

# **Estimation of Multiplier effect of Social Sector Expenditure: An exploration through Input-Output Table**

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## **Contextualising**

The global economy is yet to see the signs of a robust recovery after being triggered by the global financial crisis experienced 2008 onwards. Persistently poor economic performance in US, Europe and Japan along with slowing growth in India and China has stalled the global growth. Supply side measures involving tax cuts, credit rate cuts and other monetary policy instruments have failed to enable any change in slowdown. The principle of expansionary austerity guided by the provisions of the Maastricht Treaty binds the countries, developing or developed, to undertake fiscal intervention and stimulate demand even when the world capitalist economy is characterised by the order of debt deflation. The institutional structure of capitalist economies is often prone to instability due to its inherent nature as argued by Minsky (Economist, July 2016) who states: ‘Stability breeds Instability’, a statement that clearly captures the essence of the current economic phenomenon across the world. An inevitable solution to reduce increasing deprivation and increasing inequality is to envision social and economic change through public expenditure. While the national and international commitments to instruments such as Sustainable Development Goals (SDGs), Child Rights Commission (CRC) and the entire Rights approach on the one hand calls for an increased and well-directed domestic public expenditure on social sector including health, early childhood care, education and empowerment, a major focus on fiscal management, on the other hand, tends to view such expenditures as ‘consumption’ and therefore not as desirable as ‘investments’ on infrastructure or as crucial as defence<sup>1</sup> (CBGA, 2019). India has not been an exception to this. The recent Economic Survey 2019-20 highlights that social sectors investments (both States and Centre combined) constitutes only 6.43 percent of the total public spending. Fiscal discipline, as defined by Financial Responsibility and Budget Management (FRBM) Act, has been the main guiding force for making public policy and expenditure choices in the recent past, and adherence to the same is achieved largely by reducing social sector expenditures rather than expanding the resource base. Social sector expenditure is

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<sup>1</sup> Defence expenditure is 16.1% of the total Union Budget expenditure in 2019-20 while allocation for Health and Family Welfare was 2.42% of the total Union Budget expenditure.)

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viewed as an avoidable burden and increasing reference to social sector investments as ‘freebies; and ‘doles’ bear testimony to this trend. Curbing revenue deficit through lowering of public expenditure further aggravates already existing inequalities. This, rarely enters the arena of fiscal policy discourses, or remains less talked about even if it does.

We argue that this policy stance where prudent fiscal management prioritizes certain kinds of investment, social sector expenditure is as important for both growth (increase in incomes), and human development and well-being. This calls for an integration of social and economic policies to have a lasting and equitable impact on sustained economic growth. Looking at these recurrent expenditures on sectors such as education, health, early childhood expenditure as investment rather than as mere consumption made us use the lens of ‘multiplier’ to analyse the extent of income generation through these paths of public spending. Social sector <sup>2</sup>investments tend to transfer purchasing power in the hands of the poor whose propensity to spend is usually higher than propensity to save, which helps in boosting the demand further and therefore the investment. The distrust in the market forces and the lack of confidence in the power of liberalism to achieve economic security (full employment) and social stability endorses the need for government intervention in social policy (Marcuzzo, 2005). The growing disbelief in ‘trickle down’ economics even by the supra national organisations has come to understand the significance of raising incomes of the large segments of the society rather than relying completely on ‘job creators’ through the provision of tax breaks that widens inequality. In this regard, we explored the tool of Input-Output Table to estimate the multiplier effect of social sector expenditure in Karnataka.

### **Concept, framework and relevance of multiplier**

The concept of multiplier is based on the belief that expenditure creates incomes. The underlying logic is that economy is an integrated system and subsequently it works as a convergent process over time through rounds of expenditure and income. Multiplier is a measure of how rupees interjected into a community is re-spent, thereby leading to additional economic activity. In other words, the output multiplier measures the combined effect of a one rupee change in its sales on the output of all local industries.

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<sup>2</sup> Social Sector includes expenditure on General Education, Technical Education, Sports and Youth Services, Arts and Culture, Medical and Public Health, Family Welfare, Water Supply and Sanitation, Housing, Urban Development, Information & Publicity, Broadcasting, Welfare of SC, ST and OBC, Labour and Employment, Social Security & Welfare, Nutrition, Natural Calamities, Other Social Services, Secretariat Social Services & North Eastern Areas. NITI AAYOG  
(<https://niti.gov.in/sites/default/files/201907/Social%20Sector%20Expenditure%20of%20States%20Paper.pdf>)

There are various methods and tools to estimate multiplier and broadly these can be classified into conventional approaches (neoclassical) and alternative approaches. Classical/Heterodox/Alternative approach is based on an economic theory where analysis of all economic processes of production, distribution, exchange and accumulation is based on an idea of surplus (quantity dynamics) and subsequently price system is decided based on production conditions. Therefore, this frame provides the base to analyse growth or accumulation. On the other hand, Neo-Classical approach originating in the late 19th century moved the scope of economic analysis from production to exchange (markets/circulation) and from accumulation to allocation as the base idea moved from surplus to scarcity with economic analysis by Neo Classical economists being based on methodological individualism. The tools under conventional (neoclassical) approaches include Vector Auto-Regressive methods, Computable General Equilibrium method and Dynamic Stochastic General Equilibrium Method. These tools under conventional approaches believe in supply side theories where Investment is dependent variable and constrained by savings. Alternative approaches on the other hand include Input-Output Model (IOM) and Social Accounting Matrix (SAM) which fundamentally believes in the idea of integrated economic system and considers investment as an autonomous variable.

The concept of welfare state had its theoretical base in the concept of multiplier that was proposed by Keynes to explain the positive effect of government expenditure. This tool was used by the state to rebuild the economy in the aftermath of Second World War. Fiscal policy as a stabilisation tool analysed in the context of advanced economies shows there has been positive and temporal multiplier effect of public investment ((Jones, C. 2007, ADB, A. A., Furceri, D., & IMF, P. T. 2016, Reeves, A. et. al 2013)). Similarly, in the context of low-income countries, supply side effects were found to be greater than income side effects (Domański, B., & Gwosdz, K. 2010, & Micek, G. 2011, Ianchovichina, E., et. al 2012). Interestingly, at the disaggregated sectoral levels, research including those that have been conducted post-recession shows that social spending devoted to health and unemployment benefits have had greatest effects on growth with health having a larger multiplier effect of 4.3 over -9.8 in defence (Furceri & Zdzienicka 2012, Reeves et al., 2013 and Cassar 2015). However, there are studies that have shown negligible or negative multiplier effect which has worked under the theoretical underpinning of Ricardian Equivalence. The poor multiplier effect is linked to high debt ratio levels and high marginal propensity to import (Kraay 2012, Pereira & Andrzej 2015, Mahrous, 2016). The scholarly literature reviewed above gives us a glimpse of research on income creation through public expenditure from the lens of

multiplier. Hence, given these studies, there is merit in exploring the IO methodology to measure the multiplier effect as it follows a demand side framework suitable for our theoretical framework of Keynesian multiplier.

### **Input-Output table, its origin and importance**

Input Output Model is an accounting framework proposed by Wassily Leontief. However, Leontief himself attributes the idea of developing a detailed account of inter-industry activity and its analytical formalisation to Francois Quesnay in *Tableau Economique* and tracing further back to Sir William Petty. Petty highlighted the characteristics of production, distribution and disposal of wealth of nation as closely interconnected and the problem of assessing the value of that wealth as properly reflecting the interrelationships among these (Kurz and Salvadori 2000). Input-Output Table is generally constructed for a specific geographic region for a specified period, say, a year, and is concerned with the activity of a group of industries that both produce goods (outputs/producer) and consume goods from itself or other industries (inputs/consumers) in the process of producing each industry's own output. The basic information from I-O is presented in the inter-industry transactions table. The rows of the table describe the distribution of a producer's output throughout the economy while the columns describe the composition of inputs required by a particular industry to produce its output. The additional columns constitute the components of Final Demand that records the sales of each sector to final markets either for personal use or use by government. A significant advantage of utilizing input-output methodology is that the resulting multipliers incorporate not only the direct effects, but also the indirect and the induced effects on the economy as a result of an exogenous shock to one of the components of final demand. Given a circular flow of income and expenditure, I-O table helps understand Backward and Forward Linkages. With this objective in mind, we undertook the construction of the IO table for Karnataka, one of the first of its kind at sub-national level, to understand structural linkages at the regional economy level and estimate the multiplier effect.

### **Construction of Input – Output table and estimation of multiplier for Karnataka**

Input-Output Tables have a long history in its usage in the growth and development process of economies. The tool made its inroads in the post-independence era of India and played a key role in the planning process of India. Construction of Input Output Table is significant as it provides a comprehensive, detailed and consistent framework of the structure of the production system.

Construction of the Input-Output table for a particular state poses multiple challenges, the biggest being lack of availability of data. Hence, in order to construct the I-O table for Karnataka, our starting point was the I-O table constructed for India in the year 2013-14 published by NCAER (Saluja & Singh 2018) as the base table. We undertook rigorous data collection and finetuning of this table to construct the table for Karnataka which captures all the state level characteristics for different sectors. Another important step is to align data obtained from multiple sources into one single format for use. The exercise can be considered first of its kind in a way because of the rigour that has been undertaken, as we have estimated each of the final demand components, respective shares in the GSDP and production structure using detailed public accounts which are discussed below.

The I-O Table constructed for India in 2013-14 is a detailed table and contains 130\*130 sectors (commodity\*commodity table). For the purpose of our study that aims at estimating the multiplier effect of social sector expenditure in Karnataka, we have tried to construct the I-O Table for Karnataka for the year 2013-14 taking 23 sectors into consideration that includes Education and Research and Medical and Health as separate sectors. The 23 sectors categorisation is based on the data available in the State & District Domestic Product of Karnataka 2016-17 for these respective sectors. Also, aligned with the objectives of our study, we have disaggregated the category 'Other Services' to identify Education & Research and Medical & Health as separate categories. This helped us obtain the multiplier for the Education and Health sectors.

The Input-Output table can be divided into two major parts, the intermediate use matrix and the final demand components. The table on the next page clearly documents the processes followed in the construction of I-O Table and multiplier values obtained thereof.

I-O Table for Karnataka 2013-14				
Intermediate Consumption Matrix	Final Demand Components			
<b>Sources used:</b> <ul style="list-style-type: none"><li>Input-Output table of India for 2013-14 (NCAER (Saluja &amp; Singh 2018))</li><li>Input structure for Crops from Directorate of Economics and Statistics (DES), Government of Karnataka (GoK)</li><li>Accounts of Public Universities and Hospitals, Accounts of Department of Medical Education, Health and Family Welfare</li><li>Accounts of Public Sector Corporations</li><li>State Domestic Product Reports</li><li>Economic Survey of Karnataka</li><li>Annual Survey of Industries</li><li>Reports of Samagra Shikshana Abhiyan (Sarva Shikshana Abhiyan (SSA), Rashtriya Madhyamik Shikshana Abhiyan (RMSA), Kasturba Gandhi Balika Vidyalaya (KGBV)), Commissionerate of Public Instruction.</li><li>Data on private companies taken from CMIE<sup>3</sup></li></ul>	Private Final Consumption Expenditure (PFCE)  C	Government Final Consumption Expenditure (GFCE)  G	Gross Fixed Capital Formation (GFCF)  I	Exports and Imports  X - M
	<b>Sources used:</b> <ul style="list-style-type: none"><li>NSS 68th Round on Household Consumption of Various Goods and Services in India</li></ul>	<b>Sources used:</b> <ul style="list-style-type: none"><li>Karnataka State Government Budgets</li><li>Local Budgets and their expenditure Statements</li><li>Annual Accounts of Hospitals and Universities</li><li>Annual Accounts of Public Sector Corporations</li><li>Economic cum Purpose Classification of Karnataka State Budget Report, 2011-12 to 2018-19 (ECP).</li><li>Annual Survey of Industries</li><li>NSS 67th Round Unincorporated Non-Agricultural Enterprises</li><li>NSS 70th Round Data on All India Debt and Investment Survey</li></ul>		<b>Sources used:</b> <p>Visvesvaraya Trade Promotion Centre (VTPC) under the aegis of Department of Industries and Commerce, Government of Karnataka.</p>
<b>How the data was obtained:</b> <ul style="list-style-type: none"><li>Personal visits to DES, GoK, Public Sector Corporations, Finance Department, Education Department, Health Department, Universities.</li><li>Request for information through Right to</li></ul>	<b>How the data was obtained:</b> <p>Downloaded online from MoSPI National Data Archives</p>	<b>How the data was obtained:</b> <ul style="list-style-type: none"><li>Personal visits to State Audit and Accounts Department (SAAD) for local Budgets, visit to the Karnataka Municipal Data Society for data of Urban Local Budgets.</li><li>Personal visits to DES, GoK, Public Sector Corporations, Finance Department, Education Department, Health Department,</li></ul>		<b>How the data was obtained:</b> <p>Economic Survey of Karnataka 2015-16</p>

<sup>3</sup> Yet to be incorporated for the input structure

<p>Information Act, 2005 (RTI).</p> <ul style="list-style-type: none"> <li>Accounts taken from websites for certain departments.</li> <li>Visit to ICSSR Institute (ISEC) to access CMIE Prowess</li> <li>Download of ASI Data from MoSPI National Data Archives</li> </ul>		<p>Universities.</p> <ul style="list-style-type: none"> <li>Request for information through RTI.</li> <li>Accounts taken from websites for certain departments.</li> <li>NSS Reports</li> <li>Downloads of ASI datasets and usage of ASI Annual Reports</li> </ul>	
<p><b><i>How the data was processed:</i></b></p> <p>We used the detailed expenditure statements of the different accounts that we obtained and derived the input structure that reflects intermediate consumption (sector of origin)</p>	<p><b><i>How the data was processed:</i></b></p> <p>NSS captures detailed item wise expenditure for about 450 items, across different expenditure groups. We classified these items, into the 23 producing sectors mentioned in SDP Report. Ratio of total expenditure in Karnataka to that of India is calculated for each sector. This ratio is multiplied with the PFCE for the sector in India (from I-O India) and hence PFCE across each sector is obtained.</p>	<p><b><i>How the data was processed:</i></b></p> <ul style="list-style-type: none"> <li>For Urban Local Accounts, each item in the Budget was classified based on the description of the item. For Rural Local Audited Accounts of GPs, broad categories mentioned were classified based on the description, into CE and CF. In addition, expenditure incurred on various government schemes were proportionally distributed between CE and CF based on individual accounts of that scheme and prescribed guidelines.</li> <li>For the State Budgets, based on the description of the scheme code (15 digit code showing the major head, sub-major head, minor head, group head and object head combination), they were classified as capital expenditure and revenue expenditure respectively.</li> <li>For the Public Sector Corporations, the GFCE was computed as follows: GFCE = Employee Benefits Expenses + Finance Costs + Other Expenses. GFCF was obtained from the Fixed Assets Schedule</li> <li>To obtain GFCF from the private sector, we used ASI to estimate new capital formation. The NSS Survey on Unincorporated Manufacturing Enterprises was used to estimate net addition to owned fixed assets for both rural and urban sector in Manufacturing, Trade, Hotels and Restaurants, Road Transport, Water Transport and Other Services. For the crops sector which is largely unorganized, we used the AIDIS to estimate the data on expenditure incurred in farm business that include capital expenditure on land, livestock and implements.</li> <li>The share of the Corporate Sector in the total Private Sector was calculated by applying the capital-output ratio of each sector found at</li> </ul>	<p><b><i>How the data was processed:</i></b></p> <ul style="list-style-type: none"> <li>The report has data for 19 commodities which make up most of the exports in Karnataka. The commodities are classified across the sectors of origin and hence the value of exports is obtained.</li> <li>No such computation is available for imports and hence, as we already know the total Value Added for the state from the SDP report, we assume the residual as the total value of imports for Karnataka.</li> </ul>

		the national level and multiplying it with the Gross Value of Output (GVO) of those respective sectors in Karnataka to arrive at the private GFCF across all sectors mentioned above for the state of Karnataka. (Narayan et. al, ISEC (2010))	
<p><b>Indirect Taxes:</b></p> <p><i>Sources used:</i> Annual Financial Statement for the year 2015-16 (Budget)</p> <p><i>How the data was processed:</i> The national level proportions of Indirect Taxes for each sector from the India I-O table 2013-14 have been multiplied with Total Indirect Taxes to obtain the Indirect Taxes for each sector of the state.</p>			
<p><b>Gross Value Added (GVA):</b></p> <p>This component of the I-O table represents the final demand in the economy. It is equivalent to Gross State Domestic Product which explains the aggregate value of all goods and services produced in the year at market prices.</p> <p><i>Sources used:</i> State &amp; District Domestic Product of Karnataka 2016-17</p>			
<p><b>Gross Value of Output (GVO):</b></p> <p>The Gross Value of Output is the summation of Intermediate Consumption and Gross Value Added. Estimates of GVO are available only at the National level and not at the State level as estimation of state GSDP is based on originating concept (point of production).</p> <p><i>Sources used:</i> State &amp; District Domestic Product of Karnataka 2016-17</p> <p><i>How the data was processed:</i> The SDP Report has the GVA for 23 sectors. The Gross Value of Output data is available only for four sectors i.e. Crops, Livestock, Forestry &amp; Logging, Fishing as these are state subjects. To estimate GVO for other sectors, we have used the value of GVA available in SDP Report for each of the remaining sectors and multiplied this with the ratio of GVA to GVO obtained from the India IO Table and arrived at the GVO for Karnataka state.</p>			



### Estimated Values of Multiplier:

Sector	Backward /Output multiplier	Forward Multiplier	Income Multiplier
Crops	1.47	1.97	1.19
Livestock	1.69	1.32	1.07
Forestry & Logging	1.20	1.10	1.04
Fishing	1.34	1.04	1.14
Mining & Quarrying	1.96	3.54	1.12
Manufacturing	2.65	10.00	0.66
Electricity, gas & Water Supply	2.91	5.72	0.72
Construction	2.64	2.99	0.92
Trade & Repair Services	1.68	1.49	1.20
Hotels & Restaurants	1.96	1.29	1.04
Railways	1.93	1.02	1.24
Road Transport	2.35	1.10	1.03
Water Transport	2.60	1.03	0.95
Air Transport	3.12	1.07	0.39
Services incidental to Transport	2.47	1.07	1.06
Storage	2.33	1.01	1.12
Communication	2.50	1.44	1.04
Financial Services	1.58	1.91	1.20
Real Estate, Ownership of Dwellings & Professional Services	1.67	2.67	1.18
Public Administration	1.61	1.00	1.20
Education and research	1.55	1.11	1.20
Medical and health	1.86	1.02	1.20
Other remaining services including social and personal and community services	2.16	1.35	1.14

**Note:** The Input-Output table for Karnataka 2013-14 is available with CBPS though not added here for the sake of brevity

### Results and discussion:

The coefficient matrix acts as base to estimate the multiplier values. The sectors for which we have estimated the multiplier values include Crops, Forestry & Logging, Manufacturing, Electricity, Gas and Water Supply, Construction, Road Transport, Education & Research, Medical & Health. The multiplier values are positive for all the sectors mentioned above showing the significance of spending in general. In particular, the social sectors, Education and Health, have shown the output multiplier values to be 1.55 and 1.86 respectively while forward multiplier values being 1.11 and 1.02. Interestingly, income multiplier values obtained are the highest for the social sectors (1.20). The results imply that these social sectors have a potential of contributing to the growth of GDP by stimulating demand, and hence social sector expenditure are also investment expenditures that contribute to growth. Although it is clear that output multiplier effect is smaller for education and health as

compared to manufacturing and construction, what is clear is that it is positive and high enough to generate sufficient additional income in the economy. Although I-O Tables do not allow us to gain any insight on distribution effect, it is well-known that education and health are human-resource intensive sectors and therefore the additional income is distributed among large number of people. Therefore, we argue that public spending on education and health is important not only for the long-term gains in human capital formation but also for its contributions to the economy as well as distributive role in the short run. It is obvious from the multiplier values that manufacturing sector has larger linkage effects and this would be even larger when social sector expenditure is state driven. State driven expenditure would increase the consumption expenditure due to extra income left in the hands of the people and subsequently 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.

Karnataka, in 2001, was one of first states in India to accept World Bank guided economic reform at a time when state was in the midst of financial constraints to undergo economic restructuring at the state level. The World Bank's Reformed Model of Development, known popularly as 'fiscalised development', designed largely to 'modernise' the state's finances through non-state financing was pursued as an alternative to state-led development. The agenda put-forth in this model gives us a snapshot of the fiscal reform envisaged by the Bank and perhaps continues to guide the decision making and policy choices (GoK Finance MTFP 2001). The government wanted to withdraw itself from 'implicit subsidies' in secondary and tertiary healthcare services, irrigation, and drinking water supply, higher and technical education. The immediate step undertaken by the state to improve the fiscal base was aimed at social sectors under the rationale of poor cost recovery. It is important to mention here that studies have long shown that government's support to corporate sector has played a role in establishing Bengaluru as the Silicon Valley. These subsidies given either in form of tax cuts or other provisions are viewed as incentives and similar expenditure need to be viewed as incentives rather than freebies elsewhere as well. This is especially important if the state is committed to SDGs and CRC.

The character of economic growth in the recent years has been precarious in nature. Public investment in social sectors at this juncture is all the more imperative to boost growth as public spending ensures aggregate demand playing a key role as a counter cyclical measure. Fiscal lever when used by the government always involves tax concessions or subsidies or

bailouts that benefits corporates or high-income groups. This is counter-productive as it involves transfer of incomes away from those with greater propensity to spend. It is important therefore to have a wage led growth policy by increasing social sector investment as it tends to have positive income creation effects in Karnataka, both from supply side and demand side even in the short run. The macroeconomic vision that enhances social sector expenditure has the potential to stimulate demand through income, employment and output effects and ensures growth with distribution to achieve the long term gains of sustainable development. With this, we are arguing not only for an enhanced social sector expenditure, as that could happen as a social safety net even within the same macroeconomic growth oriented framework of ongoing debt and market driven economic systems, but also for a reformed vision where greater equality and well-being becomes the non-negotiable and foundational public policy goal.

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