

Estimating Multiplier Effect of Social Sector Expenditure in Karnataka

*An exploration through the Input –
Output table and Social Accounting
Matrix*

A Policy Brief

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**Supporting Agency: The
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1. Introduction

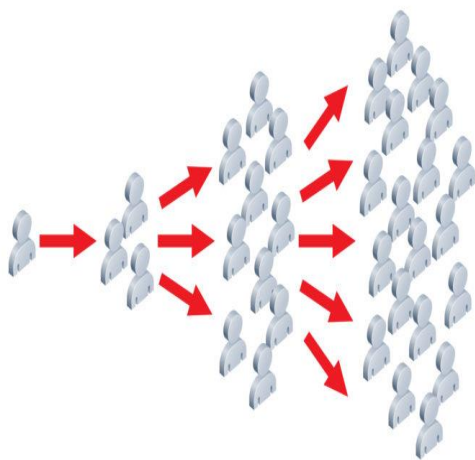
Social and economic change can, at least partially, be envisioned through public expenditure. While the national and international commitments to the Rights based approach and instruments such as Sustainable Development Goals (SDGs) and Child Rights Commission (CRC) calls for an increased and well-directed domestic public expenditure in social sector including health, early childhood care, education and empowerment, however, a major focus on fiscal management tends to view such expenditures as 'consumption' and therefore not as desirable as 'investments' on infrastructure. In order to adhere to the fiscal balance rule, governments have largely chosen to reduce spending rather than mobilising additional tax revenue. The ultimate burden in terms of reduced expenditure is thus often borne by social sectors in form of reduced budgetary outlays as they are considered to be consumption expenditures.

India has not been an exception to this rule. In a federal polity where state governments can access funds based on adherence to conditions prescribed by the finance commission, state governments by and large adopted measures that led to either stagnation or reduction in the social sector expenditures in order to reduce the revenue deficits. These measures can however be counter-productive to both growth and equality objectives in under-developed and developing economies which do not have well-funded public systems of education and health and effective social protection networks.

This policy note presents the results of a study undertaken in Karnataka to estimate multiplier effect of public spending on social sector in the state using two methodologies: Input-Output Table (IOTT) and Social Accounting Matrix (SAM). We use the lens of 'multiplier' here to argue that public spending in social sectors is critical for human development and well-being, which in turn can also boost and sustain economic growth both in the short and long run. Expenditures on education, health, early childhood and related areas should thus be viewed as investment and not mere consumption. We analyse the extent of income generation by investing public money in social sectors by assessing the multiplier effects of public investment in social sectors. The study is significant as there are very few studies on estimating the multiplier effect using IOTT or SAM at sub-national level and this is perhaps first of its kind in its use of certain datasets to make the estimation process more rigorous and accurate. Also the context of ongoing Covid-19 crisis and economic downturn makes the study more topical and relevant.

2. Concept of Multiplier

Figure 1: The Multiplier Effect: Injection of Rs.1 leads to a larger increase in the final income



Multiplier is a measure of how rupees interjected into a community is re-spent, thereby leading to additional economic activity. In other words, Multiplier is a measure of the combined effect of a ₹1 change in sales on the output of all local industries and the Multiplier Effect indicates that an injection of new spending (exports, government spending or investment) can lead to a larger increase in final national income or the State's Gross Domestic Product (SGDP).

Multipliers have also been categorised into various types. While, Type I multipliers sum together the direct (change in final demand) and indirect (supply chain effects to meet that demand), type II multiplier also includes the induced effect (the effects of wages earned in the direct and the indirect supply chain that are used to buy goods and services in the economy). Additionally, multipliers are also categorised into output, employment, income and value-added multipliers, depending on how those are estimated and for what purpose. We calculated various types of multipliers for the state of Karnataka in this study.

3. Data and Methodology

Input – Output (I-O) matrix and Social Accounting Matrix are largely used to understand multipliers and we have used these to understand the structure of the Karnataka's economy and calculate multiplier effect of social sector expenditure in particular. I-O clearly captures the circular flow and the interdependence between sectors and thus helps identify those key sectors that stimulate growth which would induce specific investments especially when there is slowdown and unequal growth. Social accounting matrix is a useful extension of I-O matrix that explicitly puts emphasis on distribution and its interaction with production. While IOTT is limited to capturing production structures, Social Accounting Matrix (SAM) is a tool that helps estimate the distribution effect in addition to understanding production structure and thus serves as a tool used for policy analysis.

We constructed I-O Table and SAM for Karnataka for the year 2013-14 in order to estimate the multiplier effect of social sector expenditure. The construction of the I-O Table at the sub-national / regional level is significant as it provides a comprehensive, detailed and consistent framework of the structure of the production system within the boundaries of that state.

However, many of the parameters that are used in construction of I-O and SAM matrices are not measured at the sub-national levels and thus the construction of SAM at state level was challenging. In order to make the estimation for Karnataka accurate, we based our calculations on the I-O table for India, 2013-14 (NCAER) and mapped its 130 sectors against the 23 sectors present in State Domestic Product report of Karnataka. We also supplemented with data from various other databases including Further, the category 'other services' was disaggregated to identify Education & Research and Medical & Health as separate categories in order to enable us to estimate multiplier effects for expenditure in these sectors.

Gross value of Output (GVO), the intermediate consumption / use matrix, final demand components and net indirect taxes were all calculated using data from various other sources such as CMIE Prowess database, Annual Survey of Industries, NSS 68th round on household consumption, Annual reports of Public Sector Corporations, Public Hospitals, Public Universities, SSA, RMSA, Commissionerate of Public Instruction, Medical Education, KGBV Accounts, Directorate of Economics and Statistics (Crops Inputs) etc. Use of data from these various other sources enabled us to undertake much of the analysis without having to rely on the national level coefficients for estimation and thus arrive at a much more disaggregated and accurate estimation of multiplier effects at the state level. The details of methodology followed and data sources have been mentioned and explained in the full report for this study.

4. Findings and Discussion

Apart from the multiplier effects presented later, estimates of many other parameters computed as part of the process present interesting insights into policy choices for Karnataka and are outlined here.

4.1. Components of final demand

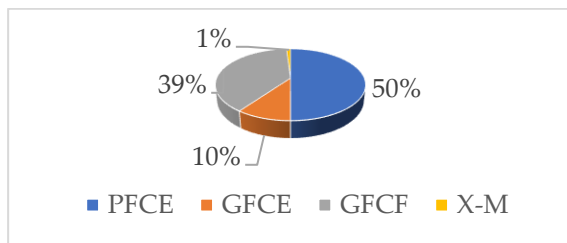


Figure 2: Share of final demand components

High proportion of consumption expenditure in the final demand components shows that consumption expenditure, specifically domestic demand as against external demand, drives the growth process in the state.

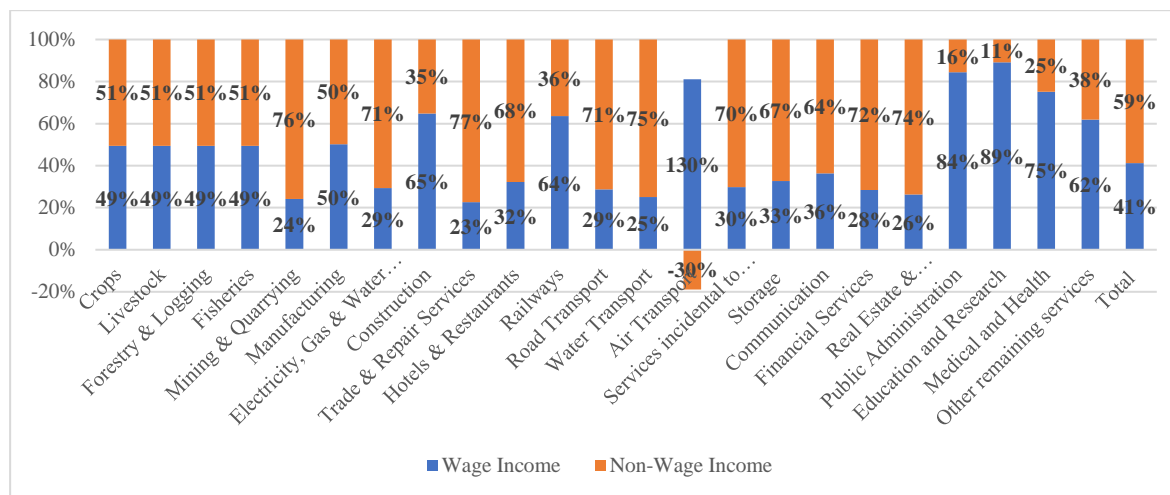
Source: Authors' calculations

4.2. Decomposition of Gross Value added

When we analyse Gross Value Added (GVA) as sum of wage and non-wage income, at the state level, one can observe that the wage income component comprises of 41% of the total GVA while non-wage share is 59%. Further, the wage and non-wage share of GVA across primary, secondary and tertiary sectors shows varied patterns. Agriculture and allied

activities show almost equal shares of wage and non-wage income, while within secondary sector, Electricity, Gas & Water Supply and Mining & Quarrying show larger shares of non-wage income due to huge indivisibility of fixed factors that's a characteristic of the sectors with wage income less than 30% share in GVA. Within the tertiary sector, wage shares are the highest for the Education & Research and Medical & Health, and Public Administration, among the 23 considered sectors. The wage income share in the total GVA of Education and Health is 89% and 75% respectively while non-wage share is merely 11% and 25% respectively, implying the high employment potential of these social sectors.

Figure 3: Share of wage and non-wage income in GVA



Source: Authors' calculations

4.3. Value addition by sectors

The share of intermediate consumption (IC) in sectoral outputs tells us about value addition made by the respective sectors. At the sectoral level, broadly, primary and tertiary sector shows a greater share of value addition. Social Sectors, Education and Health sectors with IC being merely 23% and 36% respectively have one of the highest value additions in the GVO.

4.4. Consumption expenditure across occupational categories

Disposable Income by Households is used for consumption and savings after paying for taxes. SAM reflects the consumption pattern of ten occupation households classified as per NSS¹. It is observed from estimates that the share of consumption expenditure of the regular wage earners and salaried section is the highest (29%). This is followed by self-employed in urban and self-employed in agriculture households in rural areas with the least share being that of casual labourers, reflecting their low-income levels. This unequal consumption shares across occupational households also imply unequal income distribution.

¹ The aggregate private final consumption expenditure of the state amounts to 37277473 Rupees Lakhs in 2013-14

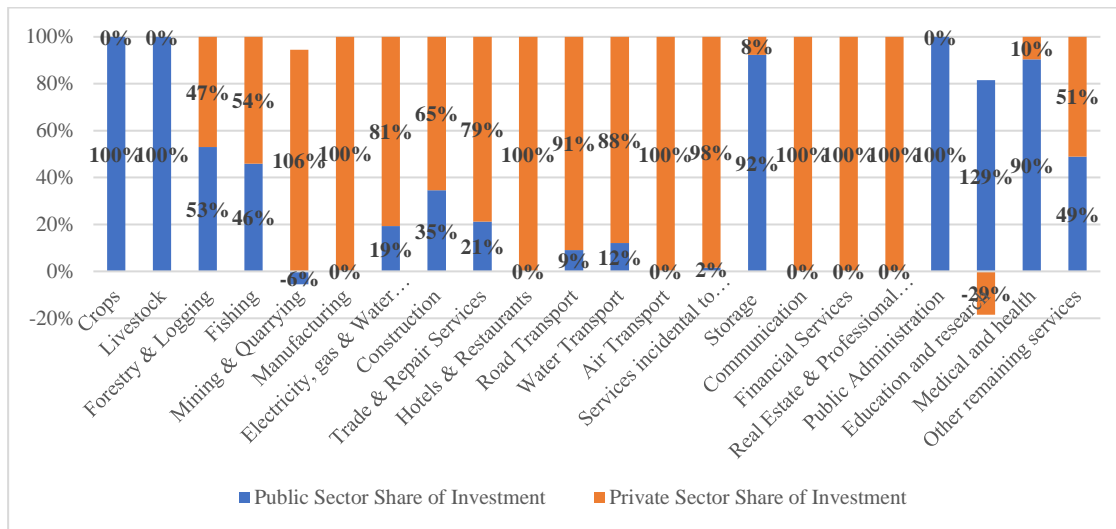
The aggregate consumption expenditure pattern across all types of households shows that Manufacturing sector (28%) captures the largest share followed by Real Estate, Ownership of Dwellings and Professional Services (19%), Road Transport (12%), Crops (9%), with Education and Health capturing 3% and 2% of the total consumption expenditure respectively.

In the rural sector, the highest consumption expenditure is on manufacturing (37%) which is almost three times more than the next items in the basket being spent on crops and road transport (both being 13%). Education and Health takes 2% & 4% share of total consumption expenditure in the rural sector. Comparing this with the urban basket tells us that their largest consumption expenditure is on Real Estate (with 30% and rent being a major factor) followed by manufacturing (22%) and road transport (11%). Interestingly, the urban sector's share in social sector expenditure is 4% in Education and 2% in Health.

4.5. Sectoral Investment in Karnataka

Investment expenditure forming around 39% of the total GDP and its sectoral composition shows that majority of investment (more than 60%) has been in the manufacturing, electricity, gas & water supply, and construction sectors. The second highest investment nearing ten percent is in crops and road transport. Education and Health takes only one percent each from the total investible resources in the state. It is further interesting to see that in Education, private sector occupies significant share of the market (76%) while in the health sector, it has full monopoly with this.

Figure 4: Sectoral share of investment between public and private sectors



Source: Authors' calculations

4.6. Analysis of Multipliers

We calculated different types of multipliers (own multiplier, output multiplier, income multiplier, primary input multiplier etc) using both IOTT and SAM matrices. We also normalized and compared the forward and backward multipliers obtained for different sectors to help us evaluate their 'key-ness' to the state's economy. Table 1 below presents the results for some of the indicative sectors important to the state economy.

Table 1: Key Sector identification based on multiplier values

Sector	Type 1 Output Multiplier	Type 2 Multiplier	Forward Multiplier	Income Multiplier	SAM Multipliers	Key Sector identification
Crops	1.4	5.2	1.2	1.1	2.99	Forward
Mining & Quarrying	2.2	4.9	1.7	1.27	1.85	Key
Manufacturing	2.9	6.3	6	0.73	2.04	Key
Electricity, gas & Water Supply	3.1	6.3	1	0.76	1.98	Key
Construction	2.8	6.9	2	0.98	2.75	Key
Trade & Repair Services	3.9	8.6	0.8	2.79	2.16	Backward
Hotels & Restaurants	2.1	5.1	0.5	1.11	1.9	Income Creation
Financial Services	1.4	3.7	1.2	1.02	0.47	Forward
Real Estate & Professional Services	1.7	4.2	1.4	1.22	6.21	Forward
Public Administration	1.7	7.8	0.5	1.24	5.74	Income Creation
Education and research	1.6	8.2	0.5	1.23	5.51	Income Creation
Medical and health	1.8	7.3	0.5	1.17	5.28	Income Creation
Other remaining services	2.2	6.5	0.5	1.19	4.54	Backward

Source: Authors' calculations

The type 1 multiplier values which emphasise on backward linkages reflect the significance of manufacturing, electricity, construction and trade, and repair services while the values of

income multiplier and SAM multipliers reveal very different patterns. Income multiplier which is obtained by multiplying the output multiplier with the ratio of value added to the output tell us that extent of factor incomes created through value addition after accounting for the intermediate use of inputs. These values tell us that Trade & Repair services, Public Administration, Education, Real Estate, Health and primary sectors create higher factor incomes. SAM multiplier values, which reflect the interaction of production and distribution processes, are the highest for Real Estate & Professional Services, Public Administration, Education and Health.

The values of all kinds of multipliers estimated seem to show that Social Sector expenditure is indeed an investment to be undertaken not only for its impact on human well-being and productivity in the long run but also for the high potential it has for income creation in the short run. The multiplier values show that manufacturing sector has larger backward linkage effects. State driven social sector expenditure would enhance consumption due to extra income left in the hands of the people and subsequently resulting in larger multiplier. In the context of Karnataka, when more than 80 percent of the households hold Below Poverty Line cards, their propensity to consume is higher. The interlinkage effects between sectors is a key to understand the rationale behind the need to undertake public investment in social sector.

5. Policy Conclusion and Recommendations

Our study also shows how given the supply side effects the industry sector has on other sectors of the economy, multipliers concerning the social sectors highlight that they do have the potential to create incomes in the short run. The choice of policy intervention differs on the type of multiplier we would like to focus on. If one emphasizes on the distribution aspect alongside production, then social sectors have shown to have potential in creating incomes directly in the hands of people. This is reflected in the SAM and Income multiplier effect being greater for social sectors than manufacturing sector reflecting the significant linkage effects of income and expenditure. Further, our study suggests that a combination of interventions is essential to overcome structural barriers that exist between rural and urban and between households to achieve a broad-based growth. Economic growth is usually associated with reducing structural inequalities but the evidence across the world and especially within developing economies varied widely. The trickle-down effect is not bound to happen is being realized lately as various features such as the sectoral composition of growth and the patterns of demand matter in reducing at least income based deprivation.

Given these conclusions we have the following two recommendations:

5.1 Viewing health and education as public investment sectors

Our results show that investments in the social sectors also have positive income creation effects in Karnataka, both from supply side and demand side even in the short run, it is therefore, imperative to enhance social sector investment to revitalise the economy and to achieve the long-term gains of sustainable development.

5.2 Moving beyond the notion of fiscal discipline as the ultimate goal of economic policy

Fiscal Discipline has become the order of the political economy of every government of the day sometimes leading to output contraction and unemployment. IO and SAM being robust tools in representing the interaction between economic processes and between agents/institutions tells us how such policies guiding the current order adversely affects the economies. The only way to pull out of this is to increase government expenditure that can drive the growth process by boosting the aggregate demand and improvement in employment levels.



Maitri Bhavan, Number 4, M.N. Krishna Rao Road,
Basavanagudi, Bangalore – 560004

Tel: +91 2656 0735

Fax: +91 2656 0734

Email: info@cbps.in

Website: www.cbps.in

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