concentration curves of disaggregation. Disaggregation is carried out in terms of gender and geography (rural

and urban dichotomy). The states with concentration curves above the line of equality are referred as pro-poor health spending states. The states with concentration curves above the benchmark line are called progressive spending states; however progressiveness here does not imply pro-poor spending, as there is no evident higher participation of population especially from the poor income quintiles on public health service utilization. Based on the pattern emerging from the concentration curve analysis, the states are grouped into the following three groups (i) States with regressive pattern of public health spending; (ii) Pro-poor spending States in rural health sector, with significant crossovers of concentration curves (either gender or geography) above 45 degree line, and (iii) States with crossovers of concentration curves at high income quintiles.

i. States with regressive pattern of health spending

Five states in India, viz., Jammu Kashmir, Punjab, Haryana, Rajasthan and Uttar Pradesh revealed a pattern of concentration curves below the line of equality (Figures 7-11). Gujarat is a mild exception as the rural concentration curve had a crossover at Q3 to above the line of equality. However, below the line of equality, it is pertinent to dichotomize the incidence of spending into progressive and regressive patterns based on the benchmark curve. The pattern of most of the concentration curves in these five states revealed that all the categories exhibit a regressive pattern of public spending on health. In case of Rajasthan, the striking feature of incidence is the progressive pattern of incidence of females in utilizing the public health provisioning, though the case cannot be referred to as pro-poor spending as the concentration curves are not above line of equality. This is inspite of the fact that the per capita public spending on health in these States [Jammu Kashmir (Rs 2082), Punjab (Rs 1813), Haryana (Rs 1786), and Uttar Pradesh (Rs 1152)] been above national average (Rs 1377) during this period, except Rajasthan (Rs 808) and Gujarat (Rs 1187). If not the differentials in health spending - the supply side determinant, what could be the determinant that explains these regressive patterns? One of the significant determinants for this regressivity is the gender and regional differentials in the behavioral access and utilisation of public health care in these States, which is primarily a demand side determinant. In these states, for most categories, the people in Q5 utilise the in-patient care in public sector, more than poor in Q1.

Figure 7: Incidence of Public Spending on Health: Gender and Geography Differentials of Jammu Kashmir

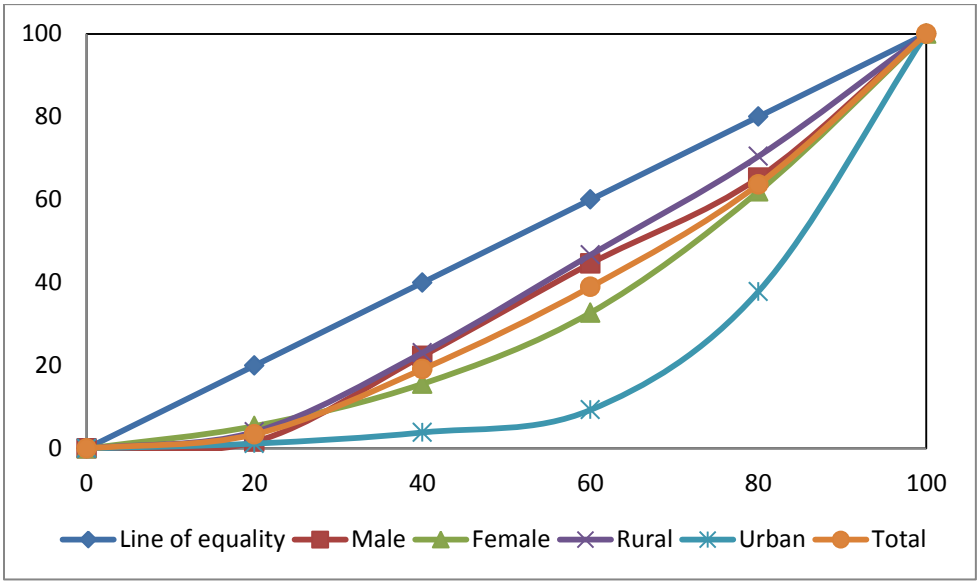


Figure 8: Incidence of Public Spending on Health: Gender and Geography Differentials of Punjab

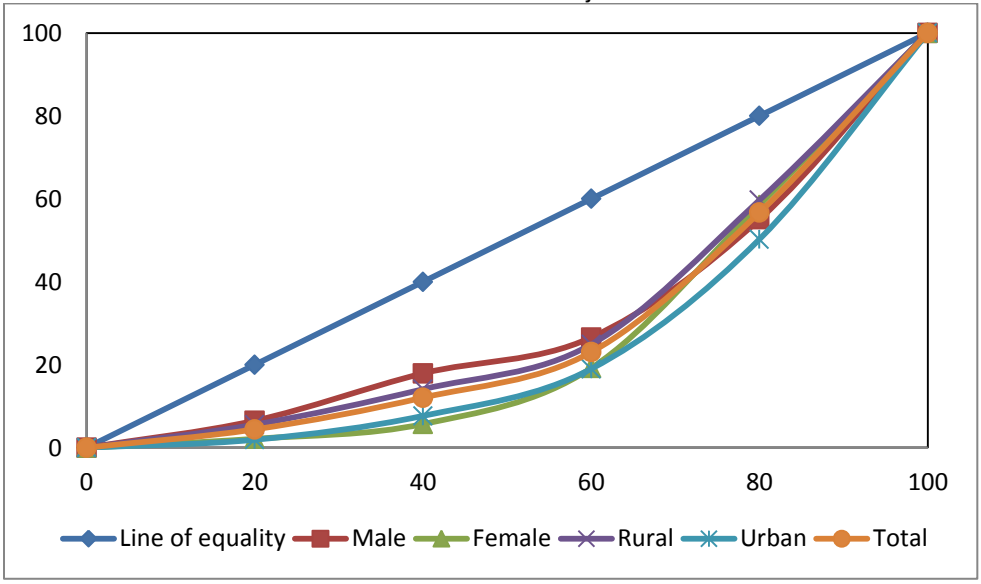


Figure 9: Incidence of Public Spending on Health: Gender and Geography Differentials of Haryana

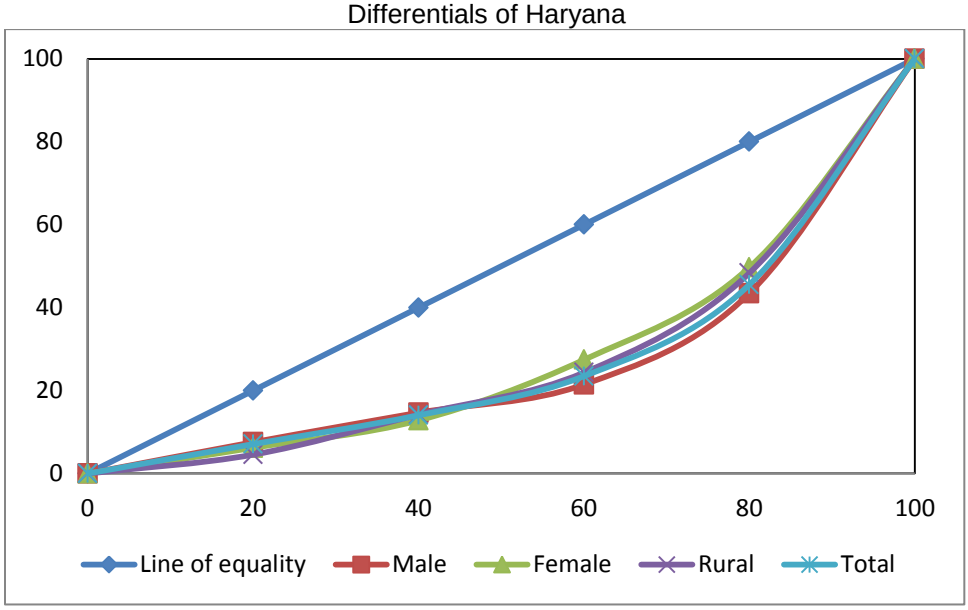


Figure 10: Incidence of Public Spending on Health: Gender and Geography Differentials of Rajasthan

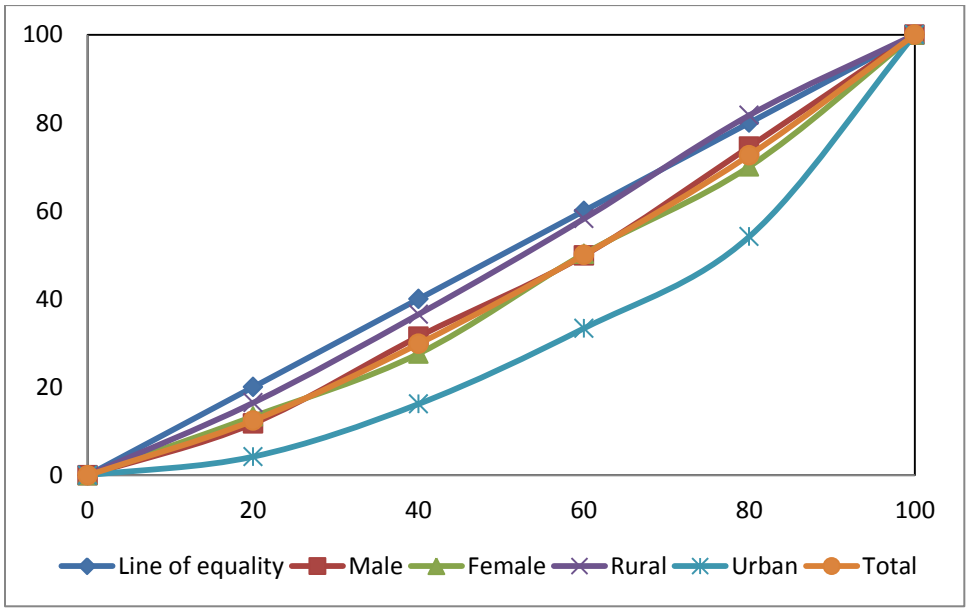


Figure 11: Incidence of Public Spending on Health: Gender and Geography Differentials of Uttar Pradesh

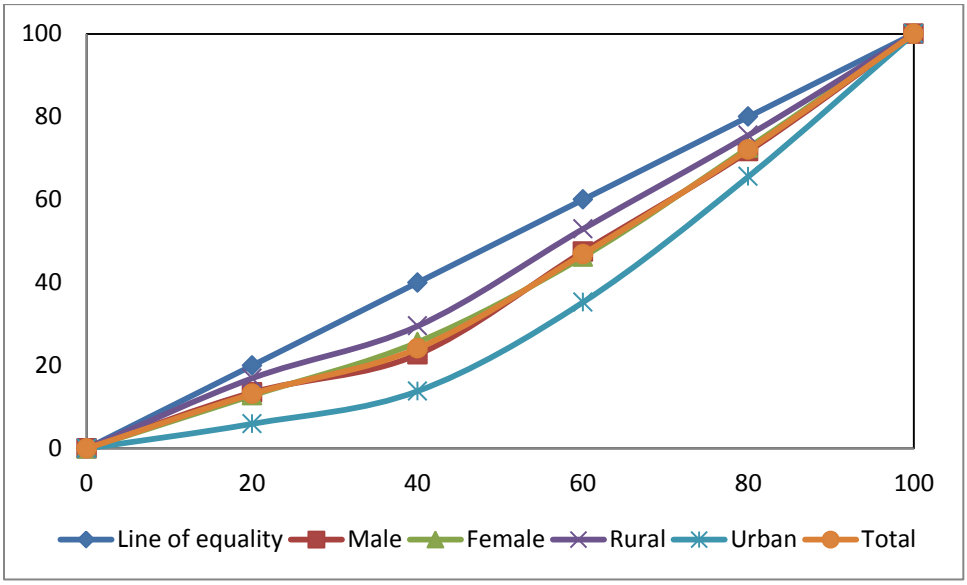
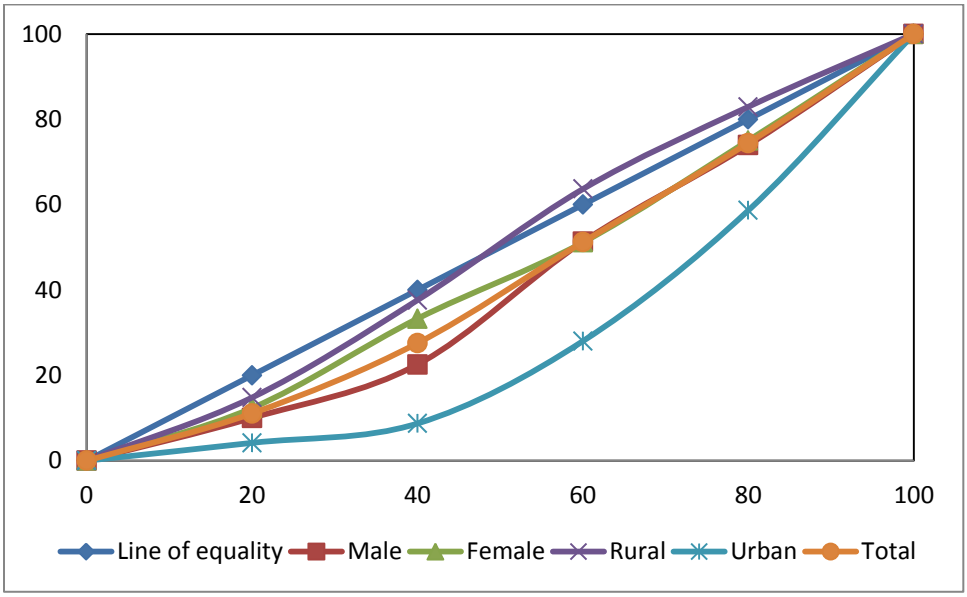


Figure 13: Incidence of Public Spending: Gender and Geography Differentials of Gujarat



(ii) Pro-poor Health Spending States in Rural Sector: Significant Crossovers of Concentration Curves and/or Curves above line of equality

Ten states of India**,** namely**,** Bihar, Jharkhand, Orissa, West Bengal, Jharkhand, Madhya Pradesh, Andhra Pradesh, Maharashtra, Karnataka and Tamil Nadu showed mostly a pro-poor pattern in health spending in rural areas, with either the concentration curves above the line of equality or with significant crossovers of concentration curves for the categories of disaggregation (figures 13-22). The concentration curves of these states revealed a relative preference of the population for public health services (rather than private sector services), especially in rural areas. This behavioral pattern may be due to either the lack of adequate private provisioning of in-patient health care system in rural areas or the lack of 'voting with feet' to the private provisioning of health care services for the in-patient services due to cost factors (especially when the expenditure on health by the poor households turn catastrophic). Pro-poor pattern of health spending however was not revealed for urban units in most of these ten states. The urban curves show a pattern of regressivity. It is interesting to note this pro-poor pattern (which is predominantly demand-side determined one), especially when the per capita health spending in most of these States are below the national average (Rs 1377). The per capita health spending of States below the national average includes Orissa (Rs 995), West Bengal (Rs 1188), Madhya Pradesh (Rs 1200), Tamil Nadu (Rs 993), Andhra Pradesh (Rs 1118) and Karnataka (Rs 997). However Bihar (Rs 1497) and Maharashtra (Rs 1576) had per capita health spending above the national average in the corresponding year.

Figure 13: Incidence of Public Spending: Gender and Geography Differentials of Bihar

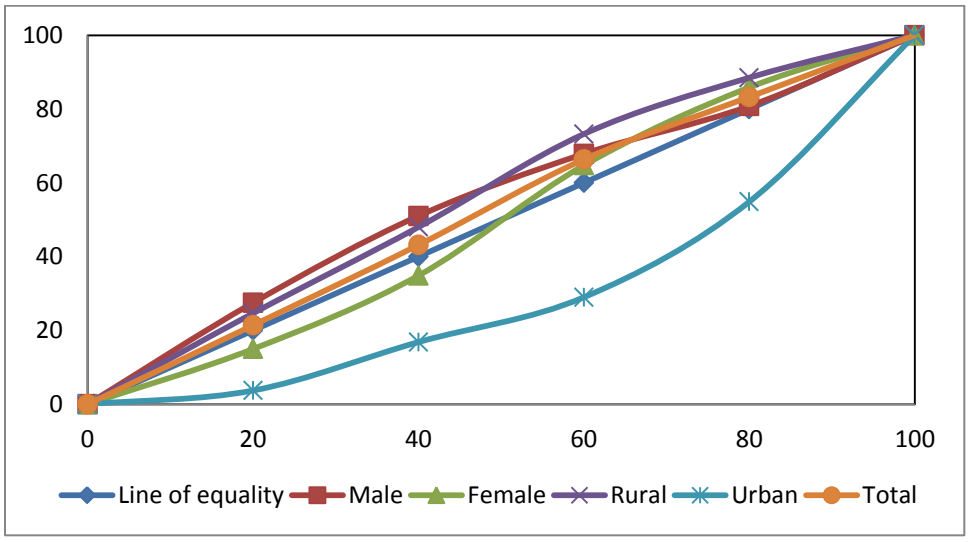


Figure 14: Incidence of Public Spending: Gender and Geography Differentials of West Bengal

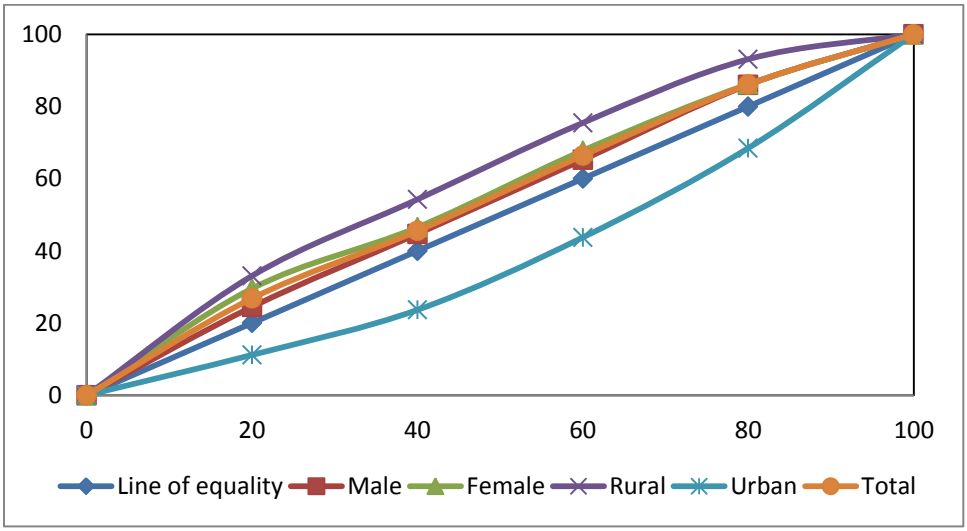


Figure 15: Incidence of Public Spending: Gender and Geography Differentials of Jharkhand

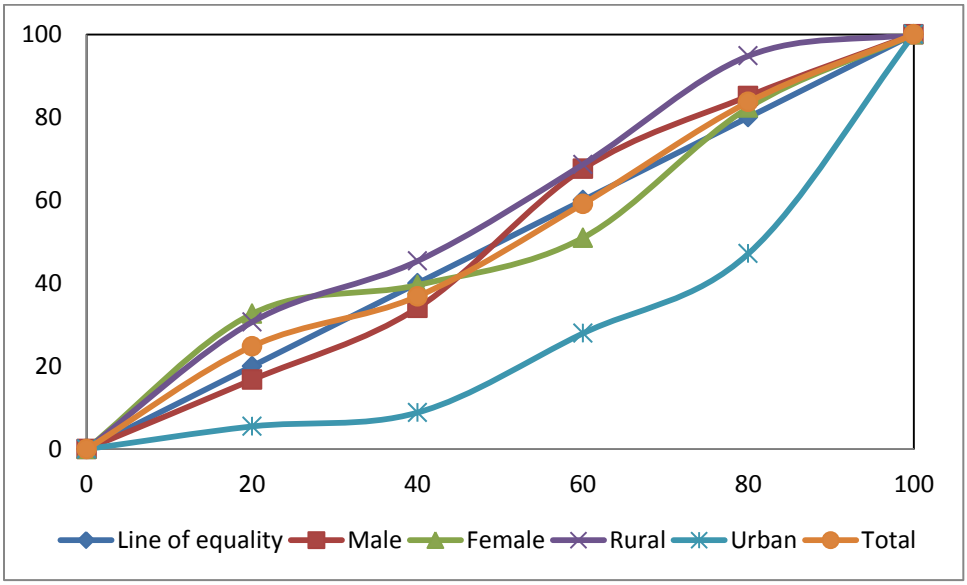


Figure 16: Incidence of Public Spending: Gender and Geography Differentials of Orissa

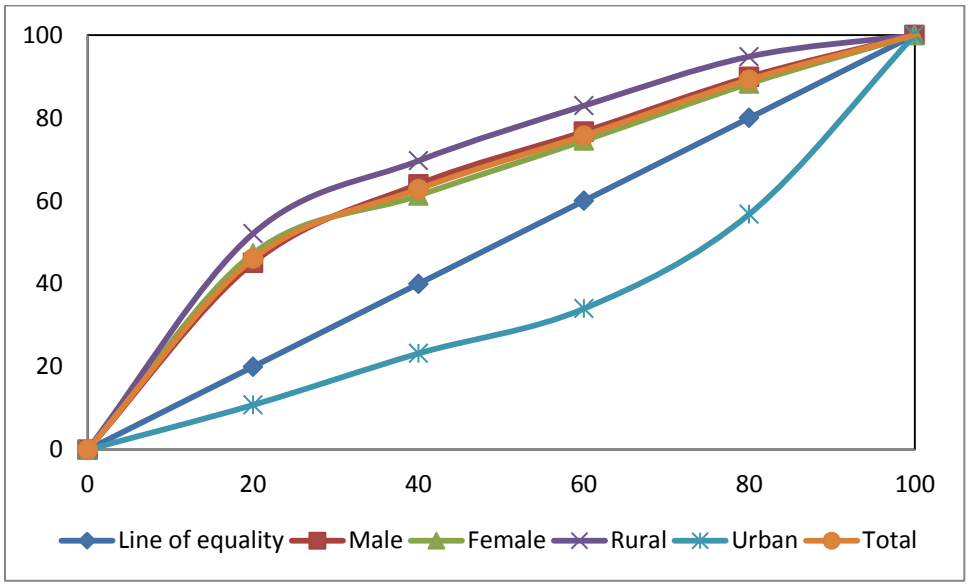


Figure 17: Incidence of Public Spending: Gender and Geography Differentials of Chhattisgarh

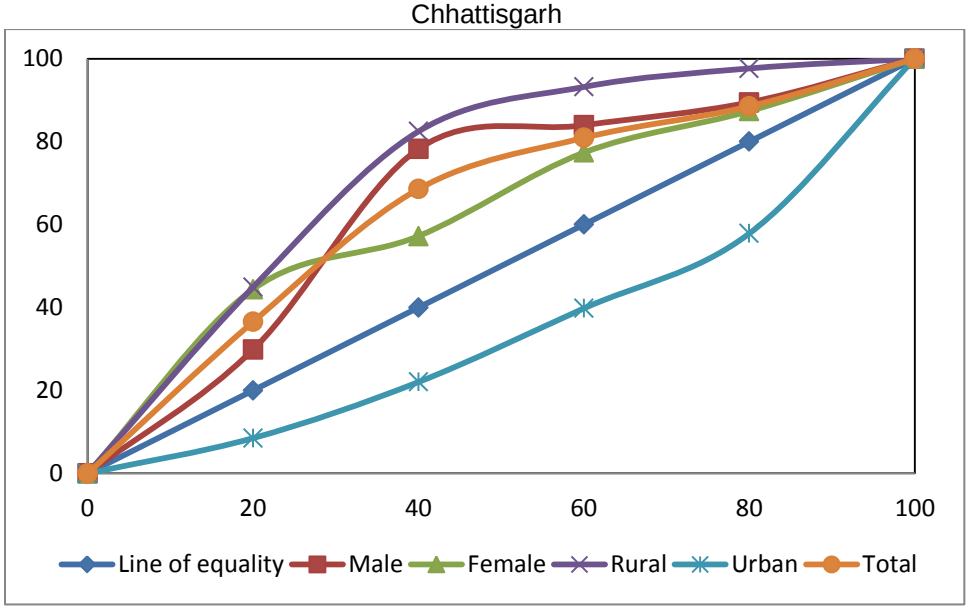


Figure 18: Incidence of Public Spending: Gender and Geography Differentials of Madhya Pradesh

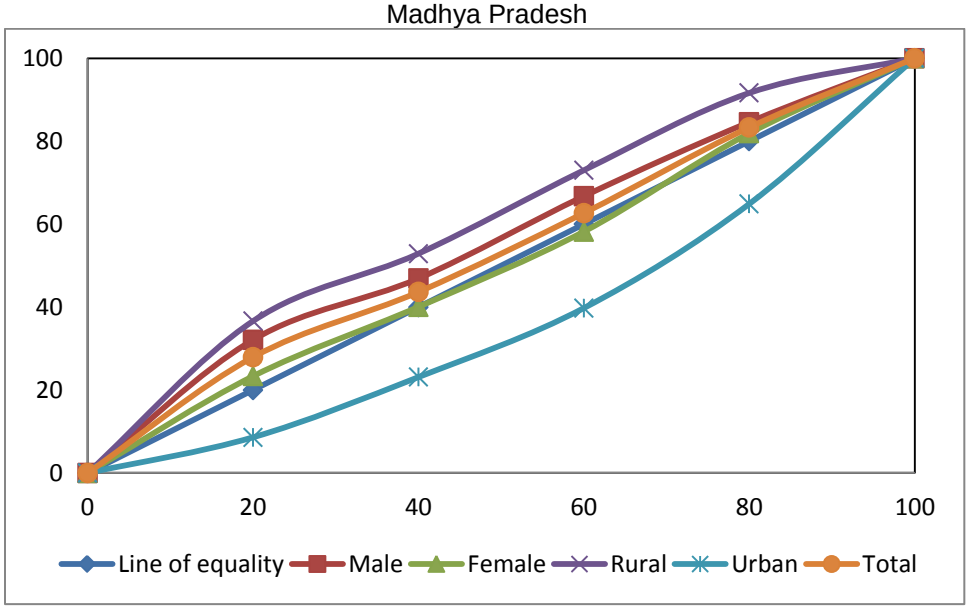


Figure 19: Incidence of Public Spending: Gender and Geography Differentials of Maharashtra

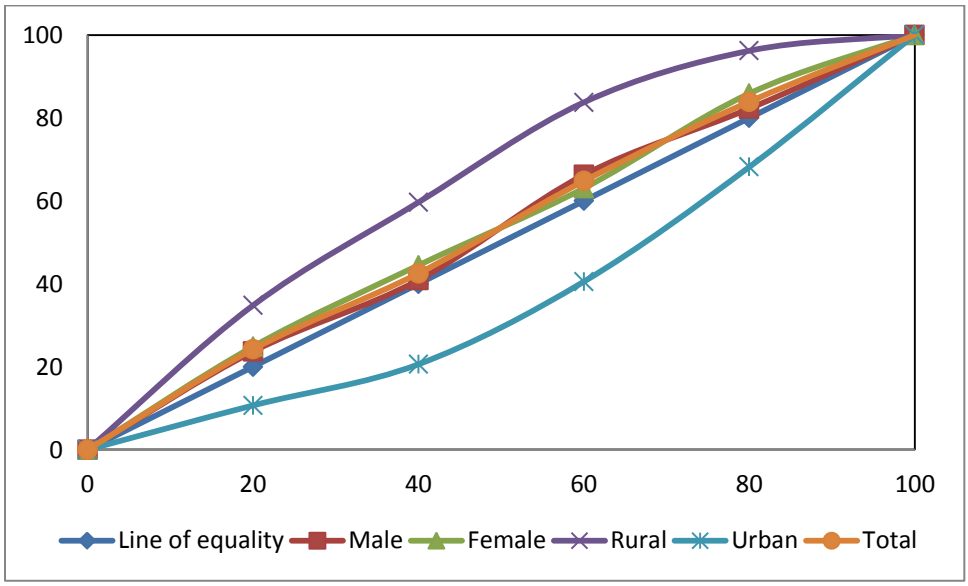


Figure 20: Incidence of Public Spending: Gender and Geography Differentials of Andhra Pradesh

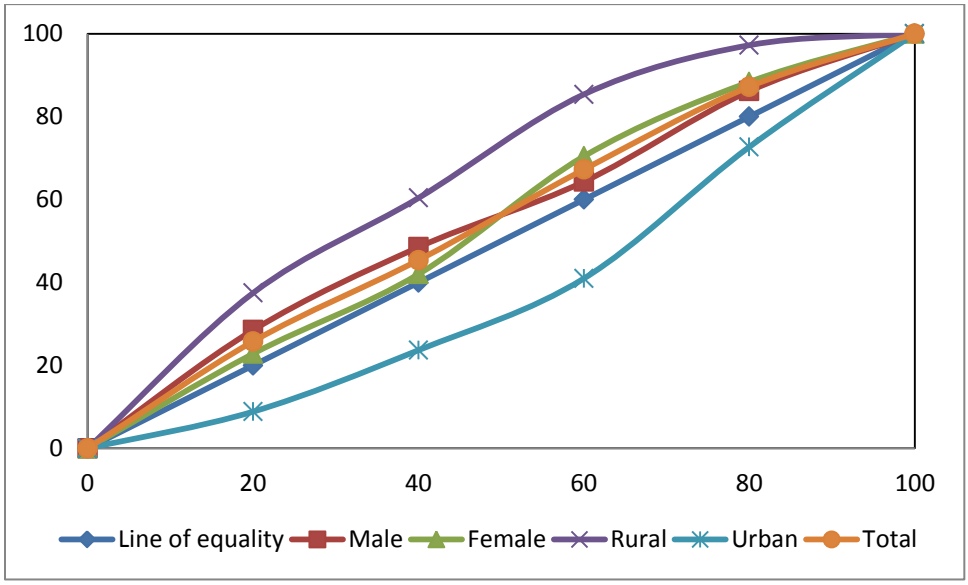


Figure 21: Incidence of Public Spending: Gender and Geography Differentials of Karnataka

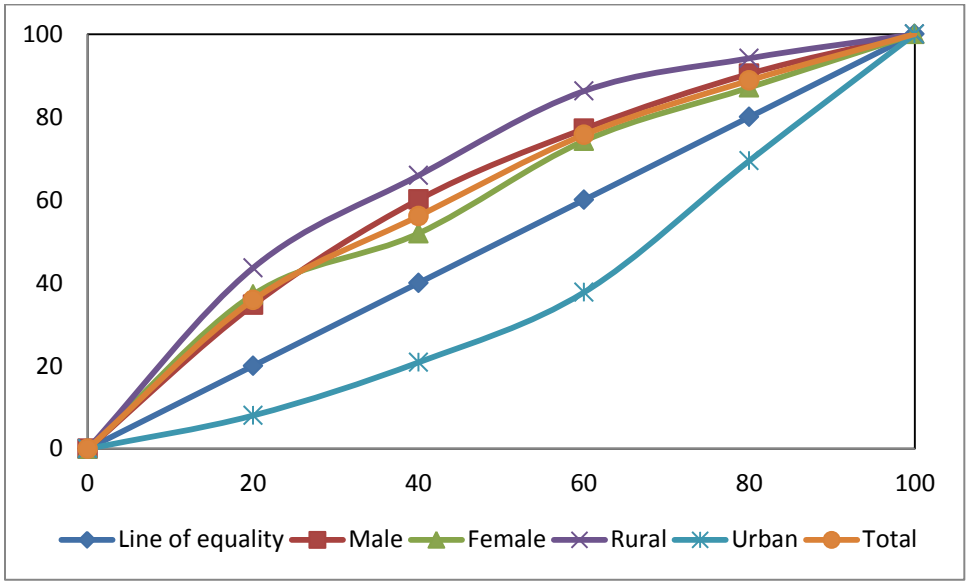
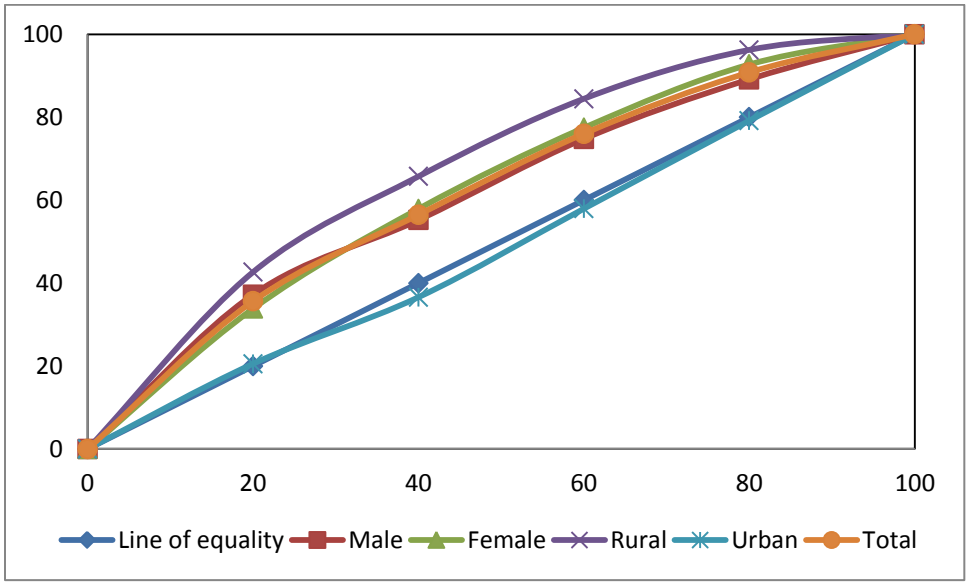


Figure 22: Incidence of Public Spending: Gender and Geography Differentials of Tamil Nadu



(iii) States with crossovers of concentration curves at high income quintiles

Kerala shows an interesting case where the concentration curves crossover the line of equality at high income quintiles (Q4 and Q5). However, the proximity of all concentration curves to the line of equality in Kerala is also noted. The crossover of incidence curve of heath care provisioning in the public sector is evidently noted at higher quintiles for men in both States. Though the per capita spending on health in Kerala (Rs 2952) and Himachal Pradesh (Rs 3927) were above national average, the utilisation pattern across quintiles revealed a benefit capture by the higher income quintiles, with evident gender differentials. The benefit capture at higher income quintiles is more by men than women in both these States. Irrespective of the high achievements in the health sector outcomes in Kerala and Himachal Pradesh, the pattern of utilisation of public health care in both these States have not been pro-poor targeted. While the incidence in Uttaranchal exhibited a crossover of concentration curves of rural and both gender curves (male and female) at higher income quintiles, Assam revealed a crossover pattern of incidence for all concentration curves except the urban curve. It is also interesting to note that urban curve was above the line of equality for lowest quintile (Q1) in case of Assam.

Figure 23: Incidence of Public Spending: Gender and Geography Differentials of Kerala

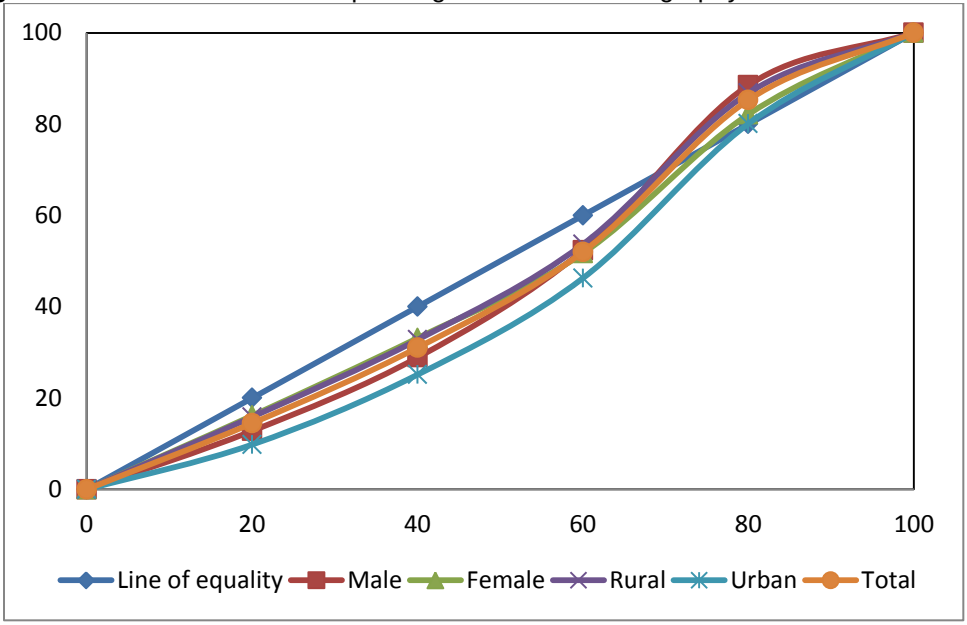


Figure 24: Incidence of Public Spending: Gender and Geography Differentials of Himachal Pradesh

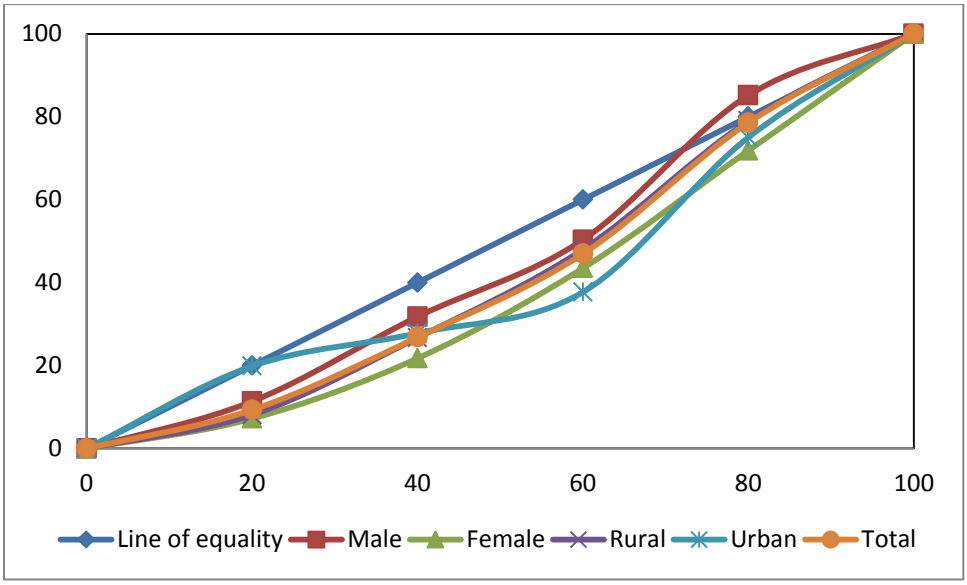


Figure 25: Incidence of Public Spending: Gender and Geography Differentials of Uttaranchal

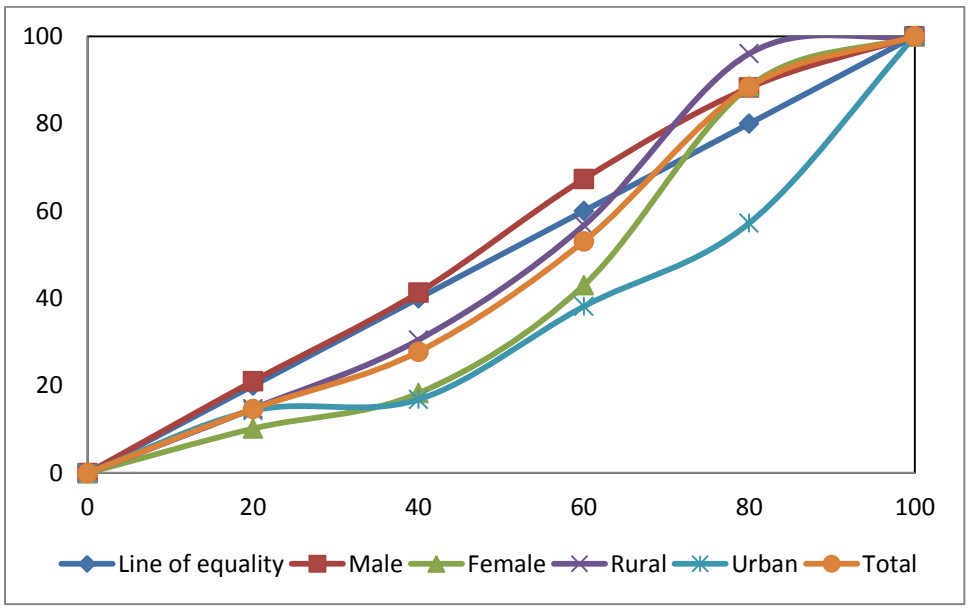
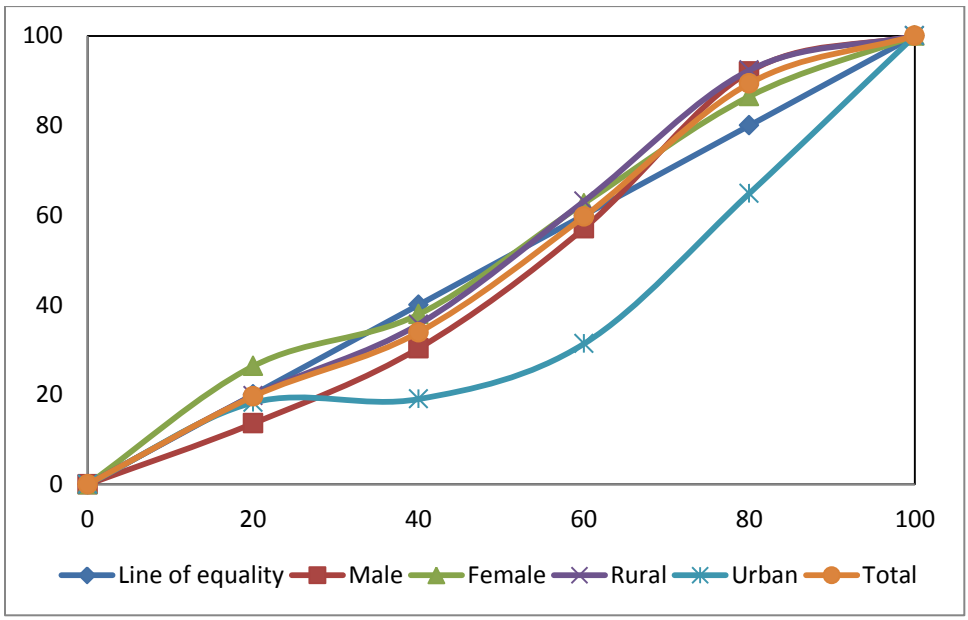


Figure 27: Incidence of Public Spending: Gender and Geography Differentials of State wise Patterns: Assam



VI. Interpreting the Revealed Incidence of Health Sector: Private Versus Public

The inferences from the incidence analysis of health sector is that in most of the states in India, especially in the rural areas, publicly financed health care system is the predominant sector for providing health services to the poor, especially among the lower income quintiles. This has significant policy implications, in terms of revamping the primary health care and/or providing the universal health care. The differentials in incidence across subnational governments point out to three factors: the variations in per unit cost of health spending across states, the problems related to accessing the health care especially in rural units and the household behaviour of revealed utilization of particular system of health care. The prevalence of private sector in the health care may be one of the reasons behind the skewed utilization of public sector health care incidence as revealed by a few states. This phenomenon is a reflection of the 'exit strategy' by the people from the public sector to private sector. Against this backdrop, the utilisation pattern of public versus private sector in health care needs to be analysed. The quintile-wise utilisation pattern needs to be analysed in terms of behavioural differences and demographic differences in both public and private sectors.

vi.1: Behavioural versus Demographic Differences in determining Benefit Incidence: Public Versus Private

Demery (2000) highlighted that demographic and behavioural aspect of each quintile must be taken into account to assess the real incidence of benefits on the poor. She states that, in the case of health expenditure the behavioural differences of each quintile affect the utilisation pattern of public health expenditure, whereas in the case of education it is the demography (number of school-aged population) that determines the actual benefit incidence. In other words the percentage share of subsidy enjoyed by the poorest quintile maybe higher than the upper quintile, but when weighed against the 'need' of the quintile, this subsidy is considerably less (Demery, 2000). These behavioural differences have profound implications for benefit incidence estimates, since hospital-based services usually cost significantly more than those offered through primary health facilities and communal clinics. Yet another issue is the difficulty in defining health '*needs'*. With public spending on education, it was meaningful to define the needs in terms of a category's school-age population. But for health, no such neat proxies for 'need' variable are available. The health needs of some categories (for example, women) are likely to be different from others (men). This ambiguity is aggravated by the data readily available on the *use* of health services by households in sample surveys.

Table 2: The Demographic and Behavioural Access of Public Health Care System: All India-Aggregate

		Behavioral Difference		Demographic Difference
IN-PATIENT	**Quintile**	**Public**	**Private**	
	Q1	26.32	15.23	20.53
	Q2	23.07	18.35	19.50
	Q3	17.33	16.85	19.97
	Q4	17.70	19.46	20.39
	Q5	15.58	30.11	19.61
OUT-PATIENT	**Quintile**	**Public**	**Private**	
	Q1	20.14	18.69	20.53
	Q2	19.23	18.24	19.50
	Q3	19.93	21.50	19.97
	Q4	17.72	19.05	20.39
	Q5	22.98	22.52	19.61

Source: (Basic data), ibid.

Based on this analytics, the paper has attempted to analyse the benefit incidence of public health expenditure on poor in the light of behavioural and demographic differences of each quintile at the all India level. The behavioural difference in access to public health spending is given by the differences in the share of utilization by each quintile to the total utilization. The demographic difference is the quintile specific share of population to the total population. When comparing these behavioural and demographic differences with respect to participation rate, it is observed that behavioral differences are consistent with the participation rate whereas demography has no effect on the rate of participation in public health programmes (*Tables 2 and 3*). This is found to be true for both public and private in-patient and out-patient.

Table 3: Participation Rates of Public versus Private Health Care: All India- Aggregate

IN-PATIENT	**Quintile**	**Public**	**Private**
	Q1	1.35	1.19
	Q2	1.24	1.51
	Q3	0.91	1.35
	Q4	0.91	1.53
	Q5	0.83	2.46
OUT-PATIENT	Quintile		
	Q1	1.42	6.31
	Q2	1.43	6.48
	Q3	1.44	7.46
	Q4	1.26	6.48
	Q5	1.70	7.96

Source: (Basic data), ibid.

The *table 4* gives the behavioural differences in gender-wise utilization of health expenditure both public and private, in-patient and out-patient along with demographic differences in each quintile. Comparing it with the gender disaggregated participation ratio (table 5), it is revealed that the behavioural differences of men and women accessing public and private healthcare services is consistent with the gender differentials in the participation ratio. Demographic differences however have no influence on the participation ratio whatsoever.

Table 4: The Demographic and Behavioural Access of Public Health Care System: All India – Gender Disaggregated Analysis

		Behavioral Difference				**Demographic Difference**	
		Public		**Private**			
		Male	**Female**	**Male**	**Female**	**Male**	**Female**
IN-PATIENT	Quintile						
	Q1	26.47	26.14	15.23	15.31	20.36	20.70
	Q2	23.76	22.28	18.35	19.61	19.51	19.50
	Q3	17.32	17.33	16.85	15.69	20.03	19.91
	Q4	16.93	18.58	19.46	19.35	20.44	20.34
	Q5	15.51	15.66	30.11	30.04	19.66	19.55
OUT-PATIENT	Quintile						
	Q1	20.21	20.08	19.21	18.20	20.36	20.70
	Q2	20.12	18.44	18.19	18.28	19.51	19.50
	Q3	18.93	20.83	21.44	21.57	20.03	19.91
	Q4	18.14	17.35	18.84	19.25	20.44	20.34
	Q5	22.61	23.31	22.33	22.70	19.66	19.55

Source: (Basic data), ibid

Table 5: Participation Rates of Public Versus Private Health Care: All India- Gender Disaggregated

Participation ratio		**In-patient**			**Out-patient**	
		male	**female**		**male**	**female**
PUBLIC						
	Q1	1.42	1.27	Q1	1.32	1.52
	Q2	1.33	1.15	Q2	1.37	1.48
	Q3	0.94	0.88	Q3	1.26	1.64
	Q4	0.91	0.92	Q4	1.18	1.34
	Q5	0.86	0.81	Q5	1.53	1.87
PRIVATE						
	Q1	1.22	1.16	Q1	6.19	6.43
	Q2	1.45	1.58	Q2	6.12	6.86
	Q3	1.47	1.23	Q3	7.02	7.92
	Q4	1.57	1.49	Q4	6.05	6.93
	Q5	2.52	2.41	Q5	7.45	8.50

Source: (Basic data), ibid

vi.2: Odds Ratio of Participation

Benefit Incidence Analysis (BIA) is indeed an effective tool to assess the distributional impact of public spending on the users of publicly provided public and private goods or services. Yet BIA is not without limitations. One major limitation pointed out by Lanjouw and Ravallion (1999) is that subsidy per unit usage may not be a good indicator of benefit. They postulated that unlike the commodities obtained on markets, utilization of a publicly supplied good is unlikely, as a general rule, to reveal the value (specifically the marginal rates of substitution with private goods) that consumers attach to that good. Another limitation of traditional BIA methodology highlighted in this paper is the over reliance on average benefits which may not reliably spell out the incidence or distributional impact of a reallocation of the budget between programs. The timing of program capture by different income groups could well be critical to the policy conclusions drawn about the incidence of gains and losses from public spending reforms.

Table 6: Odds Ratio in Health Sector: Hospitalization versus Ambulatory Services

IN-PATIENT	**Quintile**	**Odds ratio**
	Q1	1.38
	Q2	1.21
	Q3	0.91
	Q4	0.93
	Q5	0.82
OUT-PATIENT	**Quintile**	
	Q1	1.46
	Q2	1.39
	Q3	1.44
	Q4	1.28
	Q5	1.66

Source: (basic data) , ibid

Lanjouw and Ravallion (1999) put forward the estimation of marginal benefits instead of overtly emphasizing on average benefits for analyzing the benefit incidence. According to them average benefits do not entirely capture additional benefits accruing to the poor when there is a programme expansion. They put forward the concepts of average odds ratio and marginal odds ratio for estimating marginal incidence accruing to the poor by way of allocation. Suppose that the non-poor were able to capture the bulk of the gain when the program was first introduced, but are now virtually satiated at the margin. Then the poor will gain a large share of the marginal benefits from program expansion even though their share of average benefits is low. The average odds-ratio of participation is given by the ratio of the quintile-specific average participation rate to the overall average. The marginal odds-ratio of participation (MOP) is defined as the increment to the program participation rate of a given quintile associated with a change in aggregate participation in that program. Differences between the marginal and average

odds of participation reflect differences in the incidence of infra-marginal spending, (Lanjouw and Ravallion, 1999).

The average odds of participation in terms of in-patient services reported in *Table 6* suggest that the share of the total public spending going to the poorest quintile is only 27.6 % (1.38 times one fifth) in the public sector, while it is 30 % for the out-patient services. The 'benefit capture' can be calculated only by computing the marginal odds ratio, which is not attempted in the paper.

vi.3: Polarization Ratio

Polarisation ratio is the ratio of the share of the uppermost quintile, Q5 and the bottom quintile Q1. It translates what is happening in terms of utilisation at the two extreme tails. Polarization ratio captures the extent of 'exit' of the rich to private sector and the access of the poorest in public provisioning of health care. Lower the polarization ratio, higher is the benefit skewed towards the lower quintiles, which means greater the polarization.

Table 7: Polarization Ratio : Public Versus Private – All India Aggregate

	Polarization ratio (Q5/Q1)	
	Public	Private
Hospitalization	0.59	1.96
Ambulatory services	1.14	1.20

Source: (basic data) , ibid

The *table 7* provides the polarization ratio of utilization of health services in public and private sectors. It is inferred from the *table 7* that there is higher utilization of public sector in-patient care services among poor. It also showed a seemingly equal utilization of ambulatory services by both poor and non-poor.

Table 8: Polarization Ratio in Health Sector: Gender Disaggregated

	Male	**female**
INPATIENT		
Public	0.59	0.60
Private	1.99	1.96
OUTPATIENT		
Public	4.95	1.16
Private	5.21	1.25

Source: (basic data) , ibid

The analysis clearly revealed the polarization in case of in-patient care services in public sector. The gender disaggregated polarization ratio (*table 8*) reveals the polarization is greater in terms of in-patient health care services accessed by women in public sector, with Q1 significantly greater than Q5.

VII. Conclusion

It is difficult to measure targeting errors of public sector spending on health sector from a benefit incidence analysis. This incidence analysis can give clues to the minimization of errors in targeting. Results of this paper revealed a mixed scenario that broadly the public health system is 'seemingly' more equitable in a few States while a regressivity in pattern of utilization of public health care services is observed in other States. Both these evidences were to be considered with caution. This is because of two reasons. One, the underdeveloped market for private inpatient care in some states might be the factor for disproportionate crowding-in of inpatients, which made the public health care system looked 'seemingly' more equitable, especially among the lowest income quintiles. The 'voting with feet' to better private services seems possible only for the affordable higher income quintiles. Two, the co-existence of well performing public and private sectors of health might be reason which made the utilization pattern of public health care system regressive. Further analysis in terms of behavioural and demographic access to public and private health care has been undertaken to substantiate the 'exit' axiom. It is revealed that the behavioural differences of men and women accessing public and private healthcare services are consistent with the gender differentials in the participation ratio across sectors. Demographic differences however have no influence on the participation ratio whatsoever. The point to be noted is that benefit incidence methodology is not without limitations. One major limitation pointed out by Lanjouw and Ravallion (1999) is that subsidy per unit usage may not be a good indicator of benefit. Though calculating the 'subsidy' was not the focus of the paper, this problem is solved to a limited extent by calculating the odds ratio, and analysed the extent of benefit from the public spending especially for the lower income quintiles. Benefit capture however is the area for further research. The results also suggest that polarization is distinctly evident in the public provisioning of heath care services, especially related to the in-patient services more than the ambulatory services.

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