Estimating Multiplier Effect of Social Sector Expenditure in Karnataka

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

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List of Abbreviations

ADB	Asian Development Bank
ASI	Annual Survey of Industries
CBGA	Centre for Budget and Governance Accountability
CE	Consumption Expenditure
CF	Capital Formation
CFC	Consumption of Fixed Capital (or Depreciation)
CRC	Child Rights Commission
CSO	Central Statistical Office
DCU	Department of Commercial Undertakings
DGCIS	Directorate General of Commercial Statistics & Intelligence
ECP	Economic cum Purpose Classification
EU	European Union
GDP	Gross Domestic Product
GFCE	Government Final Consumption Expenditure
GFCF	Gross Fixed Capital Formation
GP	Gram Panchayat
GVA	Gross Value Added
GVO	Gross Value of Output
IMF	International Monetary Fund
IOTT	Input Output Transactions Table
IUSE	Intermediate Use
KA	Karnataka
MCA	Ministry of Corporate Affairs
MGNREGA	Mahatma Gandhi National Rural Employment Guarantee Act
MPC	Marginal Propensity to Consume
NPC	National Product Classification
NSS	National Sample Survey
OBC	Other Backward Caste
OECD	Organization for Economic Co-operation and Development
PFCE	Private Final Consumption Expenditure
PIIGS	Portugal, Italy, Ireland, Greece, and Spain
RBI	Reserve Bank of India
ROW	Rest of the World
SAAD	State Audit & Accounts Department
SAM	Social Accounting Matrix
SC	Scheduled Caste
SDG	Sustainable Development Goals
SDP	State Domestic Product
ST	Scheduled Tribe
SEZ	Special Economic Zone
TP	Taluk Panchayat
XN	Net Exports (Exports – Imports)
ZP	Zilla Panchayat

Chapter 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) on the one hand calls for an increased and well-directed domestic public expenditure in social sector including health, early childhood care, education and empowerment, on the other hand, a major focus on fiscal management tends to view such expenditures as 'consumption' and therefore not as desirable as 'investments' on infrastructure or as crucial as defence (CBGA, 2019). This viewpoint has its historical roots beginning with the fall of Bretton Woods, followed by stagflation of 1970s and 1980s, eventually leading to the formation of Maastricht Treaty, that puts larger significance on maintaining value of money, labelled as 'imperialism in the age of globalisation' (Patnaik and Patnaik, 2015). This is the basis of this policy document promoted fiscal consolidation through debt reduction.

In order to adhere to the fiscal balance rule, the broad options that exist for any government are to increase investment to promote economic and revenue growth and/or to reduce its public spending on areas that are viewed as unprofitable alongside cutting down debt repayment. The governments, both developed and developing, have largely chosen to reduce spending rather than mobilising additional tax revenue and this phenomenon in the advanced countries has come to be known as 'expansionary fiscal contraction' or 'expansionary austerity' (Pescatori, A. et al, 2011). It is believed by the advanced economies that consolidation driven by cuts in expenditure is more successful and easier in reducing fiscal deficits rather than consolidation based on tax increases. The ultimate burden in terms of reduced expenditure is thus borne by social sectors as they are considered to be consumption expenditures. In addition, there is a belief that tax increases are comparatively more harmful to growth than cut in transfers and entitlement programs (Alesina, A. et al, 2018). In the face of these developments, International Monetary Fund (IMF) has played an important role, and research has established links between IMF programmes leading to shrinking shares of budgets to public services even in democracies (Nooruddin, I., & Simmons, J. W. (2006).

India has not been an exception to this rule. For instance, MGNREGA (Mahatma Gandhi National Rural Employment Guarantee Act, one of the largest employment schemes in the world, has for the first time witnessed, in the year 2019-20, a budget allocation less than the previous year's actual expenditure. More importantly, the

recommendations of 13th Finance Commission of 2009, gave greater importance to fiscal discipline and own tax revenue collection in the formula that determined the distribution of tax proceeds and grants between the union and state governments (Chakraborty, P. 2010). In a federal polity where the union government has much greater control over revenue resources and state governments can access these funds based on the conditions determined by Finance Commission, such shifts in conditionalities are bound to influence state governments' responses. It is, therefore, not surprising that the 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. For instance, RBI study has shown that on an average social sector expenditure as a percentage of total expenditure has gone down (Kaur, et,.al 2013).

These measures, while bearing some relevance for advanced economies such as in Europe that have already established well-funded public systems of education and health, and have developed effective social protection networks, can be counter-productive to both growth and equality objectives in under-developed and developing economies. We argue that, even in this era of austerity where prudent fiscal management takes prominence, 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. This calls for an integration of social and economic policies to have a lasting and equitable impact on economic growth, and in turn looking at the expenditures on education, health, early childhood and related areas as investment rather than as mere consumption. In order to lend credence to this argument, we use the lens of 'multiplier' to analyse the extent of income generation by investing public money in social sectors. 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).

Given the context of declining government intervention in social sectors, and the significance of viewing growth through the lens of multiplier, this report 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). The report assumes significance for two main reasons:

1. 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 to use certain datasets that have never been used earlier, making the process more rigorous and estimations more accurate. Also, it helps to argue for greater transparency in data sharing both at state and national levels. Considering that states are very diverse in their economic capacities and composition, it is far more helpful for state governments to have state-level estimations to contribute to appropriate policy choices rather than depending on national level estimations.

2. The ongoing COVID-19 crisis and resultant slowdown of economy that was already trying hard to come out of the stress caused to the unorganised sector by demonetisation has widely opened the debate around what the best economic policy options are: further fiscal tightening by spending lesser on social sectors or enhancing public expenditure on various sectors including social services to add to people's purchasing power, which can in turn create demand for goods and services, and therefore revive the economy faster.

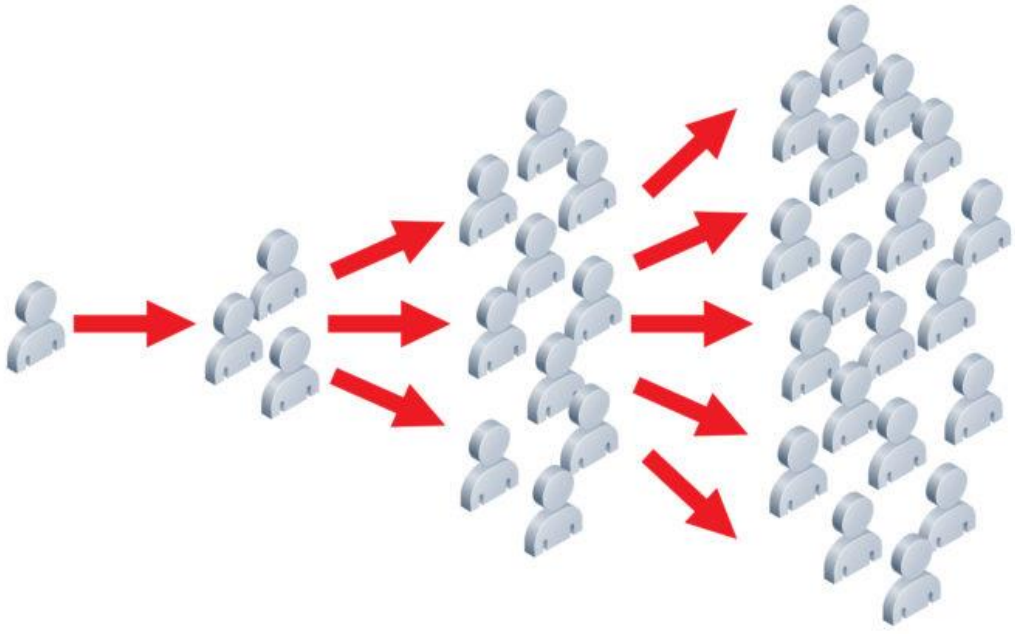
The rest of this report is divided into three more chapters: Chapter 2 presents the concept, context and types of multipliers. Chapter 3 presents briefly the process involved in construction of the Input-Output table and Social Accounting Matrix for Karnataka for 2013-14, while Annexures 2,3,4,5 gives the detailed process for the same. Chapter 4 analyses and discusses the results obtained and concludes with important policy implications.

Chapter 2. Multiplier: Concept, Context, & Types

2.1 Concept & Context

Although much older in its genesis, the multiplier emerged as a powerful concept and policy tool in post-Depression era of the 1930s when Keynes introduced the concept of effective demand in stimulating the recessionary economy through multiplier process of expenditure. Kahn had also used it to estimate employment 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 multiplier 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. Or, for one rupee of economic activity, the output multiplier measures the combined effect of a one rupee change in its sales on the output of all local industries (Hughes, David W. 2003). So, in simple 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) (Figure 2.1).

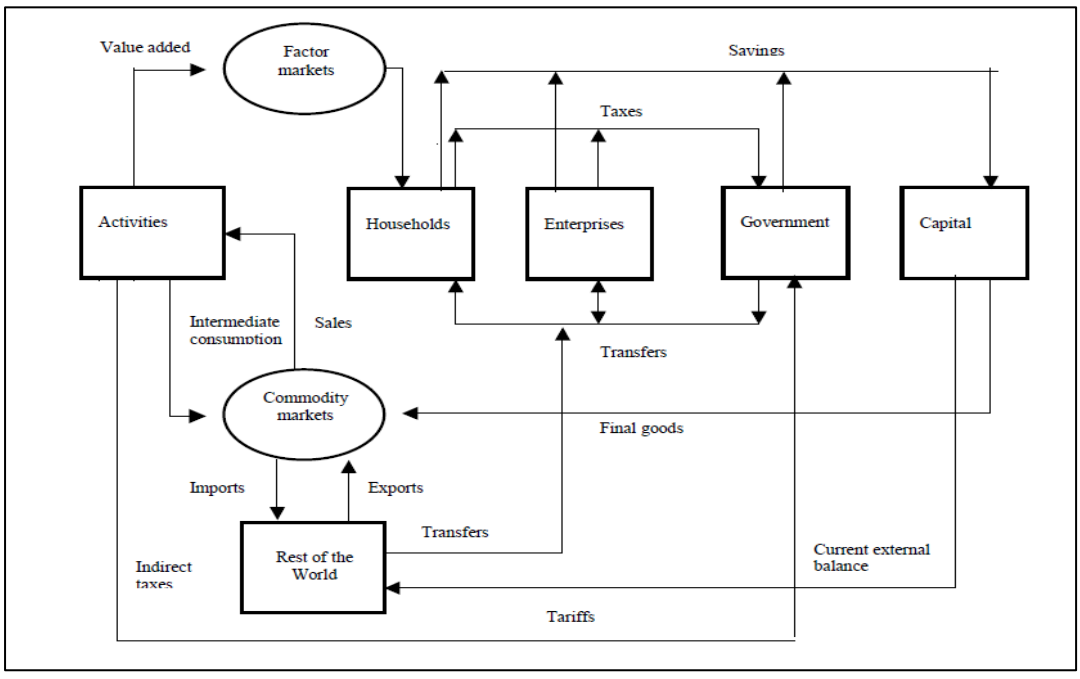
Figure 2.1: The Multiplier Effect: Injection of Rs.1 leads to a larger increase in the final income



Source: downloaded from
https://www.economicsonline.co.uk/Managing_the_economy/The_multiplier_effect.html

The value of multiplier lies between one and infinity and it is determined largely by marginal propensity to consume of the individuals. If the marginal propensity to consume (MPC) is zero, the multiplier is one whereas the multiplier is infinity if the MPC is one. The psychological law of consumption proposed by Keynes says that as income increases, consumption levels increase up to certain level, but the consumption levels remain constant after a certain rise in income threshold. From policy planning perspective, it becomes important to understand the MPC and when it is likely to become constant, as that is the time a higher injection of public spending needs to be stopped. Any additional injection is not going to create any multiplier effect on the economy. The multiplier effect on the domestic economy is higher if there are no leakages like imports. The concept of multiplier as used in this research is dependent on the notion of circular flow of income and expenditure, as shown in Figure 2.2.

Figure 2.2: Illustration of Circular Flow of Income and Expenditure



Source: Miller, R. E., & Blair, P. D. (2009)

2.2 Types of Multipliers

Multipliers have been categorised into various types. One categorisation classifies multipliers into Type I and Type II multipliers. Type I multipliers sum together direct and indirect effects of a change in economic activity. If there is an increase in the final use for a particular industry output, then there will be an increase in the output of that

industry, as producers react to meet the increased use. This is the direct effect (change in final demand). As these producers increase their output, there is subsequent increase in use on their suppliers and so on down the supply chain; this is the indirect effect (supply chain effects to meet that demand). Type II multipliers also include the induced effect. As a result of the direct and indirect effects the level of household income throughout the economy will increase as a result of increased employment. A proportion of this increased income will be re-spent on final goods and services; this is 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.

2.3 Review of Literature

Empirical Literature generally studies the impact of social sector expenditure on human capital formation through witnessing improvement in educational enrolment rates and health status of children in India (Bhakta, 2014) and the positive impact of public investment in education and health on economic growth (Jung & Thorbecke, 2003). The estimates have varied in different contexts, e.g., enhanced health expenditures leading to a four per cent increase in output due to one-year improvement in population life expectancy observed across a panel of countries. (Bloom et al., 2004) or a one percent increase in total health expenditure leading to a 0.06 – 0.10% increase in per capita GDP growth rate observed in a panel of 19 OCED countries (Beraldo et al., 2009).

The growth and welfare enhancing effects are found to be most pronounced when they are financed through a re-composition of public expenditure rather than when they are financed through increased taxation (Annabi et al., 2011). Further, relationships between maternal and child health outcomes and economic growth in different countries at different income levels suggest that the effect of marginal health investments on health outcomes is higher at low levels of GDP, i.e. in countries where the level of health investments is generally lower (Amiri & Gerdtham, 2013). Social sectors also involve addressing question of gender inequality and effect of its improvement on economic growth. Using cross-country regressions, studies have shown that income and gender inequality jointly impede growth mostly in the initial stages of development (Hakura et al., 2016, Ahang, 2014, Klasen and Lamanna, 2009). On the other hand, promoting gender equality, has shown to contribute significantly

to economic growth through accumulation of human capital in the long run (Agénor & Canuto, 2013, Kim, J et al, 2016).

India specific studies assessing the impact of public expenditure on social sectors have found a large, positive and significant impact of government spending on public goods such as health, education and basic infrastructure on per capita GDP and poverty. In a panel data analysis of 14 states in India, it was found that a reallocation of expenditures was found to have an average increase per capita GDP growth rate by 2.7 percentage points and reduce poverty headcount index by up to 6.6 percentage points (Hong & Ahmed (2009). However, a study using dynamic CGE modelling (Ganesh Kumar et al., 2017) showed the macro-economic impact of different types of public expenditure and it showed that social sector expenditure (water, education and health) does not affect GDP growth.

In this study, we are more interested in understanding the short-term growth enhancing effects of social sector expenditure using multiplier approach. A good number of studies in this respect have emanated from Europe. For OECD countries, the domestic aggregate multiplier using Input Output database was estimated to be 1.61 for the year 1997, which reduced to 1.03 with imports, and was 1.65 for intermediate sector multipliers (Jones, C. 2007). Similarly, another study for advanced economies using a dynamic stochastic general equilibrium model found that an unanticipated increase in government investment spending by 1% point increases the level of output by 0.4% (short term investment multiplier) in the same year whereas four years later, the medium-term fiscal multiplier turns out to be 1.5%. (ADB, A. A., Furceri, D., & IMF, P. T. 2016). Fiscal multipliers calculated for 25 EU countries for the years 1995 and 2010 using Vector Auto Regressive Method to estimate cross-national fixed effects estimated the multiplier for total government spending to be 1.61 (Reeves, A. et. al 2013).

Furceri & Zdzienicka (2012) conducted an analysis for nine different social policy areas for a panel of OECD countries from 1980 to 2005 and found that social spending devoted to health and unemployment benefits are those that have greatest effects. The same results were found in a Maltese economy using I-O analysis where social work, education, health sector had seen positive and had large Type II multiplier (Cassar (2015)). It is interesting to see that social sectors like health had a larger multiplier effect of 4.3 over -9.8 in defence (Reeves et al., 2013) in a study covering 25 EU countries from 1995 to 2010, both before and during the recession that began in 2008. The difference in multiplier effects across different types of spending was explained by varying degrees of absorption of government spending into the domestic economy.

Supply side effects in the local economy is found to be greater than income side effects implying the need for demand driven economy to have larger multiplier effects (Domański, B., & Gwosdz, K. 2010). The results are corroborated also by (Micek, G. 2011) who say that indirect multiplier (Supply side effects) is greater than direct (Income Effect).

However, certain studies also found public expenditure on social sector having very low or no multiplier effect on growth. Kraay (2012) conducted a study on 29 aid-dependent low-income countries using two-stage least squares (2SLS) method to calculate contemporaneous spending multiplier and the estimates show that impact multiplier is mere 0.48. The effect of government spending in Kenya using Structural VAR for the period 1991-2012 is found to be weak and this is linked to high debt ratio levels and high marginal propensity to import (Mahrous, 2016).

Nevertheless, in general, the studies undertaken in both developed and developing or low-income countries have found the multipliers to be positive and high for the social sector expenditure (Ianchovichina, E., et. al 2012; Furceri & Zdzienicka, 2012; Cassar, 2015; Reeves et al., 2013; Micek, G., 2011; Domański, B., & Gwosdz, K., 2010).

While IOTT was limited to capturing production structures, Social Accounting Matrix (SAM) emerged as a tool that helps estimate the distribution effect in addition to understanding production structure and served as a tool used for policy analysis since the 1960 and 1970s. Existing literature especially from the developing world with dualistic feature of their economies, has largely made an attempt to build SAM to understand the effect of increase in exogenous expenditure either on household incomes or for specific sectoral impacts. SAM built for Srilanka (Pyatt, G., & Round, J. I., 1979) was one of the early types of research on constructing SAM in developing countries where they found that poverty incidence was high especially among estate workers and the SAM multiplier analysis showed that this was due to poor multiplier effect of income injection unless it was injected in tea or rubber sectors. Thorbecke & Jung (1996) extended an earlier study to understand the sectoral growth and its consequences on poverty reduction and found that agricultural growth had larger effect on poverty reduction in relation to growth in industrial sector even after accounting for various multiplier effects. On similar lines, SAM built for Tanzania (Mendez-Parra, M. (2015)) was to gauge sectoral impact of an increase in final demand on output and different types of labour classified on the basis of education. The exercise shows that on an average, agriculture sector has the larger output multiplier effect reflecting stronger final demand components. It was further found that a shock that increases demand for services tends to have the strongest effect on the output of

the economy but the employment effect is rather modest due to poor backward linkages of services. Higher employment effects were found in agriculture and fisheries sector due to strong backward linkages despite lower, though not negligible, output effect. The industrial sectors have smaller output and employment multiplier effects.

Duality in developing economies persist in both occupational and employment structure that primarily gave an impetus to build SAM to understand the effect of intervention on labour market. Defourny, J., & Thorbecke, E. (1984) built SAM for South Korea for the year 1968 to find the total multipliers for various paths of injections and account destinations. They, in particular showed the relative importance of paths of the multiplier effects on households headed by unskilled workers that arise from an injection in the processed foods sector. The direct effect of this is increase in demand for unskilled labour that would create multiplier effect of no more than 25% of the total multiplier effect and the remaining is due to linkage effects or indirect paths.

Further, as part of the OECD country case studies on 'Adjustment and Equity' to trace the impact of government budget reduction in 1980's on household groups, a study in Indonesia was conducted through SAM to show that that higher income groups in both rural and urban areas were largely affected by current expenditure of government while poor income groups were equally affected by reduction in both exports and current government expenditure (Keuning, S., & Thorbecke, E., 1992). Similarly, a recent study builds SAM to analyse the impact on socio-economic activity especially on GDP of the country of an increase in households' income in Portugal (Santos, 2018). With household share in the GDP being 60.8% and their main source of income being compensation to factor services taking the largest share of 73.8% and current transfers by the government at 23.3%, it was found that origin or source of increment in household income has different effects with impact on aggregate income being larger through rise in compensation of employees relative to increase in transfers.

As we are aware that production and distribution are interconnected economic processes, studies have emphasised on understanding this interdependence. In this context, Powell, M., & Round, J. I. (2000) constructed SAM for the year 1993 to understand sector specific investment and its effect on income generation in Ghana. As far as the linkage structure of SAM is concerned, it was found that an exogenous injection of an extra 100 units of income into the cocoa sector leads to additional household incomes of 107 in urban areas and 71 in rural areas, after taking into

account the various transfer, spillover and feedback effects. While in terms of overall income effects, the SAM structure suggests that an exogenous injection of 100 units of income into the health and education sector would have larger effects on household incomes than an injection into either cocoa or mining (urban 132 and rural 84). Another recent study was to use SAM to analyse the effects on the Greek economy during the crisis period of 2008, which established that the recession was derived primarily by the decline in household income and government spending.

The construction of SAM has not been very common in India. Using India's IOTT and NSS to assess income inequality across various households and their respective contribution to national income, Pal, B. D., & Bandarlage, J. S. (2017) constructed a 78 Sector SAM for India for the year 2007-08. It claims that 'Other' social category which constitutes around 17% of the total population contribute 13% to the country's net national income whereas SC (Scheduled Caste), ST (Scheduled Tribe) and OBC (Other Backward Caste) put together contribute lesser than their share in the total population in rural areas. Further, the paper claims that urban counterparts are relatively more productive. Adding to this, the paper claims through multiplier analysis that growth in paddy would reduce income inequality among SC and ST households while it is the growth in livestock sector that does the same for OBC households. Further, Sinha, A et al, (2000) built SAM for India to understand the impact on informal households' income of a possible increase in exogenous demand for informal output and concluded that expansion in informal sector production could generate more informal sector income. Some studies have attempted to understand the energy sector using SAM approach by decomposing the sector (Ojha, V et al, 2009; Pradhan, et al, 2014).

Constructing Social Accounting Matrix at a sub-national level is a difficult task with very few attempts being made in this regard. Ganesh-Kumar & Panda (2014) analysed the impact of state government spending for consumption and investment, and the consequent spillover effect of this spending on GDP if done either in the form of central transfer or generating its own source of revenue by using SAM 2011-12 for India. The analysis showed that states with high share of manufacturing like Punjab, Kerala, West Bengal or Tamil Nadu contribute high in terms of national GDP when fiscal transfers are given to these developed states while fiscal transfers have relatively small spill over effects if given to states like Goa, Odisha, Madhya Pradesh and Chhattisgarh. By dividing India into four regions namely poor, middle income, rich and special category states, SAM was constructed for the year 2003-04 separately for these regions as spatial dimension plays a role (Pradhan, B. K, et al, (2006)). However, for the first time, a state-level regional SAM was constructed for the state of Andhra

Pradesh for the year 2007-08 though largely using India's coefficients (Saluja, M. R. (2014)).

Based on the review of literature, that establishes the usefulness of IOTT and SAM as tools for the measurement of multipliers as a policy choice tool, we chose these two tools to estimate the multiplier effect of social sector expenditure in Karnataka. Although these tools have been largely used to understand the industry specific multipliers, we have used these to understand the structure of the Karnataka's economy and calculate multiplier effect of social sector expenditure in particular. In the process, this became one of the first study to use variety of data sources to overcome the challenge of lack of adequate data at sub-national level, which we describe in detail as we go further.

2.4 Methods used to estimate Multiplier

Supply based growth theories that rests on the belief that the free enterprise economy is self-regulating, demand-based growth theories on the other hand believe that growth process is path dependent and cumulative. Past affects the present and the future and therefore history is imperative in the economy's growth process. They view the growth process as non-linear, and therefore historical. This implies that demand-based growth theories call for active government intervention in stimulating growth that could be far away from natural rate of growth. In these theories, demand deficiency is a structural problem that can be corrected only with government intervention through policies that increase aggregate demand either through increase in consumption expenditure or autonomous investment expenditure. It therefore addresses the question of both availability and more importantly affordability. These theories depend on a frame that understands economy as an integrated system and production as a social activity.

There are various methods and tools to estimate multiplier and broadly these can be classified into conventional approaches (neoclassical) and alternative approaches. 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. Alternative approaches on the other hand include Input-Output Model (IOM) and Social Accounting Matrix (SAM) which believes in integrated economic system and investment as an autonomous variable. We have used alternative methods following the demand side approach.

2.4.1 Input-Output Models

Input-Output Table is an accounting framework 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. It shows the flows of goods and services from each branch of the economy to different branches of the economy. The basic information from I-O is presented in the inter-industry transactions table (Figure 2.3). 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.

Figure 2.3: Input - Output Table Representation

		PRODUCERS AS CONSUMERS								FINAL DEMAND			
		Agric.	Mining	Const.	Manuf.	Trade	Transp.	Services	Other	Personal Consumption Expenditures	Gross Private Domestic Investment	Govt. Purchases of Goods & Services	Net Exports of Goods & Services
PRODUCERS	Agriculture												
	Mining												
	Construction												
	Manufacturing												
	Trade												
	Transportation												
	Services												
	Other Industry												
VALUE ADDED	Employees	Employee compensation								GROSS DOMESTIC PRODUCT			
	Business Owners and Capital	Profit-type income and capital consumption allowances											
	Government	Indirect business taxes											

Source: Miller, R. E., & Blair, P. D. (2009)

In a nutshell, it presents the intermediate inputs in the production of goods and services by various sectors as well as towards the final consumption. I-O clearly captures the circular flow and the interdependence between sectors by providing detailed disaggregated quantitative description of the structural characteristics of all component parts of a given economic system.

Using I-O Table, one can understand the structural characteristics of an economy and it helps identify those key sectors that stimulate growth which would induce specific investments especially when there is slowdown and unequal growth. One of the main limitations, however, is that represents a stationary system characterised by constant technical coefficients.

Backward and Forward Linkages

It is important to understand the notion of backward and forward linkages as economy is an integrated system representing in the context of a circular flow of income and expenditure.

Hirschman defines the backward linkage effect as a "non-primary" activity, i.e., an activity that employs significant amounts of intermediate inputs from other activities, should be expected to induce attempts to supply these inputs through expanding domestic production. A forward linkage effect is defined as an activity that is "non-final," i.e., an activity that does not cater exclusively to final demand, should be expected to induce attempts to utilise its outputs as inputs in some new activities (Bhattacharya, T., & Rajeev, M. (2014).

The linkage effects help us identify the core or key sectors of an economy that have the capacity to stimulate the growth of other sectors either through providing their own output to other sectors (forward linkage), or through taking inputs from other sectors (backward linkage). In simple terms, backward linkage expresses how a sector depends on others for input supplies while forward linkage identifies how a sector distributes its output to the remaining economy. The intensity of linkages reflects the potential capacity of each sector to stimulate other sectors and economy in general.

The idea of backward and forward linkages arises from the fact that economy is an integrated system where all sectors are interconnected implying existence of vertical integration set up. The extent of sectoral integration reflects the significance of the sector in the economy. Sectoral linkages describe the sector's direct and indirect association through its direct and indirect purchases and sales of direct and intermediate inputs with the rest of the sectors in the economy. A forward linkage is created when investment in a sector creates investment in subsequent stages of production. Forward production linkages refer to the part of the non-farm sector that uses agricultural output as input in its production, for instance, silk worm in the silk production.

A backward linkage is created when an investment creates or facilitates those facilities that require that investment. Backward production linkages refer to the linkages from the farm to the part of the non-farm sector that provides inputs for agricultural production for instance demand increases for say, fertilisers or tractors or agrochemicals.

We can say backward linkages are directed towards suppliers and forward linkages are directed towards consumers.

Construction of I-O Tables that are comprehensive and consistent helps us understand

how growth has changed the ratio of intermediate use in the total gross output as against the ratio of factor inputs used in the total gross output. It helps us see the linkage structures if we do an intertemporal comparison of I-O Table. The tool helps in forecasting of supply and demand in the economy for a target year.

2.4.2 Social Accounting Matrix

A useful extension of I-O matrix is Social Accounting Matrix, a tool that explicitly puts emphasis on distribution and its interaction with production as against I-O which largely focuses on production structure. Income Distribution is a key in a capitalist economic organisation because demand matters for the long run growth of the economy. Capitalist economies are monetary production economies where monetary circuit establishes both circular flow of income between economic sectors and also links economic units like households, firms, governments to each other over time. SAM tends to capture these links and interactions. SAM was built as an improvement to I-O to capture better information on distribution and final demand. The income distributional conflicts and effects of policies in a developing economy is important as it captures the inequalities through the linkage between value added and final demand.

SAM is a matrix representation of national income accounts (Figure 2.4) and this framework serves to satisfy two basic rules (Pyatt & Round, 1977):

1. For every row there is a corresponding column, and the system is complete only if the corresponding row and column totals are identical; and

2. Every entry is a receipt when read in its row context, and expenditure in its column context.

Purpose of Social Accounting Matrix

SAM, a summary table highlighting the interlinkages and the circular flow of payments and receipts among the different components of the system such as goods, activities, factors, and institutions, fulfils following purposes:

- It helps organise the information on the social and economic structure of a country for a given period.
- It provides a synoptic view of the flows of receipts and payments in an economic system;
- It represents together production, income generation, consumption, investment and external transaction.
- It forms a statistical basis for building models of the economic system, with a view to use this to simulate the socio-economic impact of policies.
- SAM is social as it captures the social background of Households unlike IO which accounts only economic transactions/functional activities.
- SAM as a technique is flexible. It has a basic accounting structure but gives scope for disaggregation.
- SAM, vouches to understand, 'Growth with Distribution' and

SAM is not limited to understand the real economy transactions. It can be extended to include the interaction between real and financial economy.

Figure 2.4: Schematic Structure of Social Accounting Matrix (SAM)

	Production Account	**Factors of Production**	**Households**	**Private Corporate Sector**	**Public Sector Corporations**	**Government**	**Net Indirect Taxes**	**Capital Account**	**ROW**	**Total Output**
Production Account	Input - Output Table		Household Consumption			Government Consumption (GFCE)		Gross fixed Capital Formation	Exports	Aggregate Demand
Factors of Production	Value Added								Net Factor Income	Factor Income
Households		Endowment of Households				Government Transfer, Interest on Debt			Net Current Transfers	Total household income
Private Corporate Sector		Operating Profits				Interest on Debt				Income of Private Corporations
Public Sector Corporations		Operating Surplus								Income of Public Sector Corporations
Government		Income from Entrepreneurship	Income tax from households	Corporate Taxes			Total Indirect Taxes		Net Capital Transfer	Total Government Earnings
Net Indirect Taxes	Taxes on Intermediate Goods		Taxes on purchases by Households			Taxes on purchases by Government		Taxes on Investment Goods	Taxes on Exports	Total Indirect Taxes
Capital Account		Depreciation	Household Savings	Corporate Savings	Public Sector Savings	Government Savings			Foreign Savings	Gross Savings of the Economy
ROW	Imports									Foreign Exchange Payments
Total Output	Aggregate Supply	Total factor endowment	Total use of household income	Private corporate income	Income of Public Sector Corporations	Aggregate Government Expenditure	Total Indirect Taxes	Aggregate Investment	Foreign Exchange Receipts	

Source: Pradhan B.K et al (2006)

The schematic structure of SAM has six major accounts, namely, 1) production represented by Input-Output Table, 2) factors being labour and capital, 3) Institutions being Private Corporate sector, Public Corporations, Households and Government, 4) Indirect Tax account that represents the tax structure of indirect taxes, 5) Capital Account, and 6) Rest of the World (ROW). Capital Account, ROW and Government are considered exogenous/policy instruments variables while the other accounts, are considered endogenous/policy objective variables. This implies that investment is an independent variable, in line with Keynesian framework. Exogenous accounts receive payments from endogenous accounts and this accounts for leakages in the economic system as these do not contribute to the multiplicative process and skip the expenditure stream. So, the matrix enables the effects of exogenous expenditure to be transmitted to the economic system through multiplier impact that follow an iterative circuit of production, use and distribution of income. Annexure 1 discusses these in detail.

Chapter 3. Construction of IOTT and SAM for Karnataka 2013-14

3.1 Background

I-O Table as a tool made its inroads in the post-independence era of India and played a key role in the planning process of India. The first I-O Table was prepared in India by the Central Statistical Office (CSO) in the year 1968-69 and subsequently it was constructed for 1973-74, 1978-79, 1983-84, 1989-90, 1993-94, 1998-99, 2003-04 and lastly for the year 2007-08 which was the last official I-O table available in the public domain. However, CSO has been publishing Supply and Use Tables (SUT) with the latest one being for the year 2015-16. SUT as a key feature of national accounts provides data that links output of industries as products, and intermediate and final uses of various

Supply and Use Table (SUT) and I-O Table

SUT provides a base for the construction of I-O table. I-O model provides a link between supply and demand levels for different sectors. It is a theoretical scheme where the final demand components are exogenously determined.

The supply use equation for any given product in an economy can be mathematically expressed as:

Output + Imports = Intermediate consumption + Final consumption + Gross capital formation (including changes in stocks and valuables) + Exports

or also can be re-written as:

Output – Intermediate consumption + Taxes on products – Subsidies on products = Final consumption (government and private) + Gross capital formation (fixed, changes in stocks and valuables) + Exports – Imports

I-O Table is based on the following assumptions:

a. Each sector produces homogeneous good and there is no scope for substitutability between the outputs of different sectors.
b. The production function is assumed to be of Leontief form where fixed proportions of inputs are used by the sector to produce a particular level of output and that implies inputs varies in direct proportion to change in output.

The other condition is called as Hawkins Simons condition that ensure viability in the economic system. This means, there is surplus in the economy, i.e. amount of output used as input should be less than the total output.

products. It helps compile Gross Domestic Product (GDP) at current prices and provides the ideal concept for balancing supply and demand (CSO, 2016).

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. Considering that the Indian states are very different from each other in terms of its history, economic size and composition and structures of production that also tend to change over time. Hence, it can be useful for policy makers to adopt or re-structure policies based on the impact it might have on the production structure. This is significant especially when we follow a federal system of functioning. However, constructing the I-O Table at the regional level is relatively more difficult as many of the parameters which form components of the I-O table are not measured at the sub-national level at present and there is very little work being done in this area of research.

We constructed I-O Table and SAM for Karnataka for the year 2013-14. The choice of the year was because the updated Indian IOTT constructed for India is for the year 2013-14 (Saluja & Singh 2017). While we made every effort to use state specific data-sources for arriving at sector specific coefficients by using data-sources that have not been used earlier, we were forced to use national level coefficients in certain cases for lack of any credible alternative, and thereby assuming that these are the same for state and national levels in those specific instances. Although this may be considered one limitation of this study, so far, all other state-level I-O Tables have shown far more dependence on national coefficients, and in that respect, ours is far more state-centric in its rigour and specificity[1]. In this section we present the methodological steps along with data sources and process of computation for the various components of I-O Table and SAM in brief while the details have been presented in Annexures 2,3,4,5.

[1] The exercise can be considered first of its kind in a way because of the rigour with which it has been undertaken to a certain extent. The process of compilation included meetings with state officials of the Economics and Statistics department to understand the data collection processes, personally gathering annual reports of Public Sector Undertakings under the purview of the Karnataka government. It also involved seeking information which is supposed to be available in public domain but is not so making us rely on the Right to Information Act (RTI). The exercise is also significant in a sense as for the first time we have been able to calculate the final demand components and been able to estimate the shares of each in the total Gross State Domestic Product (GSDP) of Karnataka

The Input-Output table: A simple representation

To understand what the values in the matrix mean, the values X_{11} to X_{33} represents the intermediate consumption in each destination sector, of the input coming from the originating sector. For example, X_{23} represents the value of intermediate consumption in sector 3 (destination sector) of the inputs coming from sector 2 (originating sector). T_1 to T_3 gives the summation of all the inputs coming from that particular originating sector.

	Intermediate Use Matrix				Final Demand Components (GVA)						Total Output (GVO)
Consuming (Destination)Sector / Producing (Originating) Sector	**Sector 1**	**Sector 2**	**Sector 3**	**IUSE**	**PFCE**	**GFCE**	**GFCF**	**Exports**	**Imports**	**Tot. Final Use (GVA)**	
Sector 1	X_{11}	X_{12}	X_{13}	T_1	P_1						
Sector 2	X_{21}	X_{22}	X_{23}	T_2	P_2						
Sector 3	X_{31}	X_{32}	X_{33}	T_3	P_3						
Total Input	X_1	X_2	X_3								
Gross Value Added (GVA)											
Net Taxes											
Total Output											

In order to calculate the final demand components, which add up to the total final use or the Gross Value Added (GVA), we need to calculate each of the individual components that include PFCE, GFCE, GFCF, Exports and Imports.

Total Input + GVA + Net Indirect Taxes = GVO = Intermediate Consumption + GVA

or

Total Use (Demand) = Total Supply

Table 3.1: Concordance Matrix of India I-O Sectors with Karnataka SDP Sectors

Sectors in Karnataka I-O table (based on SDP Report KA)	Sectors in India I-O Table
Crops	Paddy, Wheat, Jowar, Bajra, Maize, Gram, Pulses, Sugarcane, Groundnut, Coconut, Other oilseeds, Jute, Cotton, Tea, Coffee, Rubber, Tobacco, Fruits, Vegetables, Other crops
Livestock	Milk and milk products, Animal services (agricultural), Poultry & Eggs, Other livestock products
Forestry & Logging	Forestry & Logging
Fishing	Fishing
Mining & Quarrying	Coal and lignite, Natural gas, Crude petroleum, Iron ore, Manganese ore, Bauxite, Copper ore, Other metallic minerals, Lime stone, Mica, Other non metallic minerals
Manufacturing	Sugar Khandsari, boora Hydrogenated oil(vanaspati), Edible oils other than vanaspati, Tea and coffee processing, Miscellaneous food products, Beverages, Tobacco products, Khadi, cotton textiles(handlooms), Cotton textiles, Woolen textiles, Silk textiles, Art silk, synthetic Jute, hemp, mesta, Carpet weaving, Readymade, Miscellaneous, Furniture and Wood and wood Paper, paper products, Printing and Leather footwear, Leather and leather Rubber products, Plastic products, Petroleum products, Coal tar products, Inorganic heavy Organic heavy Fertilisers, Pesticides, Paints, varnishes and lacquers, Drugs and medicines Soaps, cosmetics & glycerine, Synthetic fibers, resin, Other chemicals, Structural clay products, Cement, Other non-metallic mineral products, Iron, steel and ferro alloys, Iron and steel casting & forging, Iron and steel foundries Non-ferrous basic metals Hand tools, hardware, Miscellaneous metal products, Tractors and agri. Implements, Industrial machinery(F & T), Industrial machinery (others), Machine tools, Other non-electrical machinery, Electrical industrial machinery, Electrical wires & cables, Batteries, Electrical appliances, Communication equipments, Other electrical machinery, Electronic equipments (incl.TV), Ships and boats, Rail equipments, Motor vehicles, Motor cycles and scooters Bicycles, cycle-rickshaw, Other transport equipments, Watches and clocks, Medical, precision & optical instruments, Jems&jewelry, Aircraft & spacecraft, Miscellaneous manufacturing
Electricity, gas & Water Supply	Electricity, Water supply
Construction	Construction
Trade & Repair Services	Trade
Hotels & Restaurants	Hotels and restaurants
Railways	Railways
Road Transport	Road Transport
Water Transport	Water Transport
Air Transport	Air Transport

Sectors in Karnataka I-O table (based on SDP Report KA)	Sectors in India I-O Table
Services incidental to Transport	Services incidental to Transport
Storage	Storage
Communication	Communication
Financial Services	Banking, Insurance
Real Estate, Ownership of Dwellings & Professional Services	Ownership of dwellings, Business services, Computer & related & Legal services, Real estate activities, Renting of machinery & equipment
Public Administration	Public Administration
Education and Research	Education and Research
Medical and Health	Medical and Health
Other remaining services including social and personal and community services	Other community, social & personal services, Other services

Source: SDP Report and I-O Table 2007-2008

3.2 Mapping of the Karnataka SDP sectors against India's I-O Table

The I-O Table constructed for India in 2013-14 by NCAER is a detailed table and contains 130*130 sectors (commodity*commodity table). We mapped these against 23 sectors primarily based on the sector classification available in the State Domestic Product (SDP) Report of Karnataka for 2016-17 in order to construct 23*23 sector*sector table (Table 3.1). Further, for, aligning with the objectives of our study, we have disaggregated the category 'Other Services' to identify Education & Research and Medical & Health as separate categories. This would help us obtain the multiplier for the Education and Health sectors separately.

3.3 Process towards the construction of IOTT and SAM for Karnataka 2013-14

The Input-Output table can be divided into two major parts, the intermediate use (consumption) matrix (IC matrix) and the final demand components. Computation of both the parts involves extensive analyses and clubbing of data from various sources.

3.3.1 Gross Value of Output (GVO)

The Gross Value of Output is the total value of goods produced in a particular geography in a particular year. Simply put, it is the summation of Intermediate Consumption and Gross Value Added. The calculation of Gross State Domestic

Product in states is based on the originating concept (point of production) whereas at the National level, calculation is based on the accruing concept[2].

Hence, estimates of GVO are available only at the National level and not at the State level. So, for the purpose of completing the I-O matrix, GVO estimation at the state level is necessary. The State Domestic Product Report gives us the value of the Gross Value Added at the state level across each of the 23 sectors that we have discussed. The Gross Value of Output data is available only for four sectors i.e., Crops, Livestock, Forestry & Logging, and Fishing as these are state subjects and procurement of data for these sectors becomes easier. Therefore, we have used the value of GVA available in SDP Report for each of the 23 sectors and multiplied this with the ratio of GVA to GVO obtained from the India I-O Table constructed by the NCAER in 2013-14 and arrived at the GVO for Karnataka state. However, for the manufacturing sector, we added the value of inputs which we estimated from the ASI data for Karnataka, to the GVA for the Manufacturing sector and hence got the total GVO.

GVO for Karnataka (sector-wise) = GVA for Karnataka / (GVA for India/GVO for India) (sector-wise)
GVO for Karnataka (whole) = GVO for Karnataka added for each sector

3.3.2 Estimation of Intermediate consumption/use matrix

The intermediate consumption table captures the total inputs (from various sectors) used by every sector. These total inputs, are distributed across the sectors from which they originate/ are produced and used as an input in other sectors. The intermediate consumption table helps calculate the co-efficient matrix which is further used to calculate the multipliers. In order to calculate the co-efficient matrix for Karnataka, we first need to construct the intermediate consumption matrix for Karnataka. The entire Input-Output table has been constructed at the basic prices. Hence, wherever the market prices have been taken for the calculations, they have been converted to basic prices with a base year of 2011-12. Intermediate consumption matrix required us to use multiple data sources including CMIE Prowess database, I-O table for India, 2013-14 (NCAER), 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), Annual

[2] The accrual principle is an accounting concept that requires transactions to be recorded in the time period in which they occur, regardless of when the actual cash flows for the transaction are received. The idea behind the accrual principle is that financial events are properly recognized by matching revenues.

Survey of Industries. Annexure 2 discusses the step-by-step details of constructing the input structure along with the assumptions used and details of how these data sources were used for different sectors.

3.3.3 Final Demand Components

This component of the I-O table represents the total final demand in the economy. It is equivalent to Gross State Domestic Product which explains the aggregate value of all final goods and services produced in the year at market prices. This is the exogenous component of the table. We have used the GVA figures at basic prices, as obtained by Department of Economics & Statistics for each of the 23 sectors. The components of the GVA include Private Final Consumption Expenditure (PFCE), Government Final Consumption Expenditure (GFCE), Gross Fixed Capital Formation (GFCF), Net Exports (Exports – Imports). We computed these using multiple data sources especially to be able to account for all institutions that have their own source revenue. This included

1. NSS 68th Round on Household Consumption of Various Goods and Services in India
2. ASI data for Organised Manufacturing Sector
3. Karnataka State Budget document 2015-16 (contains actuals for financial year 2013-14)
4. Local Budgets, especially at the panchayat and municipality levels
5. Public Sector Corporations
6. Public Universities and Public Hospitals
7. Karnataka Value Added Tax Ready Reckoner

Detailed method for the computation of the final demand components is given in Annexure 3.

3.3.4 Net Indirect Taxes

The calculation of Net Indirect Taxes becomes important for the Input – Output table as the role of the State affects the circular flow of income through leakages that takes place because of taxes and subsidies.

The Total Indirect Taxes can be expressed as follows:

Total Indirect Taxes = Taxes on Intermediate Goods (Intermediate Consumption) + Taxes on Purchases (by Households) + Taxes on Investment Goods (Capital Account of GFCF) + Taxes on Exports.

Annexure 4 details out the detailed methodology adopted for this computation.

3.3.5 Construction of SAM for Karnataka

The construction of SAM hinges on the construction of I-O Table, which acts as the production accounts and details out the inter-linkages between the different sectors. The component, factors include the wage and non-wage component of the GVA and the net factor income from ROW in the row totals and the total factor endowments in the columns include the endowment of households, operating profits of private corporations, operating surplus for the public sector corporations, the income from entrepreneurship earned by the Governments and the depreciation on the capital account.

Different methods and sources have been used to capture the wage and non-wage component of the GVA of each sector including agriculture, manufacturing, others that main include services, education, research, medical and health. Annexure 5 describes the details regarding how these were classified and computed. The annexure also describes how we estimated the endowment of households, the operating profits for private sector in the state, operating surplus of public undertakings, income from entrepreneurship, depreciation on capital account, net factor income and finally the total factor endowments and the total factor income.

Using the sources mentioned above and the methodology described in the annexures, we constructed the I-O table and SAM for Karnataka for 2013-14. Based on existing empirical work, we can state that the share of the final demand components has neither been overestimated nor underestimated. The I-O Table and SAM computed for Karnataka for the year 2013-14 are attached as Annexure 9 and Annexure 10[3].

[3] In Excel sheets

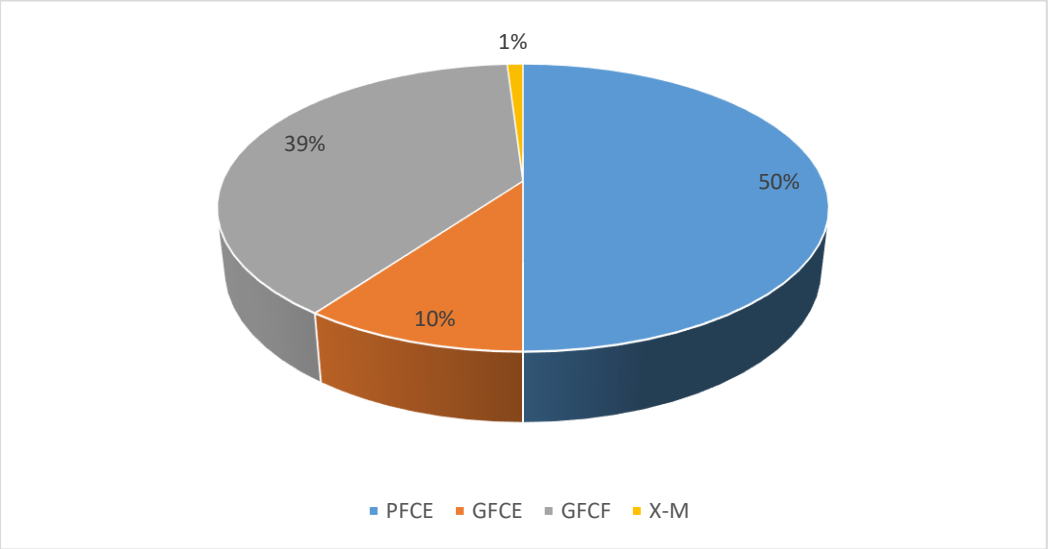
Chapter 4. Analysis and Discussions

In this chapter, we present the key results of some of the computations and analyse the multiplier values and their implications for Karnataka's public policy choices. It is not only the multiplier values but also other computations undertaken to arrive at multiplier values that provide us with key pointers for policy choices.

4.1 Components of Aggregate Demand

Aggregate Demand components help us know the structure and discern the drivers of the growth process. Constructing SAM and IOTT helped us bifurcate the total GVA into its demand components where the share of the PFCE is 50% while GFCE is 10%, GFCF is 39% and Net Exports is 1% of GSDP (Figure 4.1).

Figure 4.1: Share of final demand components in GSDP



Source: Authors' calculations

Intermediate consumption as a proportion of GVO forms 52% of the total GVO. This shows that consumption expenditure drives the growth process in the state of Karnataka. It further implies that domestic demand as against external demand plays a pivotal role in growth meaning that the state's economy is not dependent on exports in any major manner. Table 4.1 further shows that share of the total inputs in the total Gross Output is around 52% while GVA as share of the GVO amounts to 47.6%.

Table 4.1: Share of Aggregate Demand Components in Final GSDP (2013-14)

Share of Aggregate Demand Components in Total GSDP and GVO (Rs. Lakhs)			
	Values in Rs. Lakhs	**as % GVA**	**As %GVO**
PFCE	37277473	50%	24%
GFCE	7154303	10%	5%
GFCF	28922238	39%	18%
X-M	749099	1%	0%
IC	84346330		53%
GVA	74103113		47%
GVO	158449443		

Source: Authors' calculations

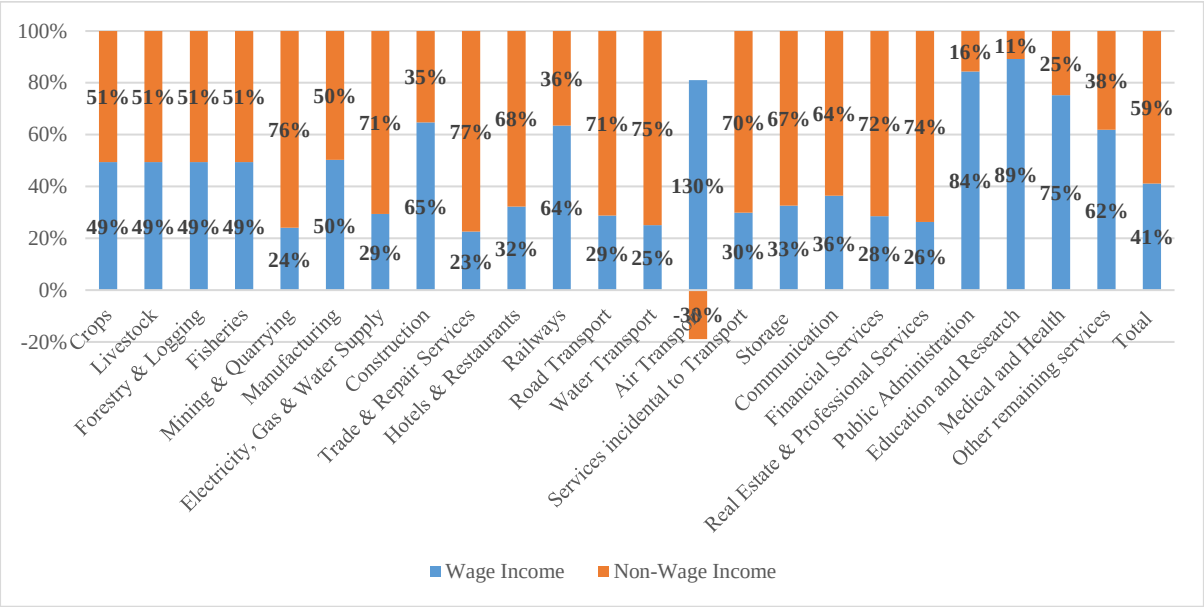
4.2 Decomposition of Gross Value Added

The net social product after replenishing for the inputs from the total outputs gives us the estimate for value addition. Net income or Gross Value Added can also be expressed as a sum of wage and non-wage income, which is one of the three ways to look at GVA apart from the lens of production and expenditure. GVA from Income method includes the sum of all factor incomes earned by all factors across all sectors of the economy. Wage Income involves remuneration to labour services while Non-wage Income includes income that accrues to capitalists and landlords in the form of profits, rent and interest. The classification of income expressed as wage and non-wage income instead of wage and capital income is to account for the self-employment that exists in the state and therefore to capture the mixed income that they accrue.

At a 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. In addition, as expected construction (65%) is relatively more labour intensive than manufacturing sector (50%) within secondary sectors. One can claim that in an aggregate sense, primary and secondary sectors are relatively more labour intensive than tertiary sector, also indicating towards the employment potential of these sectors. However, the components of the tertiary sector show diverse patterns. The 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 4.2).

Figure 4.2: Share of Wage and Non-Wage Income in GSVA

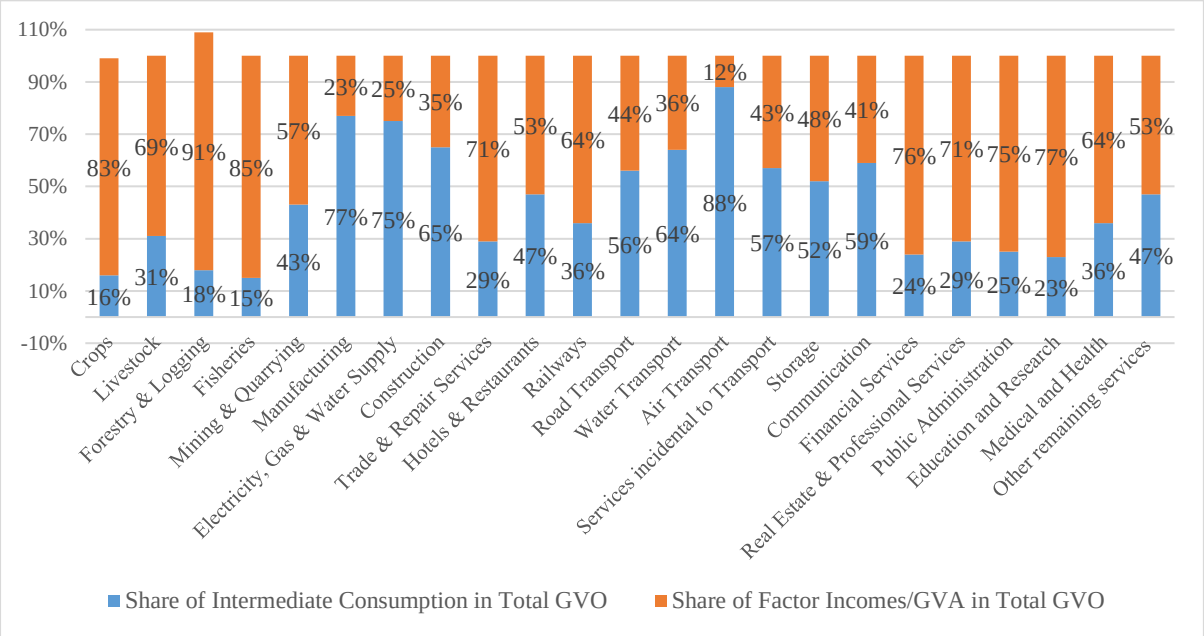


Source: Authors' calculations

4.3 Distribution of Output Disposition and Distribution of Inputs

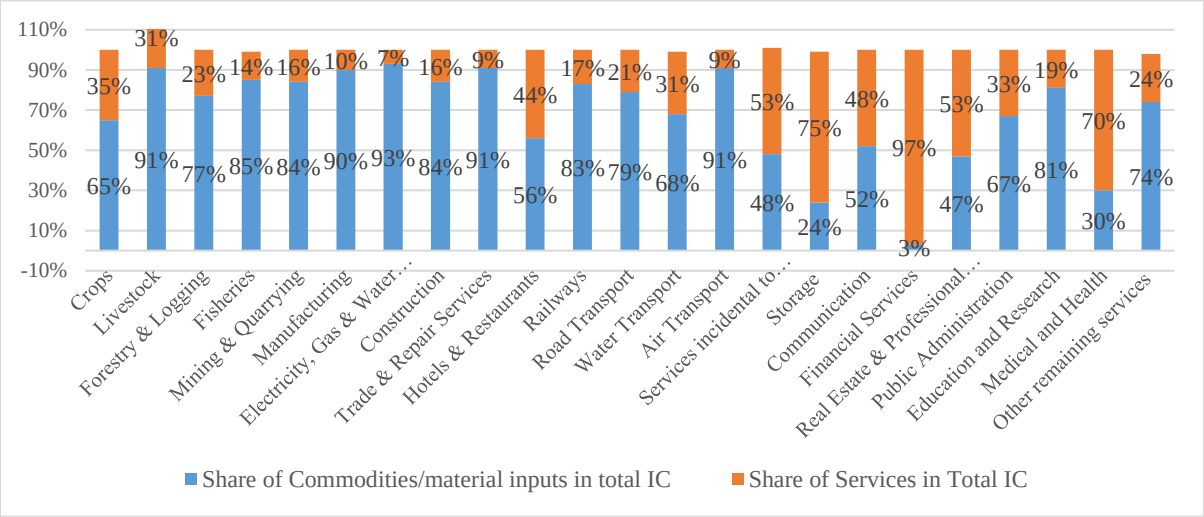
The share of intermediate consumption (IC) in sectoral outputs tells us about value addition made by the respective sectors. Figure 4.3 reflects the percentage distribution of output dispositions by comparing the share of IC in total output with share of GSVA in total output. At an aggregate level for the state, Karnataka's share of IC in total output is 53 percent while that of GVA is 47 percent. At the sectoral level, broadly, primary and tertiary sector shows a greater share of value addition. In particular, sectors with more than 60 percent value addition are Crops, Livestock, Forestry & Logging, Fisheries, Trade & Repair Services, Financial Services, Real Estate, Ownership of Dwellings & Professional Services, Public Administration, Education and Health and Community Services. Sectors with greater share of IC (usage of inputs) are Manufacturing, Mining & Quarrying and Electricity, Gas & Water Supply & Construction. Social Sectors, Education and Health sectors with IC being merely 23% and 36% respectively have one of the highest value additions in the GVO.

Figure 4.3: Distribution of Output Disposition



Source: Authors' calculations

Figure 4.4: Percentage Distribution of Inputs



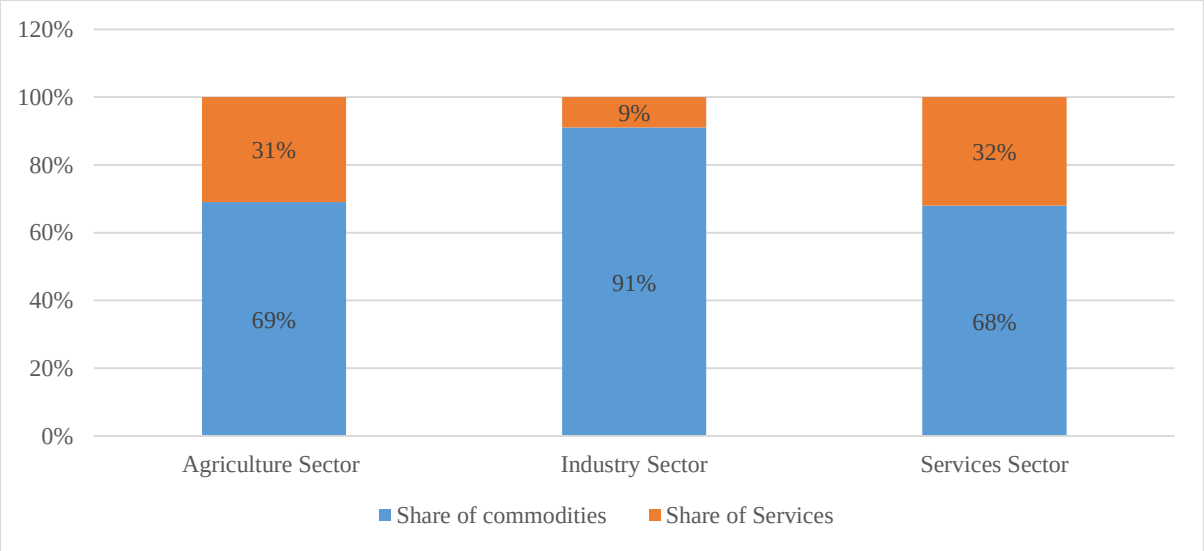
Source: Authors' calculations

Figure 4.4 reflects the distribution of inputs into material inputs/commodities and services in the total inputs used in the production process. This shows that several of the 23 sectors are material inputs driven while this is least true for the financial services sector followed by Storage sector. The share of commodities in total inputs is 81% in Education and while it is only 30% for Health. This analysis is of significance as it tells us that despite the fact that service sector growth has driven the growth at an aggregate level in Karnataka, the intensity of services as inputs is relatively less. A

temporal analysis, however, may give us a better picture about the services sector and its growth in other sectors therefore explaining inter sectoral linkages much better.

Figure 4.5 presents the distribution of inputs for aggregate sectors and it shows that although the share of commodities is high across all aggregate sectors, the share of services in agriculture sector is higher than that in the industry reflecting a possibility of improvement in agricultural production and productivity. This also implies the increasing intermediate use of service sector inputs in other sectors which is partly responsible for the service sector led driven growth.

Figure 4.5: Percentage Distribution of Inputs across major sectors



**Agriculture: Crops, Livestock, Forestry & Logging, Fisheries*
Industry: Mining & Quarrying, Manufacturing, Electricity, Gas & Water Supply, Construction
Services: Trade & Repair Services, Storage, Hotels & Restaurants, Road, Air, Water & Rail Transport, Services incidental to transport, Communications, Financial Services, Education, Health, Public Administration, Other remaining services
Source: Authors' calculations

4.4 PFCE Distribution across Occupational Households

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 NSS[4]. 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

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

in rural areas with the least share being that of casual labourers, reflecting their low-income levels (Table 4.2). This unequal consumption shares across occupational households also imply unequal income distribution.

In Rural sector, the highest share of consumption expenditure among self-employed in both agriculture and non-agriculture perhaps also reflects control over land and capital while the low consumption expenditure share of salaried households in rural areas reflects the low level of salaried jobs. If one digs deeper, it would perhaps also reflect feminised character of so-called salaried jobs in rural areas. The consumption expenditure obviously has a relationship with the presence of high disposable income but certain categories of households such as urban self-employed, rural self-employed in non-agriculture and urban casual labourers consume more than their share in the total disposable income.

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. However, the aggregate figure hides more than it reflects and so one has to emphasize on the consumption pattern across each of the households.

The rural and urban consumption basket differs and therefore requires separate analysis. 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.

However, one cannot actually say anything about the sustainability of consumption expenditure as these can be based on debt and not merely income. It, therefore, doesn't reflect the precarious nature of employment.

Table 4.2: Distribution of PFCE across sectors across household categories

	Household Categories*									
Sectors	**RH1**	**RH2**	**RH3**	**RH4**	**RH5**	**RH6**	**UH1**	**UH2**	**UH3**	**UH4**
Crops	13%	11%	11%	15%	13%	9%	6%	5%	10%	3%
Livestock	6%	7%	7%	9%	6%	4%	4%	3%	5%	2%
Forestry & Logging	2%	2%	1%	3%	2%	1%	0%	0%	1%	0%
Fisheries	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Mining & Quarrying	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Manufacturing	38%	34%	34%	40%	37%	34%	21%	22%	30%	17%
Electricity, Gas & Water Supply	3%	3%	2%	3%	2%	2%	5%	5%	6%	4%
Construction	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Trade & Repair Services	7%	10%	7%	3%	4%	14%	7%	7%	4%	2%
Hotels & Restaurants	4%	4%	6%	6%	7%	13%	2%	5%	4%	9%
Railways	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%
Road Transport	13%	13%	15%	11%	13%	9%	11%	12%	8%	8%
Water Transport	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%
Air Transport	0%	0%	0%	0%	0%	0%	1%	1%	0%	0%
Services incidental to Transport	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Storage	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Communication	2%	2%	2%	2%	2%	1%	2%	2%	1%	2%
Financial Services	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Real Estate & Professional Services	2%	5%	4%	1%	5%	3%	31%	30%	21%	31%
Public Administration	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Education and Research	2%	2%	4%	1%	1%	2%	3%	2%	2%	17%
Medical and Health	5%	4%	2%	3%	3%	5%	1%	2%	2%	2%
Other remaining services	4%	4%	4%	4%	4%	3%	4%	4%	3%	3%
All Sectors	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

**The ten categories of Households include Self Employed in Agriculture (RH1), Self Employed in Non-Agriculture (RH2), Rural Regular Wage/Salary Earning (RH3), Casual Labour in Agriculture (RH4), Casual Labour in Non-Agriculture (RH5), Rural Others (RH6) in Rural Sector while in Urban it includes Urban Self-Employed (UH1), Urban Regular Wage/Salary Earning (UH2), Casual Labour-Urban (UH3) and Urban Others (UH4).*

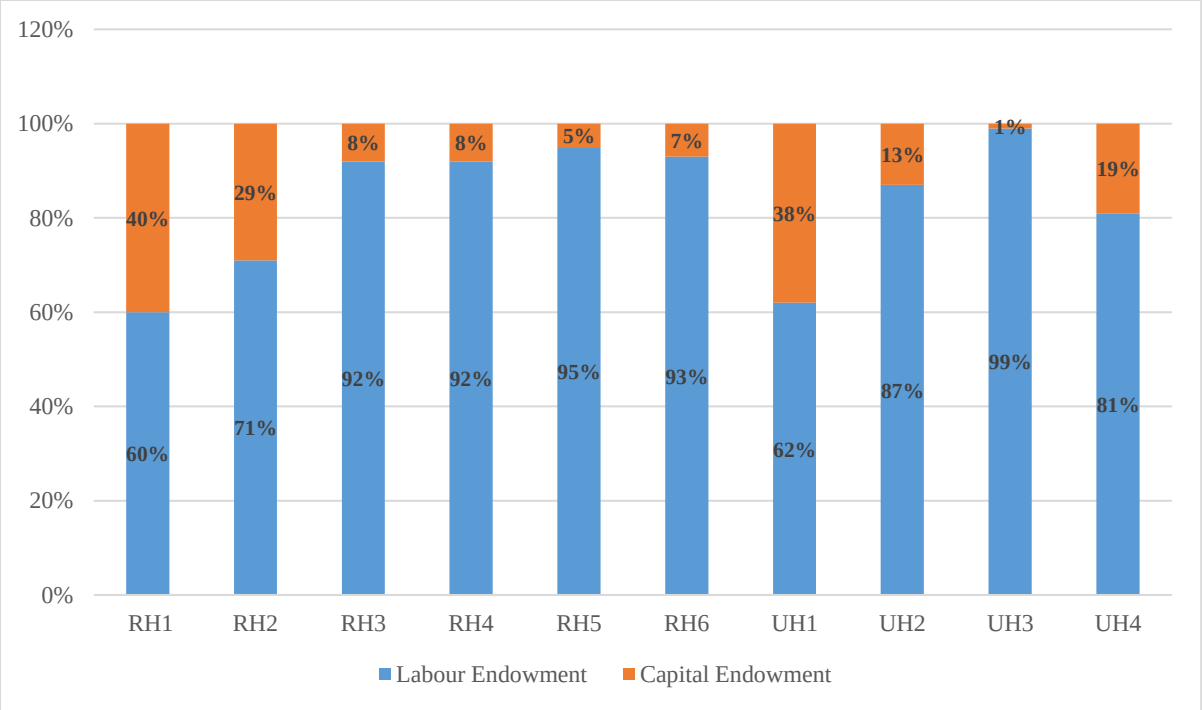
Source: NSS 68th Round on Household Consumption of Various Goods and Services in India, Jul 2011-Jun 2012

4.5 Factor Incomes to Households

This part of the SAM represents incomes that the households received for factor ownership. An interesting pattern is seen across the incomes that these households earn based on ownership of factors though incomes earned through owning labour is greater across all household categories. Those who are self-employed in either agriculture or in urban areas earn the least from owning labour (60% and 62%

respectively). It is not surprising that casual labourers earn the highest share from labour service in both rural and urban areas. Another interesting result is that regular wage or salary earners in rural areas earn more from labour than their counterparts in urban areas while it is reverse for the capital incomes. Ownership of factors show unequal distribution across households, and across rural and urban sectors as well. The urban sector continues to remain employment focused sector with labour ownership being higher here while capital ownership is higher in the rural areas, indicating towards the role of land as capital (Figure 4.6).

Figure 4.6: Distribution of labour and capital endowment across households



Source: Authors' calculations

4.6 Factor Incomes to Private Corporate and Public Sector Enterprises

The incomes that private corporate sector and public enterprise earn is for the ownership of capital that amounts to Rs. 15681721 lakhs in the year 2013-14 of which only Rs. 51901 lakhs (less than one percent) are for the public sector. Private Corporate Sector earns almost cent percent of the operating profit, which clearly signifies the essential characteristic that demarcate it from the public sector. However, there could

also be issues of accounting practices and ownership details that vary between these two, and could contribute in the manner in which profits are accounted for[5].

4.7 Sectoral Investment in Karnataka

Investment is one of the key aggregate demand components with dual nature. It has a huge potential to create incomes through multiplier effects alongside the role of creating productive capacity through accelerator effects. 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. This pattern could partly be due to huge fixed costs and indivisible character of those investments while it could partly be also due to the supply-side linkages (Type 1) they possess. Economic development literature support the observed pattern (Mallick,J, 2009, Nagraj, R 2013). Education and Health takes only one percent each from the total investible resources in the state (Table 4.3).

Table 4.3: Sectoral share of Investment

Sectoral shares of Capital Account (GFCF)	Sector Investment Share
Crops	10%
Livestock	0%
Forestry & Logging	1%
Fishing	0%
Mining & Quarrying	0%
Manufacturing	25%
Electricity, gas & Water Supply	18%
Construction	19%
Trade & Repair Services	1%
Hotels & Restaurants	4%
Railways	0%
Road Transport	8%
Water Transport	0%
Air Transport	0%
Services incidental to Transport	0%
Storage	0%
Communication	1%
Financial Services	1%
Real Estate & Professional Services	7%
Public Administration	1%

[5] Here it is important to be cautious about the fact that land owned by public sector is no way accounted like the way it is with regards to household sector.

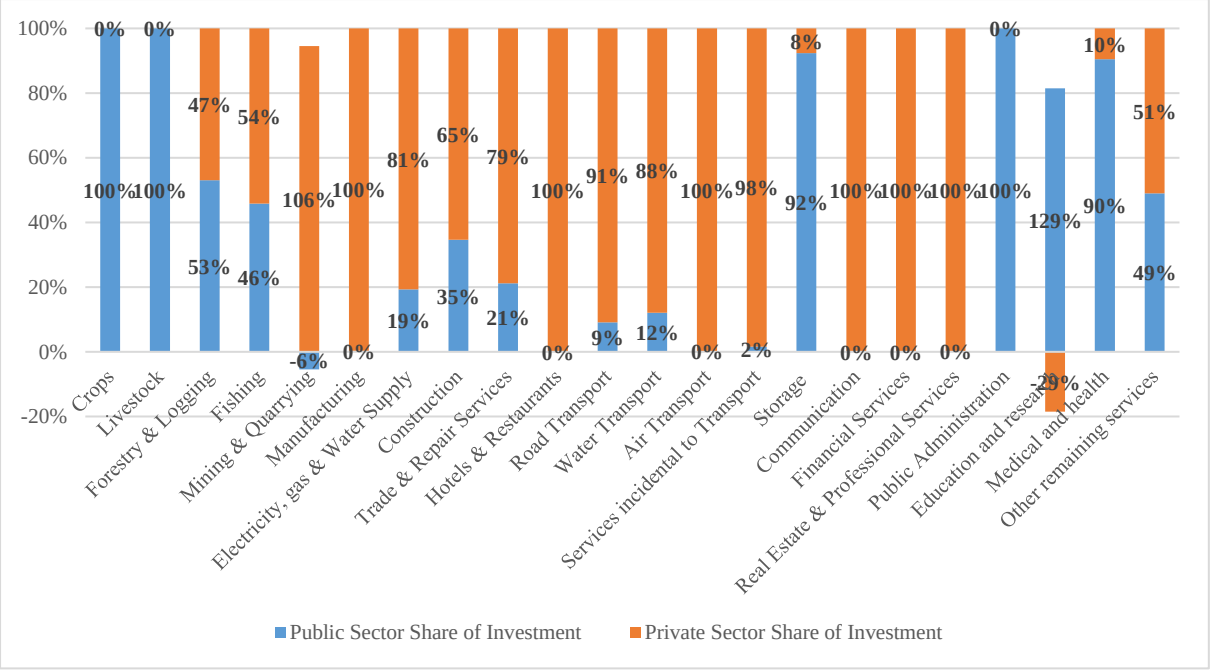
Table 4.4: Sectoral share of Investment

Sectoral shares of Capital Account (GFCF)	Sector Investment Share
Education and research	1%
Medical and health	1%
Other remaining services	1%

Source: based on GFCF calculations

Investment, as discussed above, acts as a stimulus to growth in output and incomes. It is interesting to see the share of autonomous investment (del Y/del I) and induced investment (del I/del Y) creating both multiplier and accelerator effects respectively. The private and public share in total gross fixed capital formation is given in Figure 4.7. At an aggregate level, one can see that there has been disinvestment in the public sector by five percent. At a sectoral level, the public sector investment has been in the manufacturing, electricity, gas & water supply, construction, road transport, financial services and Health sectors. 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[6].

Figure 4.7: Sectoral share of investment between public and private sectors



Source: Authors' calculations

[6] We realised that the current method used to estimate GFCF which shows public investment share in Education and Health is 129% and 90% respectively. But the general understanding / scenario is that there is huge private sector participation in Education and Health. However, the method that we have used relies heavily on CMIE which has a small sample for Education and Heath. Hence, the source could be the reason for a different picture for Karnataka as against what is believed

4.8 Savings

It is observed that the total savings of the state mobilised by various institutions amount to 23263883.7 rupees lakhs. Out of the gross savings, Private Corporate Sector does the highest with 64% followed by foreign savings and then, household savings. Government sector dissaved by 7% in the year 2013-14.

4.9 Direct and Indirect Tax Share

Karnataka is one of the states to have the highest tax raising capacity in the country. The direct taxes in Karnataka amount to 5976980 rupees lakhs while Total indirect taxes amount to 8685138 rupees lakhs with 40% and 60% share respectively. But the government also provides subsidies to incentivise certain production activities. So, the total net indirect taxes (Indirect Taxes - Subsidies) would amount to 5802565 Rupees Lakhs.

4.10 Analyses of Multipliers

4.10.1 Linkages

Theoretically, the linkages assist in sectoral allocation of resources and growth promotion. For a sector, the proportion of the cost of intermediate inputs to total value of output gives the backward linkage coefficient while the proportion of total value of intermediate demand to the total value of output gives forward linkage coefficient.

An increase in the output of a particular sector has two kinds of effects on other two sectors of an economy. First, it results in an increase in demand through increased consumption of inputs by all sectors that supply their output to this sector. Second, an increase in output of a particular sector also implies the availability of additional amounts to other sectors for increasing their own production. These are termed backward and forward linkages respectively. So backward linkage in simple terms means dependence of one sector on others for input supplies. While forward linkage implies boosting up the output demand by increasing the supply of one's sectors output to others further down the value-added chain. The column sum of the coefficient matrix gives us the extent of backward linkage coefficient for that particular sector. In this sense, sector with the highest backward linkage coefficient are Manufacturing, Electricity, Gas & Water Supply, Construction and Road Transport. On the other hand, the row sum of the coefficient matrix gives us the forward production linkage coefficient and sectors with high forward linkage are

Manufacturing, Construction, Real Estate, Ownership of Dwellings & Professional Services and Agriculture (Table 4.4).

Table 4.5: Linkage coefficient across sectors

Sectors	Total Input/Linkage Coefficients (Backward)	Linkage Coefficients (Forward)
Crops	0.16	0.76
Livestock	0.31	0.08
Forestry & Logging	0.18	0.11
Fishing	0.15	0.03
Mining & Quarrying	0.43	0.29
Manufacturing	0.77	3.15
Electricity, gas & Water Supply	0.75	0.67
Construction	0.65	2.02
Trade & Repair Services	0.29	0.38
Hotels & Restaurants	0.47	0.06
Railways	0.36	0.04
Road Transport	0.56	0.51
Water Transport	0.64	0.02
Air Transport	0.88	0.02
Services incidental to Transport	0.57	0.02
Storage	0.52	0.20
Communication	0.59	0.14
Financial Services	0.24	0.62
Real Estate & Professional Services	0.29	0.78
Public Administration	0.25	0.00
Education and research	0.23	0.04
Medical and health	0.36	0.17
Other remaining services	0.47	0.06

Source: Authors' calculations

4.10.2 Own Multipliers

A look at the multiplier matrix of I-O tells us that diagonal elements have highest values compared to non-diagonal elements implying that the direct impact of the change in exogenous demand in felt highly on the sector itself. The non-diagonal elements reflect the direct interdependence between activities. The own multiplier values reflect that manufacturing, electricity, gas & water supply, construction and mining & quarrying has the highest values unlike the non-diagonal elements which reflect direct interdependence. The column sums of the multiplier matrix that gives

us the output multiplier value tells us that Electricity, Gas & Water Supply, Manufacturing, Construction, Road Transport has the highest multiplier value indicating the stronger backward linkages that the sectors possess. This also implies why policies are planned with these heavy sectors as focus areas (Table 4.5).

Table 4.6: Own IOTT and SAM Multipliers

Sectors	Own IOTT Multipliers	Own SAM Multipliers
Crops	1.05	1.33
Livestock	1.06	1.14
Forestry & Logging	1.13	1.13
Fisheries	1.03	1.03
Mining & Quarrying	1.16	0.93
Manufacturing	1.97	3.57
Electricity, Gas & Water Supply	1.26	1.37
Construction	1.26	1.37
Trade & Repair Services	1.02	1.10
Hotels & Restaurants	1.00	1.05
Railways	1.00	1.01
Road Transport	1.04	1.18
Water Transport	1.00	1.00
Air Transport	1.00	1.03
Services incidental to Transport	1.00	1.01
Storage	1.22	1.22
Communication	1.01	1.04
Financial Services	1.30	1.40
Real Estate & Professional Services	1.12	1.46
Public Administration	1.00	1.00
Education and Research	1.03	1.09
Medical and Health	1.20	1.24
Other remaining services	1.01	1.08

Source: Authors' calculations

4.10.3 Output Multiplier SAM and IOTT

A comparison of output multiplier of both SAM and IOTT that capture the backward linkages/supply side effects also reflects some interesting patterns. IOTT, as it represents production structure, shows that output multiplier effects are larger in sectors like Electricity, Manufacturing, Construction and Mining while these are lower for Social Sectors (1.59 for Education and 1.73 for Health). On the other hand, the SAM output multiplier effects show that along with Manufacturing, Construction and Electricity, Education also has one of the highest output multiplier effects. Health sector also shows a better supply side effects with the value of 5.43. It is important to recognise that social sectors also have better supply/backward linkages when the income distribution structure is also considered, which is what happens in the SAM computations (Table 4.6).

Table 4.7: Output Multipliers for IOTT and SAM

Sectors	Output Multiplier SAM	Output Multiplier IOTT
Crops	4.95	1.34
Livestock	4.93	1.70
Forestry & Logging	4.33	1.29
Fisheries	4.50	1.36
Mining & Quarrying	0.45	2.14
Manufacturing	6.73	2.88
Electricity, Gas & Water Supply	6.06	3.05
Construction	6.10	2.72
Trade & Repair Services	4.33	1.80
Hotels & Restaurants	4.75	2.01
Railways	5.38	1.92
Road Transport	5.33	2.43
Water Transport	-0.42	2.67
Air Transport	37.44	3.36
Services incidental to Transport	22.24	2.10
Storage	4.76	2.08
Communication	5.26	2.20
Financial Services	4.01	1.34
Real Estate & Professional Services	4.35	1.67
Public Administration	5.76	1.61
Education and Research	6.31	1.59
Medical and Health	5.43	1.73
Other remaining services	7.43	2.20

Source: Authors' calculations

4.10.4 Household Income Multiplier SAM

The Household Income multiplier values reflected in SAM shows the indirect linkage the sectors have on household income distribution. The comparison across our sectors shows that except for air transport and services incidental to transport, highest income multipliers have been reported from Education, Public Administration, Other remaining services, Health and Agriculture, implying that households have higher average propensities to spend on these sectors. This means that the influence of these sectors on the incomes of the factors of production is greater than other sectors, and an increase in the demand for goods from these sector influences household income in a bigger way compared to, say, manufacturing sector. SAM provides us with comprehensive income multiplier and these allow us to examine the effects of exogenous injections on the distribution of income across households (Table 4.7).

Table 4.8: Household Income Multipliers

Sector	HH Income Multiplier
Crops	1.64
Livestock	1.48
Forestry & Logging	1.42
Fisheries	1.44
Mining & Quarrying	-0.17
Manufacturing	1.52
Electricity, Gas & Water Supply	1.31
Construction	1.49
Trade & Repair Services	1.12
Hotels & Restaurants	1.25
Railways	1.58
Road Transport	1.26
Water Transport	-0.39
Air Transport	9.67
Services incidental to Transport	6.92
Storage	1.22
Communication	1.36
Financial Services	1.23
Real Estate & Professional Services	1.20
Public Administration	1.88
Education and Research	2.14
Medical and Health	1.70
Other remaining services	2.12

Source: Authors' calculations

4.10.5 Primary Input multipliers

Primary Input Multipliers reveal that an exogenous increase in demand have highest influence for sectors that include public administration, Education, personal and community services, crops and health. For the remaining sectors, there is not much variation (Table 4.8).

Table 4.9: Primary Input Multipliers

Sectors	Primary Input Multipliers
Crops	2.69
Livestock	2.44
Forestry & Logging	2.33
Fisheries	2.35
Mining & Quarrying	-0.30
Manufacturing	2.51
Electricity, Gas & Water Supply	2.22
Construction	2.40
Trade & Repair Services	2.05
Hotels & Restaurants	2.18
Railways	2.48
Road Transport	2.19
Water Transport	-0.68
Air Transport	15.20
Services incidental to Transport	11.98
Storage	2.15
Communication	2.32
Financial Services	2.25
Real Estate & Professional Services	2.17
Public Administration	2.79
Education and Research	3.11
Medical and Health	2.58
Other remaining services	3.40

Source: Authors' calculations

4.10.6 HH Income Multiplier across Households

The income multipliers among households turn out to be the highest for the self-employed in both agriculture and non-agriculture in rural areas, and also in urban areas, with the lowest multiplier value being for casual income households. This implies that growth effects are not reaching these households and therefore they

require special government intervention as market forces are not able to trickle down its effect on these groups (Table 4.9).

Table 4.10: Income Multipliers by Household Groups

HH Categories	HH Income Multiplier
RH1	9.07
RH2	2.29
RH3	1.94
RH4	3.19
RH5	1.21
RH6	0.11
UH1	9.92
UH2	14.15
UH3	1.4
UH4	1.09

Source: Authors' calculations

4.10.7 Full Income Multipliers

A submatrix in SAM reflects the Full Income Multipliers for Households where the diagonal elements of the matrix show the combination of direct and indirect effects of an exogenous increase in the income of an institution working through the other accounts of SAM back to its source. The comparison of diagonal elements reflects that regular salaried and self-employed in urban areas, and self-employed in agriculture in rural areas benefit the most from an exogenous increase in the income of any household group. It shows the contrast between rural and urban sectors where rural sector except for those self-employed in agriculture, and therefore landed, is devoid of any redistribution effects. The beneficial impact due to the increase in the income of other household groups is clearly small (Table 4.10).

Table 4.11: Full Income Multipliers by HH Groups

Full Income Multipliers										
HH Categories	**RH1**	**RH2**	**RH3**	**RH4**	**RH5**	**RH6**	**UH1**	**UH2**	**UH3**	**UH4**
RH1	1.23	0.34	0.25	0.31	0.29	0.54	0.28	0.22	0.32	0.30
RH2	0.06	1.09	0.06	0.08	0.07	0.14	0.07	0.06	0.08	0.08
RH3	0.05	0.07	1.05	0.06	0.06	0.11	0.06	0.05	0.07	0.06
RH4	0.08	0.12	0.09	1.11	0.10	0.18	0.09	0.08	0.11	0.10
RH5	0.03	0.04	0.03	0.04	1.04	0.07	0.04	0.03	0.04	0.04
RH6	0.00	0.00	0.00	0.00	0.00	1.01	0.00	0.00	0.00	0.00
UH1	0.26	0.37	0.27	0.33	0.31	0.59	1.30	0.24	0.35	0.33
UH2	0.36	0.52	0.38	0.47	0.44	0.82	0.42	1.34	0.49	0.46
UH3	0.04	0.05	0.04	0.05	0.04	0.08	0.04	0.03	1.05	0.05
UH4	0.03	0.04	0.03	0.04	0.03	0.06	0.03	0.03	0.04	1.04

Source: Authors' calculations

4.10.8 Comparison of SAM and IOTT Multipliers

Estimating output and forward multipliers should be normalised as it helps us identify the key sectors with varied potential for the economy. The normalisation was done by taking the value of sector's own multiplier value divided by the sum of multipliers for all the sectors, and then normalised by 23, the number of sectors under our purview. Further, a comparison of normalised forward and backward multiplier helps us arrive at the key sectors and their potentials. There are four categories these sectors and their 'key-ness' can be classified as follows;

Category 1: Sectors that have high forward and backward linkage effects influence both the sector they get and take input. The sectors where both effects are high are called the key sector or locomotive sector

Category 2: Sectors that have high backward but low forward linkage effects are the sectors effective in the evaluation of natural resources of the country.

Category 3: Sectors that have high forward but low backward linkage effects are the sectors producing intermediate goods and they increase the production of sectors demanding these goods.

Category 4: Sectors that have low backward and forward linkage effects do not influence the other sectors directly, but help to increase the country's income by creating added value

Table 4.12: 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	1.10	2.99	Forward
Livestock	1.9	6.2	0.6	1.20	2.06	Income Creation
Forestry & Logging	1.3	5.7	0.5	1.14	1.78	Income Creation
Fishing	1.4	5.4	0.5	1.19	2.18	Income Creation
Mining & Quarrying	2.2	4.9	1.7	1.27	1.85	Key
Manufacturing	2.9	6.3	6.0	0.73	2.04	Key
Electricity, gas & Water Supply	3.1	6.3	1.0	0.76	1.98	Key
Construction	2.8	6.9	2.0	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	1.90	Income Creation
Railways	1.9	6.6	0.5	1.25	2.31	Income Creation
Road Transport	2.5	5.4	0.7	1.09	2.53	Backward
Water Transport	2.7	5.6	0.5	0.99	1.00	Backward
Air Transport	3.5	8.2	0.5	0.44	4.36	Backward
Services incidental to Transport	2.1	5.1	0.5	0.92	4.49	Income Creation
Storage	2.1	4.9	0.6	1.02	3.80	Income Creation
Communication	2.3	5.5	0.5	0.94	3.97	Backward
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

These normalised multipliers[7] give us interesting results. 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

[7] Rasmussen index procedure was followed to identify the key sectors. If both normal output (NOM) and normalised forward multiplier (NFM) are greater than one, then its considered to be a key sector; if NOM <1, NFM >1, then forward, if NOM>1, NFM <1 then Backward and if both NOM and NFM are less than then it means they help in income creation.

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 (Table 4.11).

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 are key to understand the rationale behind the need to undertake public investment in social sector.

4.11 Policy Conclusions and Recommendations

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 are 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 where a new form of development, known popularly as 'fiscalised development', designed largely to 'modernise' the state's finances through non-state financing and develop channels to do so was implemented. The World Bank's Reformed Model of Development 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 do not get classified as wasteful expenditure unlike when the same is spent on social sectors; these are incentives and similar expenditure need to be viewed as incentives and investment elsewhere as well. This is especially important if the state is committed to SDGs and CRC.

In view of the above, we here have two main policy suggestions:

1. **Viewing health and education as public investment sectors**

One of our recent studies on public expenditure on children in 16 states in India clearly revealed a very high positive correlation between high level of public spending on education, health, nutrition and protection and the development indicators for the same establishing the need for public system led expansion of these sectors. States like Gujarat despite high GSDP and capacity to spend have not been able to achieve a high progress in child development and empowerment indicators as they have failed to invest sufficiently in public education and health whereas states like Odisha have achieved a turnaround though its high public spending and wise choice of policies (Jha et al, 2019). Therefore, to reiterate, 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.

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

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 like sectoral composition of growth, demand patterns etc., matters in reducing at least income based deprivation. Our study also shows the supply side effects in the industry sector has on other sectors of the economy. The 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 in the economy of the state.

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Annexures

Annexure 1: The Accounts of Social Accounting Matrix (SAM)

1. Production activities: The production account in SAM is represented by Input Output Table that captures the origin (producing sectors) and the destination of those commodities used as inputs in consuming sectors. The rows of the matrix in this account records payments at market prices for economic activity of producing goods and services, i.e., the row accounts show how commodities are distributed between intermediate input demand and final demand. The column of the production accounts records expenditure on purchase of raw materials for producing output, expenses made on taxes imposed on intermediate purchases (indirect taxes) and expenses on imports. The row total amounts to Aggregate Demand while the column total records Aggregate Supply which is made up of both domestically produced goods and imports.

2. Factors of production: The factors primarily refer to labour and capital in this case who earn incomes from employment in domestic production activities. The row in the factor accounts records receipts for the factor services that make up the total value added and the income factors receive from rest of the world. The column in the factor accounts refers to expenditure made as payments by household account, private corporate sector, public corporations and government for labour and capital services (both domestic and foreign). Here one can disaggregate labour and capital accounts into segmentation as it has structural consequences.

3. Institutions: The economic agents (institutions) include households, private corporate sector, public corporations, and government. The accounts of these institutions in the row represent the income while on the column side there is expenditure incurred by those economic agents.

3.1 Households: The row in Households account records income received by households from their endowments, government transfers, and external world. The column in the Households account on the other hand captures households' expenditure for the purpose of consumption, income tax paid to government and indirect taxes paid on purchases and finally savings made of the income. This account can be used further for disaggregation to show income distribution, and therefore to show the within-group characteristics of poverty and inequality.

3.2 Private Corporate Sector: The other institution is Private Corporate Sector whose row account records receipts to their services in the form of operating profits for factor

services, and interest paid by government. The column of Private Corporate sector account records expenditure made by the sector towards payment of corporate taxes and resources allocated for savings. The row total of this institution captures Income of Private Corporations while the column total captures the usage of this income.

3.3 Public Sector Corporations: The row account records the income in the form of operating surplus while the column account captures the public sector savings.

3.4 Government: The row records receipts from various sources like Households, factors, Private Corporate Sector, Public Sector in the form of taxes while the column account records the expenditure incurred by the government towards consumption, interest payments, transfers, and savings. The row total captures the total government earnings while the column total presents the aggregate government expenditure.

4. Net Indirect taxes: This column captures the indirect tax structure and subsidies given to sectors.

5. Capital Account: This account represents the aggregate capital account of all institutions in the economy. It defines the savings and investment or accumulation account of the economy. The row of capital account captures the receipts in the form of savings mobilised by Households, Public Sector, Private Corporate Sector, Government and savings done by the external sector. The column records the allocation of resources for capital formation or investment across sectors and taxes on investment goods.

6. Rest of the World (ROW): The row account of ROW records income receipts by ROW done towards imports in the form of foreign exchange payments while the column of ROW captures expenditure incurred by the external sector towards exports, current and capital transfers, taxes on exports and foreign savings that totals foreign exchange receipts.

Annexure 2: Estimation of Input Structures

	Sector	Data sources and Process
1	Electricity, Construction, Road Transport, Medical and Health, Air Transport, Communication Financial Services, Hotels and Restaurants, Mining, Railways, Real Estate, Ownership of Dwellings & Professional Services, Services incidental to Transport, Storage, Trade and Repair Services	The Centre for Monitoring of Indian Economy (CMIE) Prowess IQ database that collects data of all kinds of accounts from private companies and public sector companies, including the balance sheets, profit and loss accounts, capital works in progress accounts, other financial statements, share prices and capital history etc. From this database, we picked out companies which belong to Karnataka (identifying the companies headquartered in Karnataka) as it is impossible to specifically calculate the financials only based on operations in a particular region. We went with the assumption that these companies, if they had operations in other states, would be offset (counterbalanced) by the information lost from other companies which had headquarters outside Karnataka, but had operations here. The next step was to aggregate the companies into the 23 sectors, based on the major operation of the company under consideration. CMIE Prowess, in its database, has already classified companies according to the industry. And therefore, it was easier for us to align these industries as per our 23 SDP sectors. On the whole, we had about 2216 companies registered in Karnataka that have been classified into the 23 sectors. Note here that we have also included the Public Sector Corporations for the computation of input structures. The next step was to look at the profit and loss account of these companies in combination with the capital works in progress and fixed assets statement in order to obtain the expenditure structure of these companies. These expenditure structures are what we call as the input structures for these companies aggregated at the sector level. Table A2.1 below shows which of the I-O sectors were matched with the CMIE sectors.
2	Medical and Health	To derive the input structure for Health, data from both the private and public sectors were used. For the public sector, we used annual accounts of four major public hospitals and examined their Expenditure statements. For the private sector, we used the accounts of private companies engaged in provision of health services which was taken from the CMIE data. The data was weighted according to their representation in the total spending in the entire state and the input structure was arrived at.
3	Crops	The input structure for crops is obtained from the DES, Government of Karnataka. States maintain data on agriculture and allied activities as it is a state subject. They collect data on prices and quantities for various input items like seed, organic manure, fertilisers, repairs and maintenance, irrigation charges, market charges etc. These are then assigned to the different sectors and the input structure is derived.
4	Manufacturing	The Manufacturing sector in India is made up of the organised sector and the unorganised sector with high inter-linkages between the two of them. The data for the organised sector was taken from the Annual Survey of

	Sector	Data sources and Process
		Industries (ASI) 2013-14 for Karnataka. This contains detailed item-wise data on inputs based on 2011 Revised National Product Classification for Manufacturing Sector (NPC-MS) and National Product Classification for Services Sector (NPC-SS) codes which helped us derive the input structure for the organised sector. This input structure is assumed as the input structure for the entire manufacturing sector for Karnataka including the unorganised sector, for which there does not exist any single source for this data.[#]
5	Education and Research	To derive the input structure for Education, we went with the assumption that the State is the largest provider of education at various levels. These levels under consideration include primary and secondary education, higher education (Universities), and Medical Education.*
6	Primary and Secondary Education	We have used multiple sources including the annual reports of Samagra Shikshana Abhiyan (Sarva Shikshana Abhiyan (SSA), Rashtriya Madhyamik Shikshana Abhiyan (RMSA), Kasturba Gandhi Balika Vidyalaya (KGBV)), and Commissionerate of Public Instruction. The Expenditure Statements and their respective schedules (and Payments Statements in-case detailed break up of Expenditure was not available) were used to arrive at the input structure for Primary and Secondary Education.*
7	Higher Education (Universities) and Medical Education	Annual accounts of Public Universities in Karnataka based on the list provided by the Department of Higher Education, Government of Karnataka were obtained through Right to Information Act, 2005 (RTI). The Expenditure statements of two large Universities were used to derive the input structure. For Medical Education, the Expenditure Statement obtained from the Directorate of Medical Education was used.*
8	Forestry	We used expenditure statements from public sector corporations, namely Karnataka Forest Development Corporation Limited and Karnataka State Forest Industries Corporation Limited to arrive at the sectoral distribution of inputs.
9	Livestock, Fisheries, Water Transport, Public Administration and Other remaining services	We obtain the coefficient matrix from the India I-O table published by the NCAER in 2013-14 and apply the same structure to Karnataka. Of course, this was calculated with the assumption that inter-sectoral linkages for India or the input structure for a particular sector in India is similar to the input structures for Karnataka. For example, the intermediate consumption for a particular sector*sector combination can be computed as follows: Intermediate Consumption (Crops / Crops) = (X_{11} / GVO crops) * GVO of Crops for KA Intermediate Consumption (Crops / Mining) = (X_{12} / GVO mining) * GVO of Mining for KA where, Sector 1 = Crops, Sector 2 = Mining

	Sector	Data sources and Process
		Here, based on the input coefficients that we have obtained, it is multiplied with the GVO in that particular sector in the state, to obtain the value of intermediate consumption/use.

* *The accounts of Primary and Secondary Education, Higher Education, Medical Education were weighted in proportions of the state's outlay for these levels to arrive at the final input structure for the education sector.*
 # Although the NSS 67th Round held in July 2010 - June 2011 on Unincorporated Non-Agricultural Enterprises exists, it doesn't include any detailed data on inputs, and hence, it was not possible to work out the input structure for unorganised manufacturing sector.

Table A2.1: Concordance between I-O sectors and CMIE sectors

I-O Sectors	CMIE Sectors
Crops	
Livestock	
Forestry & Logging	
Fisheries	
Mining & Quarrying	Mining
Manufacturing	Manufacturing
Electricity, Gas & Water Supply	Electricity
Construction	Construction
Trade & Repair Services	Trade (Wholesale and Retail)
Hotels & Restaurants	Hotels and Restaurants
Railways	Railway Transport
Road Transport	Road Transport, Taxi Services
Water Transport	
Air Transport	Air Transport
Services incidental to Transport	Services and Logistics
Storage	Storage and Distribution
Communication	Communication
Financial Services	Financial Services
Real Estate, Ownership of Dwellings & Professional Services	Real Estate, Information Technology, Business Consultancy, Recreational and Professional Services
Public Administration	
Education and Research	Education
Medical and Health	Health
Other remaining services including social and personal and community services	Other Recreation and Miscellaneous Services

Annexure 3: Computation of Final Demand Components

Gross Value Added (GVA):

This component of the I-O table represents the total final demand in the economy. It is equivalent to Gross State Domestic Product which explains the aggregate value of all final goods and services produced in the year at market prices. This is the exogenous component of the table. The GVA figures are obtained easily by Department of Economics & Statistics for each of the 23 sectors. The data was provided to us at both basic and market prices but we have used the data available at basic prices as the entire I-O table is computed at basic prices. The components of the GVA include Private Final Consumption Expenditure (PFCE), Government Final Consumption Expenditure (GFCE), Gross Fixed Capital Formation (GFCF), Net Exports (Exports – Imports).

The individual components of the GVA were computed by exploring multiple data sources. The main data sources used for the computation of final demand components are given below:

Sources	Description
NSS 68th Round on Household Consumption of Various Goods and Services in India	This survey was conducted during the period July 2011 – June 2012 to capture the expenditure incurred by a household for private domestic consumption for different reference periods (7 day, 30 day or 365 day period).
Annual Survey of Industries (ASI):	The ASI gives us the industrial statistics for India for the registered manufacturing sector. This survey is conducted by the Central Statistics Office (CSO) and provides disaggregated data on costs, investment, production, employment etc., by each of the manufacturing sectors. This data was used to derive the value of inputs and the input structure for the manufacturing sector. This is for the organised sector only.
Karnataka State Budgets	We referred to the Budget of 2015 which contains actuals for financial year 2013-14. This captures the detailed capital and revenue expenditure undertaken across all Administrative Departments and Departmental Commercial Undertakings (DCUs).
Local Budgets	Although the State Budgets contains data on the transfers to the Rural Local Bodies and Urban Local Bodies, it does not capture the own sources of revenue and the detailed expenditure across different functions by these bodies. Hence, a detailed analysis of the local accounts is required to understand the different categories of expenditure incurred. We procured the Consolidated Annual Audited Accounts from the State Audit and Accounts Department (SAAD) for the year 2013-14 for all the Gram Panchayats (GP). For the Taluk Panchayat (TP) and Zilla Panchayats (ZP),

Sources	Description
	due to difficulty in accessing of data, State Budgets were used. It is important to note that unlike GPs, these two tiers do not have any major sources of own revenue. For the Urban Local Bodies, detailed accounts were obtained from the Karnataka Municipal Data Society. In addition, accounts of the Bruhat Bengaluru Mahanagara Palike (BBMP) were added to the above to get the overall picture of ULBs in the State
Public Sector Corporations	These are autonomous bodies under the State that function independently by generating their own sources of revenue with additional grants from the State Government. Based on the list of Public Sector Undertakings provided by the Department of Public Enterprises, Government of Karnataka, we obtained the Annual Accounts of these Corporations. Some of these accounts were obtained through RTI. To account for the data from these Corporations, the Expenditure Statements, Fixed Assets Statements and Balance Sheet were examined thoroughly to compute GFCE and GFCF
Public Universities and Public Hospitals	These are also autonomous bodies which generate own sources of revenue and also receive grants from the State Government. Hence, where possible, Annual Accounts of these Public Bodies were used to calculate the Consumption Expenditure (CE) and Capital Formation (CF). Those institutions for which we had procured Annual Reports, respective outlay in the State Budget were removed to avoid double counting (*List of Hospitals and Universities is provided in Annexure 8)*
Karnataka Value Added Tax Ready Reckoner	This database provides detail item wise tax rates for each of the commodities in Karnataka for the year 2013-14. This data was used in the estimation of indirect taxes.

Using the above data sources, each of the components of the gross value added is calculated based on the methodology followed below.

Private Final Consumption Expenditure (PFCE)

PFCE represents expenditure on new durable and non-durable goods and on services done by households and non-profit institutions serving households like temples etc. This consumption expenditure also includes imputed gross rent of owner-occupied dwellings, consumption of own account production. It can be visualised as the total 'out of pocket' expenditure of the entire population residing in a particular country during the year.

PFCE data is aggregated and available in the public domain at the national level. Even at the National level, this data is estimated and aggregated using the Consumer Expenditure surveys conducted by the NSSO. Hence, for the purpose of our study, we would be using the data from the NSS 68th Round on Household Consumption of Various Goods and Services in India, which was conducted in the period July 2011 –

June 2012 to capture the expenditure incurred by households on domestic consumption items for different reference periods (7 day, 30 day or 365 day period). The survey captures detailed item wise expenditure for about 450 items, which comprises food items, fuel and light, clothing and footwear, and remaining items pertaining to education, medical, durable goods, services and other miscellaneous items.

Steps:

There are about approximately 448 items as per the Schedule Type 2. Depending on the item type (Item_Code), the data on the amount spent is given, for different reference periods such as 7 days, 30 days and 365 days respectively. In order to estimate the PFCE for the entire year, we have to annualise these spent amounts by multiplying it with factors like 12 - in case on monthly spending, 365/7 in case of data on 7 day spend amount. Some data is already available as annualised figures.

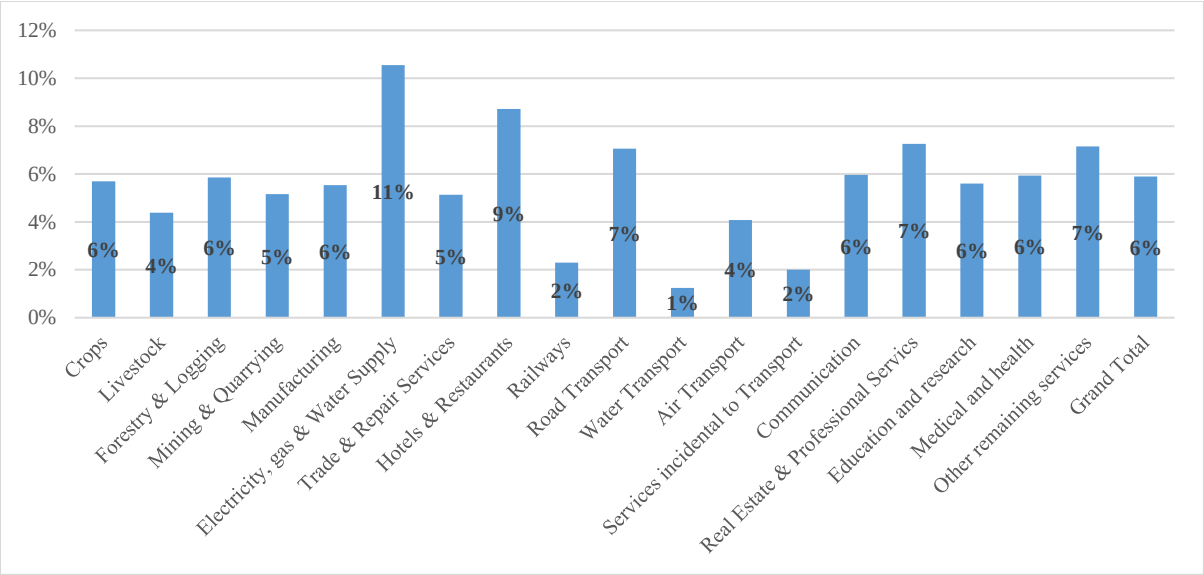
The next step is to classify each item type into the sector of origin. Here, the concept of sector of origin came about since we are looking at the sector from which the product is coming/produced that the household is consuming. Hence, for example, books are a product of manufacturing by the manufacturing sector, and that is the most appropriate sector among the 23 sectors for which we are building the I-O table and subsequently SAM. Hence, books will be classified as part of manufacturing sector and not as part of Education sector as Books are inputs to Education sector that comes from manufacturing (the origin sector). Using the same reasoning, we classify the remaining 448 items.

It is to be noted that for some of the items, we had the data both on the first hand purchase value as well as the second hand purchase value and cost of repairs and raw materials. These items were mostly classified into the 'Trade & Repair Services' sector and the 'Real Estate, Ownership of Dwellings & Professional Services' sector and the industry of origin concept was applied here although we were cognizant that the amount spent on raw materials would be in the 'sector of origin'. This was done as we looked at this more from a service point of view as the item was already purchased and its value captured, either in the past or the same year and it was now being 'serviced' by a different sector.

After the previous steps of classification of items, we estimate the total amount spent in each sector both in Karnataka and India. Hence, we have the total amount spent in the 23 sectors. We then get the ratio of the amount spent in Karnataka to India in each

of the 23 sectors (Figure A3.1). Once this proportion is obtained, we apply them to PFCE for India given by the I-O table 2013-14 constructed by NCAER and hence compute the PFCE for each sector for Karnataka.

Figure A3.1: Percentage of Household Consumption Expenditure in Karnataka wrt. India



Source: NSS 68th Round on Household Consumption of Various Goods and Services in India, Jul 2011-Jun2012

Government Final Consumption Expenditure (GFCE):

The government final consumption expenditure is equivalent to the current expenditure on compensation of employees, purchase of non-durable goods and services net of sales and the consumption of fixed capital. These expenditures are the ones incurred by various administrative departments of the government including ministries and departments of the state government, autonomous bodies under the state government, rural and urban local authorities engaged in administration, public sector corporations, and all other such offices of the state government involved in administration.

Karnataka publishes the Economic cum Purpose Classification of Karnataka State Budget Report, 2011-12 to 2018-19 (ECP). This report publishes the GFCE data for the state of Karnataka of the General Government (Administrative Departments). However, this has some limitations. This data does not include the data for the Public Sector Corporations. It also captures the transfers to the Local Bodies as pure transfers without classifying them as Consumption Expenditure or Capital Expenditure. Hence, a detailed analysis of the three data sources including General Government Budget, Local Budgets / Local Accounts and Public Sector Corporations was explored in detail to obtain the GFCE for Karnataka.

Public Accounts:

Public Accounts are simply all accounts of all the institutions belonging to the public sector including the State Government departments, Local Governments (Panchayat Raj Institutions PRIs), Public Sector Corporations, Public Universities, Public Hospitals and other such public institutions. In order to compute the Government Final Consumption Expenditure (GFCE) and Gross Fixed Capital Formation (this includes capital formation for the entire state, including public and private sector) we needed to go into the in-depth analyses of each category of the above-mentioned accounts.

State Government Budgets:

Among all the government accounts, State Government Budgets form a very important source of information on many aspects of government policy making. Budget reflects the health of the overall economy of a state. As discussed earlier, there are many other accounts apart from government budgets which reflect the state of public finances, for example, the local government budgets, accounts of public sector corporations, accounts of public universities and hospitals which, apart from receiving grants from the state budget, also generate their own sources of revenue.

Here, we will discuss the process involved in the detailed analyses of the State Government Budgets. The Budget data we have is a combination of the following variables: Demand Number, Department Code, Major Head, Sub Major Head, Minor Head, Group Head, Sub Head, Scheme Code, Description, and Object Head. Each of these heads capture some information on the demand for grants, like, major head captures the department from which the grant is originating, also capturing if the demand is for revenue expenditure or a capital expenditure. The minor head represents the specific sub department/or function that the demand for grant is. The scheme code is a 12-digit code which, as a combination indicates specifically what kind of grant is being demanded. The object head is a 3 digit number which classifies the expenditure into the purpose/objective of spending for the particular scheme, like, office stationery, salary etc.

Each year, the budget also gives us the Budgeted Estimates (BE) of that year, the Actuals from two years prior to the budgeted year, and the revised estimates of the previous year. We took the data for the actuals spent in the financial year 2013-14 from the budget of the year 2015 (which gives the BE for the year 2015-16). The next task

was to classify each of the 7000 entries of scheme codes into multiple levels of classification. They are as follows:

Type of Expenditure (Revenue / Capital): This classification was mainly done to identify all expenditures, as either some kind of consumption expenditure or capital expenditure. The various categories into which a revenue and capital expenditure can be classified included transfers, subsidies, purchase of goods and services, maintenance, advances, pension, interest payments, construction of road, buildings etc. Once the expenditure was classified into various such heads, they are further clubbed in broad categories (purpose of expenditure). Some inputs were obtained from DES in instances where the description of the expenditure item was vague.

Type of Institution: The type of Institution is important to classify the State Government Departments from the other public sector institutions like Public Sector Corporations, Public Universities, Public Hospitals, Local Governments and any other Autonomous Institutions for which we analysed the accounts separately to take care of double counting. We basically retained only those expenditures done by the state government department after which each of the expenditures items to the respective sectors on the concept of 'sector of origin'.

Given below in table A3.1 is the different heads each that of the expenditures were classified into and the amount of actual expenditure in the particular year for that head based on the scheme codes. As can be seen, there are about approximately 7000 such combinations. As discussed earlier, in many cases, in spite of applying the above rules for classification, it was difficult to identify the category that the scheme code combination should belong to.

Table A3.1: Classification of budget expenditure items into different heads

Type of Expenditure for purpose of I-O Table	Description	Amount of Actual spent in 2013-14 in Rs. Lakhs	Number of Scheme Code combinations
Salary and Pension Payments	Allowances	93488	420
	Benefits, Other (Cash)	517222	3
	Benefits, Others (Cash) – 2071	19	2
	Benefits, Social (Cash)	13336	737
	Pension Payments	399020	80
	Salary	710112	1223
	Salary/Allowance	1847	18
Purchase of Goods and Services		1020506	2451
Maintenance	Maintenance, Other Construction	26370	61
	Maintenance, Buildings	52049	21
	Maintenance, Road	80748	10
Capital Formation	Outlay, Buildings	116016	82
	Outlay, Machinery	8106	103
	Outlay, Other Capital	766383	335
	Outlay, Road	365892	31
Purchase of Assets	Purchase, Financial Assets	164564	40
	Purchase, Land	758	2
Subsidies	Subsidies	118660	18
Transfers, Local Authorities	Capital Transfers, Local Authorities	31500	3
	Transfers, Local authorities	632559	668
Transfers to Autonomous Bodies, Transfers to Individuals	Capital Transfers, Autonomous bodies	7500	1
	Capital Transfers, Individuals	65829	12
	Transfers, Autonomous bodies	478435	224
	Transfers, Individuals	1528477	213
Transfers to Hospitals / Universities		66579	24
Public Sector Corporations		814735	88
Loans and Advances	Advances, Local Bodies	62530	2
	Advances, Non-Government Organisations	235057	40
Receipts to Funds	Receipts to Funds	-130020	128
Net Interest	Commercial Interest	59	6
	Interest Payments	765532	61
DCU, Change in Stock	DCU, Change in Stock	-17	9
Grand Total		9013852	7116

Source: Analyses of Karnataka State Budgets – 2015

Once the detailed classifications were obtained, there were classified as GFCE or GFCF based on its type. Based on discussions with DES and based on the ECP report norms (which follows norms advised by CSO), the following were considered as GFCE and GFCF respectively.

GFCE = Salary and Pension Payments + Purchase of Goods and Services (after deducting for receipts)

Gross Fixed Capital Formation = Capital Formation + Maintenance Expenditure

Here, maintenance of buildings, other construction work and roads is considered in capital formation as this involves some sort of 'creation of assets'.

Local Government Accounts (Rural Local Bodies and Urban Local Bodies):

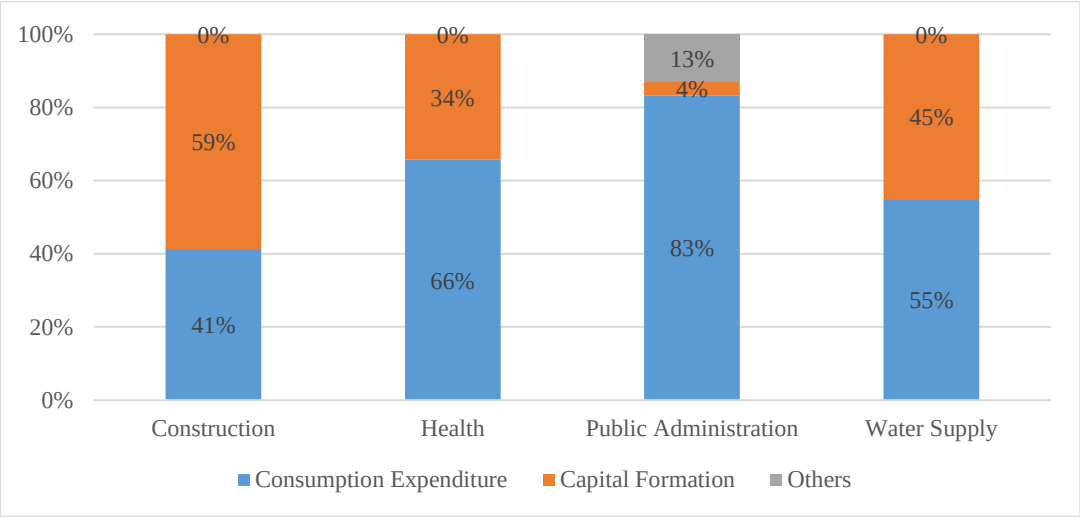
Karnataka has been one of the pioneer states in this respect with steps taken for decentralisation setting up a three-tier system in 1987. We have now successfully established the three-tier system of governance both in the rural local bodies (RLBs) and the urban local bodies (ULBs). Both the RLBs and ULBs have some autonomy in term of finances. Their sources of revenue include grants received from the state and central governments based on the ratio fixed by the Central Finance Commission and State Finance Commission, grants under different Centrally Sponsored and Central Sector Schemes. They generate their own sources of revenue, both non-tax and tax in terms of building rents, user fees, etc., and property tax on properties located in their jurisdiction.

Urban Local Bodies:

Karnataka has about 214 ULBs in the state. These include City Corporations (CC), about 8 in number, Town Municipal Committees (TMC) (94), City Municipal Councils (CMC) (44) and Taluk Panchayats (TP) (68). With help from the Asian Development Bank, Karnataka had established the Karnataka Municipal Data Society (KMDS) which has the exclusive right to maintain all kinds of records related to Urban Local Bodies including their financial statements, demographic details of ULBs, dashboards, training modules etc. They act as a one source stop for all the data requirements of ULBs. We visited the KMDS office to get information on the financials of all the ULBs. Only one of the ULBs i.e. Bruhat Bengaluru Mahanagara Palike (BBMP) maintains and gets its accounts audited separately. The data on both receipts and expenditure was provided to us for each ULBs.

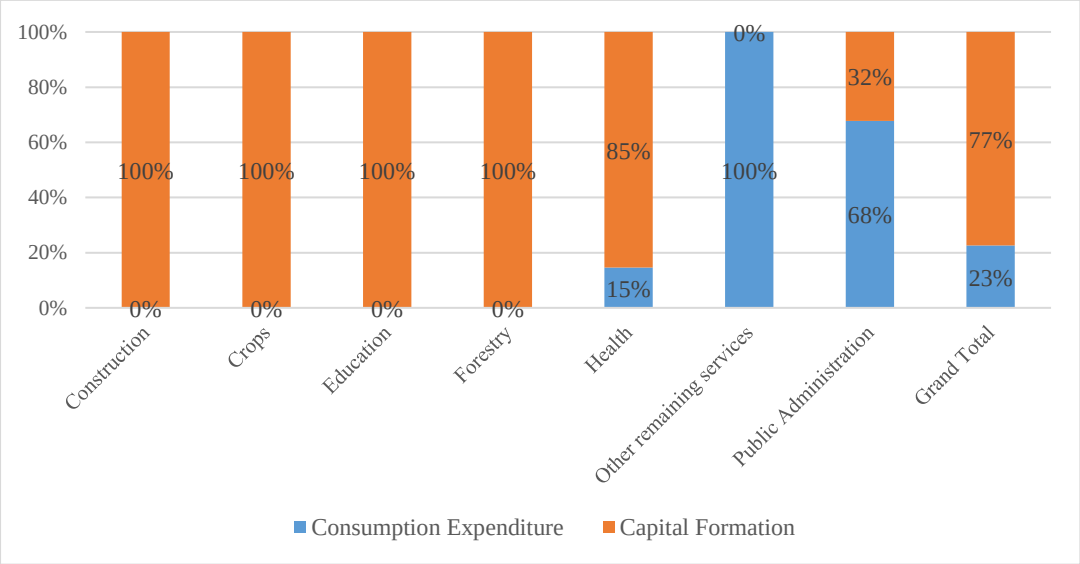
The expenditure items were classified as either capital formation or consumption expenditure for each of the major heads. We classified this data further into the sectors in which they were spent and these were added to the calculations of GFCE and GFCF respectively. Similarly, we did this separately for the accounts of BBMP which we obtained from their office. Given below in Figure A3.2 and Figure A3.3 is the distribution of consumption expenditure and capital formation across different sectors in the urban local bodies.

Figure A3.2: Percentage of spending across different categories across sectors in Urban Local Bodies in Karnataka apart from Bruhat Bengaluru Mahanagara Palike



Source: Urban Local Bodies Audited Accounts

Figure A3.3: Consumption and Capital Formation distribution across sectors in Bruhat Bengaluru Mahanagara Palike



Source: BBMP Audited Accounts

Rural Local Bodies:

All Gram Panchayats have to get their accounts audited by the State Audit and Accounts Department (SAAD). Karnataka had about 5631 Gram Panchayats as of 2013-14. Apart from these, we also have Taluk Panchayats (240) and Zilla Panchayats (30) whose accounts are already present in the state Budget as all the funds is routed through the State treasury and they do not generate any own sources of revenue unlike GPs.

Gram Panchayats:

We obtained these accounts from SAAD, which gave a detailed list of expenditures. The Table A3.2 below gives us the detail of these expenditures and its 'type' of expenditure to consumption expenditure or capital formation. Each of these expenditures were also assigned to a particular sector depending on where it was spent.

Table A3.2: Summary of Gram Panchayat Accounts

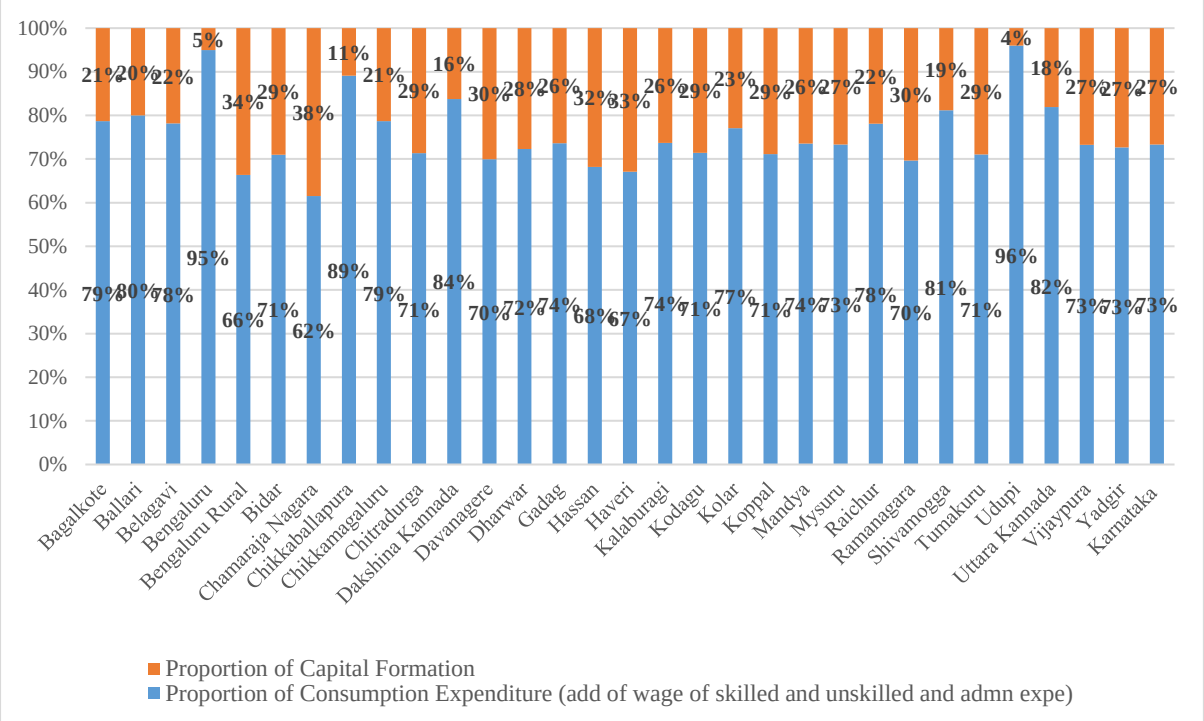
Expenditure type	Amount in Rs. Lakhs	Sector	Type of expenditure
General Administration	23642	Public Administration	Consumption Expenditure
Public Security	6330	Public Administration	Consumption Expenditure
Works Executed by G.P.'s	11254	Public Administration	Capital Formation
Public Health	3712	Health	Consumption Expenditure
Civil Amenities	17740	Public Administration	Consumption Expenditure
Education	821	Education	Consumption Expenditure
13th Finance	71737	Public Administration	Capital Formation
Development Grants	7772	Public Administration	Capital Formation
Nimala Karnataka	12049	Water Supply	Capital Formation
Indira Awaz	46988	Construction	Capital Formation
Mini Water Supply	4988	Water Supply	Capital Formation
Asraya Yojane	5544	Construction	Capital Formation
S.G.S.Y. Yojane	2209	Public Administration	Capital Formation
Grama Swaraj	9140	Education	Consumption Expenditure

Expenditure type	Amount in Rs. Lakhs	Sector	Type of expenditure
MGNREGA (CE)	105444	Crops	Consumption Expenditure
MGNREGA (CF)	38237	Crops	Capital Formation
Other Schemes	30005	Public Administration	Consumption Expenditure

Source: Gram Panchayat Audited Accounts

Here, note that for MGNREGA, as the whole amount was given, it had to be split into capital formation and consumption expenditure as it forms a sizeable amount of the funds spent at the GP level. We examined the MGNREGA accounts for Karnataka for the year 2013-14 and took a proportion of the total expenditure which was spent on wages of skilled and unskilled workers and administrative expenditure and tax as the consumption expenditure and the rest as capital formation. The figure A3.4 below gives the proportions used across various districts as this was done based on the activities in a particular district.

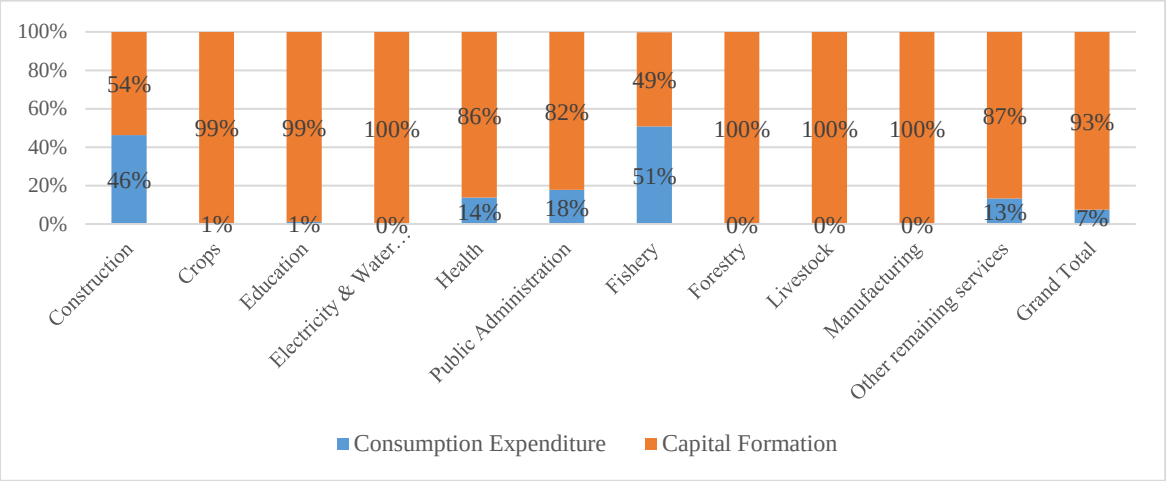
Figure A3.4: Distribution of MGNREGA Proportions between Consumption Expenditure and Capital Formation



Source: MGNREGA Accounts for Karnataka, 2013-14

Taluk Panchayats and Zilla Panchayats: The data for the Taluk and Zilla Panchayats are given in the State Government Budgets in the link documents for each scheme code combination that we had discussed previously in the budget section. Here again, we follow the same method followed previously in the State Budgets analyses based on the description of the expenditure and the major head or department which was budgeted the money to obtain expenditures as given in Figure A3.5 below.

Figure A3.5: Proportion of Consumption Expenditure and Capital Formation in Taluk and Zilla Panchayats



Source: Karnataka State Budgets, 2015

Thus, all the GFCE and Capital Formation that is computed are added to the final calculations of GFCE and GFCF respectively.

Public Sector Corporations:

Karnataka has about approximately 80 PSEs. They are autonomous bodies under the state government that function independently by generating their own sources of revenue with additional grants from the State Government. In order to get the data from corporations, we personally visited some of the Corporations, government departments under whom these Corporations function and also applied through RTI to obtain the annual accounts for these Corporations for the year 2013-14. Two statements, profit and loss accounts/ income and expenditure accounts, fixed assets statement from the annual accounts were of importance for our analyses which help us compute the GFCE and GFCF respectively.

Table A3.3: Variables from Annual Accounts of Public Sector Corporations

Statement from Annual Accounts	Variables and Formulae
Fixed Assets Note (Tangible Assets + Intangible Assets + Capital Works in progress)	Additions – Tangible Deletions / Deductions – Tangible Additions – Intangible Deletions / Deductions – Intangible Capital works in progress – Additions Capital works in progress – Deletions Total Additions Total Deletions Depreciation – From Fixed Assets Statement
Profit and Loss Statement	Employee Benefits Expense Finance Costs Other Expenses Depreciation from P&L (As on 31st March, 2014) Interest Income Interest Expenditure Rental Income Rental Expenditure Profit / Loss before Tax Tax Expenses Profit / Loss (After Tax)
Variables and Formulae	GFCE = Employee Benefits Expense + Finance Costs + Other Expenses GFCF = Total Additions - Total Deletions – Depreciation Operating Surplus = Net Interest + Net Rent + Profit GVA = Operating Surplus + GFCE + Depreciation

Source: Statements of Public Sector Corporations

Table A3.3 gives a list of variables that we used from each of the account statements. A combination of the above variables was used to calculate the GFCE and GFCF. The formulae for the same are as follows:

GFCE = Employee Benefits Expense + Finance Costs + Other Expenses

GFCF = Total Additions - Total Deletions – Depreciation

These formulae were arrived at based on discussions with the DES, GoK on what all should be included in Consumption Expenditure and Capital Formation. For example, employee benefits expenses include all kinds of welfare measures taken by the Corporation for its employees in addition to labour services they provide. Finances

costs are mostly bank charges and interest payments which the corporation has to make on its loans. Other expenses included miscellaneous office expenses of the Corporation which are mostly revenue expenditure that include electricity bills payment, rent payments, water charges etc.

Once we had the GFCE and GFCF calculated for all the Public Sector Corporations, we took to classifying the Corporations into different sectors so that the value of GFCE and GFCF could be added to those sectors, meaning to say that they were incurred by those sectors in the state of Karnataka. Given below in Table A3.4 is a list of Corporations names and the sectors to which they were assigned based on the kind of economic activity they were involved.

Table A3.4: List of Corporations and classification into sectors

Sector	Name of PSE	Consumption Expenditure	Capital Formation
Construction	Karnataka Road Development Corporation Ltd	2244	5183
	Karnataka Rural Infrastructure Development Ltd	4119	253
	Rajiv Gandhi Rural Housing Corporation Ltd	845	11578
Crops	Cauveri Neeravari Nigam Ltd	21674	1115991
	Karnataka Neeravari Nigam Ltd	28151	1037070
	Karnataka State Seeds Corporation Ltd	2462	765
	Krishna Bhagya Jala Nigama Ltd	38776	126387
Electricity	Bangalore Electricity Supply Company Ltd	139608	196919
	Chamundeswari Electricity Supply Company Ltd	59395	46532
	Gulbarga Electricity Supply Company Ltd	0	0
	Hubli Electricity Supply Company Ltd	0	0
	Karnataka Power Corporation Ltd	189961	302954
	Karnataka Power Transmission Corporation Ltd	144614	152664
	Mangalore Electricity Supply Company ltd	48517	5036
	Power Company of Karnataka	119	-1
Financial Services	Karnataka State Financial Corporation Ltd	26413	-243
Fisheries	Karnataka Fisheries Development Corporation Ltd	934	45
Forestry	Karnataka Forest Development Corporation Ltd	4569	5355
	Karnataka State Forest Industries Corporation Ltd	2123	-11
Livestock	Karnataka Sheep & Wool Development Corporation Ltd	677	67

Sector	Name of PSE	Consumption Expenditure	Capital Formation
Manufacturing	Dr. Babu Jagjeevan Ram Leather Industries Development Corporation Ltd (LIDKAR)	483	-5
	Karnataka Cashew Development Corporation Ltd	637	61
	Karnataka Compost Development Corporation Ltd	183	-5
	Karnataka Handloom Development Corporation Ltd	6509	-35
	Karnataka Silk Industries Corporation Ltd	4358	133
	Karnataka Soaps & Detergents Ltd	10512	-45
	Karnataka State Agricultural Produce Processing & Export Corporation Ltd	165	1901
	Karnataka State Beverages Corporation Ltd	6679	83
	Karnataka State Coir Development Corporation Ltd	178	-101
	Karnataka State Handicrafts Development Corporation Ltd	1785	54
	Karnataka State Industrial & Infrastructure Development Corporation Ltd	1470	-474
	Karnataka State Small Industries Development Corporation Ltd	2936	-151
	Karnataka State Textile Infrastructure Development Corporation Ltd	127	-10
	Karnataka Togari Abhivrudhi Mandali Ltd	25	-3
	Karnataka Vidyuth Karkhane Ltd	2853	1
	Mysore Electricals Industries Ltd	1735	2
	Mysore Paints and Varnish Ltd	583	-1
	Mysore Paper Mills Ltd	16756	3004
	Mysore Sugar Company Ltd	5583	8906
	N.G.E.F (Hubli) Ltd	742	27
Mining	Hutti Gold Mines Company Ltd.	26973	4010
	Mysore Minerals Ltd	15075	-742
Other remaining services	D. Devraj Urs Backward Classes Development Corporation Ltd	944	4
	Dr. B.R. Ambedkar Development Corporation Ltd	3106	36
	Jungle Lodges and Resorts Ltd	3390	-248
	Karnataka Maharshi Valmiki Scheduled Tribe Development Corporation Ltd	596	-10
	Karnataka Minorities Development Corporation Ltd	647	9

Sector	Name of PSE	Consumption Expenditure	Capital Formation
	Karnataka Police Housing Corporation Ltd	1854	70
	Karnataka State Tourism Development Corporation Ltd	6863	1181
	Karnataka Women's Development Corporation Ltd	365	-16
	Marketing Consultants & Agencies Ltd	852	-25
	Shree Kanteerava Studios Ltd	110	312
Real Estate and Professional Services	Karnataka Electronics Development Corporation Ltd	1592	3174
Road Transport	Bangalore Metropolitan Transport Corporation Ltd	200321	238300
	D Devraj Urs Truck Terminals Ltd	128	3629
	Karnataka State Road Transport Corporation Ltd	345923	16669
	North East Karnataka Road Transport Corporation Ltd	126257	7338
	North West Karnataka Road Transport Corporation Ltd	154440	-41035
Storage	Karnataka Food and Civil Supplies Corporation Ltd	7857	60
	Karnataka State Warehousing Corporation Ltd	4493	8335
To be apportioned	Mysore Sales International Ltd	7053	2172
Total		1688334	3263109

Note here that, for one of the Corporations, i.e. Mysore Sales International Limited (MSIL started its operations in 1966 as a marketing organisation, and in course they have diversified into various activities now including Chit Funds, Beverages, Paper, Consumer products, Industrial products, Hire purchase, Tours and travels etc. Hence, the GFCE and GFCF had to be divided among these sectors. To do so, we used the data on total revenue to apportion the value of GFCE and GFCF based on the revenue accrued to each of the sectors. Once that was done, we obtained the total GFCE and GFCF for all the corporations put together. The GFCF that we talk about here is simply the Capital Formation for the Public Sector Enterprises functioning in Karnataka.

For the Public Sector Corporations, the GFCE was computed as follows:

GFCE = Employee Benefits Expenses + Finance Costs + Other Expenses

Note that, all the calculations for GFCE and CF (Public Sector) are in market prices as the accounts from which they were obtained gives the data in market prices. As the I-O table has to be constructed in basic prices, we have calculated the tax component for each of these sectors separately and converted the data into basic prices. More details will be given in the indirect taxes section.

Gross Fixed Capital Formation (GFCF):

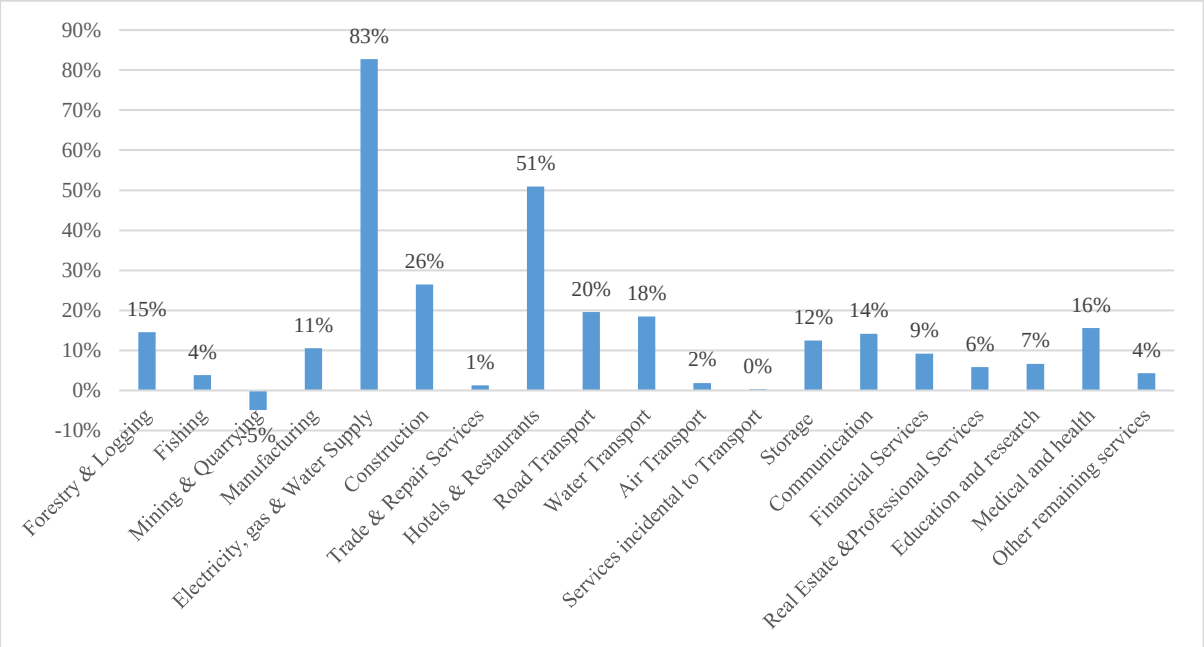
The GFCF is essentially the net investment in a particular year in the entire economy. The aggregate GFCF is not available at the state level for Karnataka. To compute the aggregate GFCF, we largely relied on the CMIE Prowess data that has been discussed before. We assume that the data on Total Income and Total Capital Formation available in CMIE Prowess for the sample companies registered in Karnataka is reflective of the financials of the entire state. Although this may seem like a limiting assumption, this was the best we could access for anything at the state level. We computed the C/Y ratio for each of the sectors for which data was available in CMIE (Figure A3.6). This ratio was multiplied with the Gross Value of Output for Karnataka to arrive at GFCF for in Karnataka. For those sectors whose C/Y ratio was not available from Prowess or the numbers were not reliable as it is difficult to disaggregate the data for Karnataka, like say Air Transport as it is a large sector and the capital formation for this sector cannot be assumed to solely represent the capital formation in Karnataka, we used India C/Y ratio available from National Accounts Statistics (NAS) 2013-14 to compute GFCF for these respective sectors. These four sectors included Forestry, Fisheries, Water and Air Transport. This data from NAS included the GVO of Private Sector Corporations in India and the GFCF for Private Sector Corporations.

GFCF for the Crops sector: The crops sector is largely unorganised and we have used NSS 70th Round Data on All India Debt and Investment Survey conducted between January - December 2013. This provides us with the data on expenditure incurred in Farm Business that include Capital Expenditure on Land, Livestock and Implements. The data presented includes new purchases, major repairs and improvements made on these resources. To further capture the private corporate sector in Agriculture, we followed the method prescribed by Narayana, Vani and Kusuma (2011), who provide us the time series data for the period 1999-2000 to 2008-2009. This time series was extrapolated till 2014 by computing Compounded Annual Growth Rate (CAGR). The

share of the Corporate Sector GFCF in Agriculture forms three per cent of the total Private sector GFCF in Agriculture and the remaining share is contributed by Household (Unorganised) sector in Agriculture. This was added to the calculations of GFCF which we did for the public sector using sources that included General Government Budget, Local Budgets / Local Accounts and Public Sector Corporations, and followed a methodology similar to the computation of GFCE to identify capital formation. Both these were added to obtain the GFCF for the Crops sector.

GFCF for the Livestock and Public Administration sector: There was no data in CMIE for the Livestock sector and Public Administration is a public service. Hence, for these two sectors, we computed the Capital Formation by taking data from public accounts as described in the GFCE computation and hence arrived at the GFCF data for these two sectors.

Figure A3.6: Capital to Output (C/Y) Ratio used for computation of GFCF across sectors



Source: CMIE Prowess and National Account Statistics

A note on the estimation of Capital Formation in the Public Sector:

For the purpose of our study and analyses, we have also computed the capital formation in the public sector by largely following the same method which we followed in the computation of GFCE. Hence, the sources explored include General Government Budget, Local Budgets / Local Accounts and Public Sector Corporations where each item was classified based on the description into CE and CF. The difference between Additions in the Gross Block and Deductions/Disposals in the Gross Block is taken as New Capital Formation in that year.

By deducting the public sector GFCF obtained using the above methodology from the total GFCF gives us the data on the GFCF for the private sector.

Exports and Imports:

Data on exports and imports at state level is captured by Directorate General of Commercial Intelligence and Statistics in quantity terms only. This is limited to data by sea route, air route, river and railway route. However, no data on movement of goods by land is maintained by them or in any other source. The data by sea route alone captures the value of transactions. For Karnataka, the Visvesvaraya Trade Promotion Centre (VTPC) under the aegis of Department of Industries and Commerce, Government of Karnataka complies and publishes the export data for 19 commodities using data obtained from Director General of Commercial Intelligence and Statistics, Kolkata, Export Promotion Councils (EPCs), Commodities Boards and other State agencies. Trade & industry bodies also support the creation of this database. Assuming that these 19 commodities make up most of the exports in Karnataka, we use this data to classify the commodities across the sectors and hence the value of exports is obtained. However, 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. The imports were then divided across the sectors based on the proportions in the I-O table constructed by NCAER in 2013-14. The computations as discussed above help us obtain the final demand components of the I-O table.

Annexure 4: Net Indirect Taxes

The calculation of Net Indirect Taxes becomes important for the Input – Output table as the role of the State affects the circular flow of income through leakages that takes place because of taxes and subsidies. To arrive at Net Indirect Taxes, the detailed methodology is discussed below.

The Total Indirect Taxes can be expressed as follows:

Total Indirect Taxes = Taxes on Intermediate Goods (Intermediate Consumption) + Taxes on Purchases (by Households) + Taxes on Investment Goods (Capital Account of GFCF) + Taxes on Exports.

Taxes on purchases by Households:

Our starting point is the Household sector as we have the most disaggregated data on the purchases (consumption expenditure) by this sector. For the purpose of our SAM we had classified the household sector into 10 different occupational groups. Once this was classified, we obtained the list of 448 items for which the private final consumption expenditure was computed. For computing PFCE, we had computed by annualising the PFCE across each of the 23 sectors and separately across each of the household groups. Please note that, the consumption expenditure included the taxes paid by the consumer. As we have the list of 448 items and the respective item expenditures spent by each of those household groups, we obtained the tax rates for each of the 448 items that the consumer would have paid by referring at the VAT Rates for Karnataka in 2013-14 for goods, and the service taxes charged by the Government of India for Services. There were also other taxes like the luxury tax, entertainment tax etc, charged by the respective states. Some of them were also exempted from tax (like many agricultural goods) and some items were levied excise duty by the state (liquor items). One may argue that there is more number of items than just 448 but as our data on consumption expenditure was limited to these 448 items, we assume it covers most of the essential household expenditure. These 448 items have been divided into different baskets depending on the item type, say, for example, food items, durable items, education spend etc. While most of the spending happens for a particular item, each of the item groups has one category which captures all the 'other goods/services' not mentioned in the item list (448) but is still being incurred by the household. Hence, technically, the household expenditures have been captured for more than just 448 items. Obviously, when this is the case, we will not have a tax rate for these 'other goods/services' since we do not have information on the item for which that expenditure was incurred. For these cases, what we did was to find the average tax

paid (by weighting). So, for example, for the group of items which included torch, lock, umbrella, raincoat, lighter (bidi/ cigarette/ gas stove) and other minor durable-type goods, each of these items have a different tax rate. Hence, for the item category 'other minor durable-type goods' we used the weighted tax rate of the taxes paid on torch, lock, umbrella, raincoat, lighter.

For some of the services mentioned in the list of items, for example, laundry, cleaner, barber, hair dresser etc., we are aware that some of these services provided by the formal sector are chargeable. But applying the tax to all the household groups, especially rural and other urban household groups apart from the urban salaried class would give us an overestimated number as we want to believe that these sectors avail services of the informal sector not coming under the purview of tax. Hence, in such cases, we went with the assumption that only the 'Urban Regular wage / salary earning' went for formal services and paid taxes, and hence, we computed the approximate tax paid for these kinds of services for only such household groups.

The formula used for computing the taxes are as follows: Consumption Expenditure Value / (1+Tax Rate) = Value of item before tax

Hence, Total Taxes Paid = Consumption Expenditure Value - Value of item before tax

Adding up the total taxes paid for each item across households, gives us the value of the total taxes for each of the sectors when the items are grouped into the sectors.

Taxes on Intermediate Goods:

We described earlier the methodology of computing the indirect taxes for households. Based on the expenditures incurred by households across various items, item groups which can be grouped into the 23 sectors, we obtained the average tax rate for each of the household groups and likewise, the overall tax rate for each sector. The table A4.1 below shows in detail these tax rates.

Table A4.1: Tax rates across sectors

Sector	Grand Total
Agriculture	1.0%
Air Transport	5.0%
Communication	12.0%
Education	0.4%
Electricity, gas & Water Supply	0.6%
Forestry	0.0%
Health	2.8%
Hotels & Restaurants	2.7%

Sector	Grand Total
Livestock	0.6%
Manufacturing	8.6%
Mining	1.0%
Other Services	7.0%
Railway Transport	0.0%
Real Estate & Professional Services	0.0%
Road Transport	9.8%
Services incidental to transport	5.0%
Trade & Repair Services	11.5%
Water Transport	0.0%
Grand Total	3.9%

Source: Authors' calculations

So, 1% is the total taxes paid to the agriculture sector by the households. From the I-O table, we have the data of the total intermediate consumption from each of the sectors. To that data, we compute the value of taxes on these intermediate goods by assuming the average tax rates as listed above to get the total taxes on the consumption of intermediate goods.

Taxes on purchases by Government:

There is no direct way of getting data on taxes paid by the government for its purchases. Hence, we followed a similar methodology as mention above for computation of taxes on intermediate goods. We used the weighted average tax rate for each of the sectors from the PFCE calculation, applied those rates on the sector wise government purchases to obtain the taxes on purchases by Government.

The overall data for indirect taxes at a state level is computed by multiple sources including the data accrued from the Department of Commercial Taxes and Karnataka Annual Financial Statement released by the Budget Finance Department. However, data is not available for each of the 23 sectors of the I-O Table and SAM or the break up is not available as individual components mentioned above. Hence, we used this data to verify the total taxes that we obtained by addition of individual components. Our estimation of indirect taxes was approximately 28% higher than what was for Karnataka from the above-mentioned sources. We assume that, as both the methods uses a different method to estimate the total indirect taxes collection, there is a chance for the data to not be equivalent.

The IOTT and SAM take into account the net indirect taxes, and hence, it becomes important to look at the data on subsidies. We obtained the data on subsidies from the Overview of Budget, Finance Department, 2015 document which gives us data on the

subsidies provided by the government across different items. These items were then classified to their sectors of origin and the subsidies were computed sector-wise accordingly (Table A4.2) Once this data on subsidies was obtained, we apportioned it according to the proportion of indirect taxes in each of the categories including taxes on intermediate consumption, taxes on purchases by households, taxes on purchases by government, taxes on capital goods and accordingly, sector wise net indirect taxes were computed.

Table A4.2: Subsidies in Karnataka

Type of Subsidy	Sector	In Rs. lakhs
Food	Agriculture	304604
Transport	Road Transport	69110
Power	Electricity, Gas & Water Supply	546000
Industries	Manufacturing	9884
Housing	Construction	44804
Cooperation	Financial Services	270480
Agriculture	Agriculture	26278
Milk	Livestock	68122
Others and Labour	Apportion according to other sectors	71040
Agriculture & Horticulture	Agriculture	47126
Animal Husbandry and Fisheries	Livestock	1200
Milk	Livestock	9576
Co-operation	Financial Services	14750
Women & Child Development	Other remaining services	37158
Housing	Construction	71346
Education	Education	25418
Commerce & Industries	Manufacturing	16008

Source: Overview of Budget, Finance Department, 2015

Once all the components for the I-O table are computed, we then move on to compute the components of the Social Accounting Matrix.

Annexure 5: Construction of Components of Social Accounting Matrix

In the sections below, we will discuss the computation of each of these components which will finally help us arrive at the Social Accounting Matrices.

Production Accounts

The production accounts are nothing but the Input-Output table which talks about the inter-linkages between the different sectors. The method for its computation has been discussed above.

Factors

The factors include the wage and non-wage component of the GVA and the net factor income from ROW in the row totals and the total factor endowments in the columns include the endowment of households, operating profits of private corporations, operating surplus for the public sector corporations, the income from entrepreneurship earned by the Governments and the depreciation on the capital account. Each of these have been computed as given below:

Wage and non-wage component

Within SAM, GVA is divided into wage and non-wage income. Different methods and sources have been used to capture the wage and non-wage component of the GVA of each sector. The method followed is given in brief below.

Sl. No	Sector	Data sources and Process
1.	**Agriculture**	Cost of Cultivation Surveys is the main source used to capture the wage and non-wage income shares in the GVA of the crop sector. As GVA of sectors are given to us by DES, we had to use CCS only to understand the composition of GVA into wage and non-wage income. CCS are All India Surveys which tries to capture the item-wise break-up of the cost of cultivation per hectare for each of the major crops of the state to which we multiply the same with total hectares under cultivation of each crop and sum the same across all the major crops to find the shares of wage and non-wage income in crop sector. The shares obtained in crops sector is assumed to be same in other allied agriculture sectors of Livestock, Forestry & Logging and Fishing
2.	**Manufacturing**	For this sector, Annual Survey of Industries and NSS Employment and Unemployment Survey were used to calculate the wage and non-wage component of the GVA. ASI was finally used for the distribution of shares as both sources approximately reflected more or less similar estimates. To estimate the wage share in manufacturing, Total Emoluments and Provident Fund and Other Welfare Expenditure given in ASI for each state was added to get the wage income while to estimate the non-wage income, we used the profits estimate given in the ASI.
3	**Education & Research and Medical & Health**	These sectors are of our main concern and to estimate the wage and non-wage share of GVA, we have used the GFCE (employee benefit expenses alone) and GFCF components of each sector and assuming expenditure equals income, we have seen the shares of these and applied the same on GVA of the state. These estimates were calculated using sources that include annual reports accrued through RTI of Universities, Primary and Secondary Education, Hospitals (both Specialised and General).
4	**Other Sectors**	For the remaining sectors, we have used the shares of Compensation to Employees (Wage Income) and Operating Surplus (Non-Wage Income) given in National Accounts Statistics and applied the same to Karnataka GVA of sectors mentioned above to get estimates.

Value Added Income to Households or Endowment of Households

As discussed earlier, the total household income can be seen as comprising of factor incomes i.e., wage income and capital income to households, government transfer, interest on debt, net current transfers. India Human Development Survey-II (IHDS) conducted in 2011-12 is the only comprehensive national level sample survey which asks questions on the total household income and expenditure for the households

across occupational groups. Having estimated the PFCE for Karnataka during the construction of the I-O table and using the proportion of household income to expenditure from the IHDS for each occupational group, we estimate the total household income for Karnataka by applying this proportion on already estimated PFCE for the state. Once this income was estimated, the next step was to divide the total income into different categories i.e., as wage income, non-wage income, transfers from the government and transfers from the rest of the world based on the variables available in IHDS. The variables are income from agriculture, income from business, income from benefits, income from rent, interest income, dividend income, income from shares, transfers from non-residents etc. Using these variables, we calculated the proportions of these components in the total income and used that to estimate the endowment of households.

Operating Profits of Private Corporate Sector

There is no data source which gives us the operating profits of the private corporate sector at the State level. CMIE is the only source that can give us some data on companies. We took a ratio of the operating profits of companies registered in Karnataka to India separately for financial companies and non-financial companies which accounted for about 3.5% and 8.4% respectively. By applying the above proportions which we obtained for financial companies and non-financial companies on the operating surplus of the financial and non-financial companies in India on NAS data for India, we estimated the operating profits for Karnataka.

Operating Surplus

This was estimated as the summation of net rent, net interest, net profit income obtained from the annual reports procured from Public Sector Undertakings.

Income from Entrepreneurship

It is the income received by the government from the factors i.e. labour and capital for the services that is rendered by them. These comprises of profits, income from property, net interest received from various authorities, from other sectors, and other kinds of property receipts. This number is computed and given by the Economic – cum – Purpose Classification Report 2011-12 to 2018-19 taken from the Statement on Income and Outlay Account of Administrative Departments (Receipts).

Depreciation on Capital Account

This component was directly obtained from the SDP Report 2015-16 that provided us CFC data for each of the 23 sectors for the year 2013-14. This was used as is for the construction of SAM for Karnataka.

Net Factor Income

Net Factor Income constitutes remittances received and sent by the factors. To estimate this component, we have used RBI Bulletin that gives us the share of Karnataka in the total remittances received to be 15 percent. This has been assumed as Karnataka's share in the credit and debit reflected in Balance of Payments Statement and further is used to estimate the labour and capital income. For the labour income, we have taken the net of the data on Compensation of employees and for the capital income, we have taken the net of the data on Investment income.

Total Factor Endowments and Factor Income

Addition of all the above components gives us the data on the total factor endowments (column total) and the total factor income (row total). These have some mismatch in the total figures which is expected as we are collating data from multiple sources.

Households

Households are one the four institutions which make up the SAM. The total use of household income (column total) includes the household consumption expenditure, income tax paid by households, taxes on purchases by the households, and the household savings. The row totals of households include the endowment of households, the government transfer, interest on debt and net current transfer from ROW to the households which make up with total household income. The computation of each of these components are discussed in the following section.

Household Consumption Expenditure

The method for the computation of the household consumption expenditure has been explained in Annexure 3 for PFCE calculations. For the purpose of SAM, we have gone ahead and divided the households into 10 different groups primarily based on occupations as given in Table A5.1. These include 6 different types of households for the rural sector and 4 different types of households for the urban sector that helps us gauge the extent of consumption expenditure. These occupational groups were

classified based on the household type given in the NSS 68th Round on Household Consumption of Various Goods and Services in India.

In order to disaggregate the PFCE by household occupational groups, we obtained the household level consumption expenditure for each of the items by the 10 household classes. Once this data was obtained, the consumption expenditure was aggregated across the 23 sectors for each of the occupational groups, RH1 to RH6 and UH1 to UH4. The proportion of spending by each occupational group in the total expenditure in that sector was obtained. These proportions were applied to the overall PFCE that was estimated for each of the 23 sectors, and hence, the PFCE was disaggregated across the occupational groups.

Table A5.1: Household Occupational Group Code and Definitions

Code	Definition
RH1	Self Employed in Agriculture
RH2	Self Employed in Non-Agriculture
RH3	Regular wage / salary earning
RH4	Casual labour in agriculture
RH5	Casual labour in non-agriculture
RH6	Others
UH1	Self-employed
UH2	Regular wage / salary earning
UH3	Casual labour
UH4	Others

Source: NSS 68th Round on Household Consumption of Various Goods and Services in India

Household Income

The household income has been estimated using mainly the sample data from the India Human Development Survey (IHDS 2011-12). We classified the household groups in the IHDS to match the household occupational classifications in the National Sample Survey data. Once this was done, we obtained the total income and expenditure data from the IHDS for the sample from Karnataka and thus obtained the ratio of income to expenditure. These ratios were they applied on the consumption expenditure data estimated during the PFCE calculation to obtain the household income data for each of the 10 occupational groups.

Income Tax from Households

Income tax from households also forms a component of the total government earnings. Personal income tax in India is collected by the Central Government and passed on to the State Governments. The Central Board of Direct Taxes gives us data on the direct tax collection across the states. This is provided in the Time Series Data Financial Year 2000-01 to 2018-19 by Income Tax Department. The data provided at the state level is limited to total direct tax collected from all states with no breakup of its components. To arrive at the share of each component at the state level, we assumed the India's proportion of personal income tax (38%), corporate income tax (62%) and applied this on Karnataka's total direct taxes. In order to divide the total personal income tax across the household occupational groups, we assumed the proportions of household incomes to be the proportion of taxes collected

Household Savings

The total use of household income can be expressed as:

Total use of household income = Household Consumption + Income Tax from Households + Taxes on purchases by Households + Household savings.

The data on household savings at the state level is unavailable and there is no way of estimating this component. Therefore, as we had already computed the household expenditure, the income tax from households and the taxes on purchases by households, we are using the residual method to estimate the household savings

Govt. Transfer, Interest on Debt

This component is part of total Household Income which is received by households as transfers (no quid pro quo) and interest income paid by government for the bonds held by households. These form part of disposable income of the households. This is calculated using IHDS data where the total household income procured is divided into wage income, capital income, transfer from domestic sources and transfer income from ROW and other sources. These proportions obtained across the ten household groups were then applied on the total household income to obtain the government transfers. The data to get the interest on debt at a household level is very limited and hence this value could not be computed.

Net Current Transfer

Current transfers are those benefits, either in the form of cash or kind, made or received by households, to or from non-resident households independent of the source of income of the sender and the relationship between households. Current transfers directly affect the level of disposable income and influence consumption of goods of services. This component is estimated using the proportions that we obtained by bifurcating the total household income from IHDS into various components across all types of occupational categories. This was multiplied with the proportion of current transfers estimated for Karnataka from RBI bulletin assuming the share of KA in total current transfers to be 15 percent.

Private Corporations

The total private corporate income (column total) includes the corporate taxes and the corporate savings and in the row totals it includes the operating profits and the interest on debt. The calculations for each of these components has been discussed below.

Corporate Taxes

To estimate this component of the matrix, we relied on Central Board for Direct Taxes (CBDT) which gives state-wise data on the total Direct taxes and its types including Corporate Income Tax, Personal Income Tax and Other Direct Taxes. Corporate Taxes amount to 62 percent of the total Direct tax collection in India. By applying this proportion on the total direct taxes collected in the state as obtained from the CBDT, we estimated the corporate taxes in the state.

Income of the private corporate sector

The same procedure that was followed for the calculations of the operating profits for the private corporate sector was followed for the computation of its income using CMIE for Karnataka. We took a ratio of the total income of companies registered in Karnataka and India separately for financial companies and non-financial companies which accounted for about 6% and 5% respectively for the state. By applying the above proportions which we obtained for financial companies and non-financial companies on the GVA of the financial and non-financial companies in India using NAS, we estimated the Private Corporate Income for Karnataka.

Interest on Debt

This component is part of the income of private corporate sector i.e., interest income received by the corporate sector on the bonds and securities issued by the government. To estimate this component, we used the residual method by calculating the difference between the Income and operating profits of private corporations.

Corporate Savings

This component was also computed through backward calculation by first estimating the Private Corporate Income and Corporate Taxes and the difference between the two gave us the Corporate Savings.

Government

The column totals for the government sector includes the government consumption, government transfer, interest on debt, the interest on debt by the private corporations, the taxes on purchases by the government and the government savings. The row totals include income from entrepreneurship, income tax from households, corporate taxes, total indirect taxes and net capital transfers and which form the total government earnings. The method to arrive at each is discussed in the above sections.

Government Savings

To estimate Govt. savings, we calculated the difference between Total Expenditure of the State Government reported in ECP (2011-12 to 2019-20) and Total Receipts (Both Administrative Departments & Departmental Enterprises). It shows there is dissaving in the state due to excess expenditure.

Net Capital Transfer

This is estimated using the data from RBI Balance of Payment Statement with the assumption that Karnataka's share to be 15 percent. Capital Transfers do not affect the level of disposable and therefore accounted under ROW and Government.

Total Government Earnings

This was derived through summation of all the components in the respective row to arrive at the earnings of government from different sources.

Capital Account

The column totals of the capital account include the gross fixed capital formation, and the taxes on investment goods to arrive at the aggregate investment and the row totals includes the components of the gross savings of the economy. The computation of most of the components have been discussed in the previous sections. Given below is the computation of the foreign savings.

Foreign Savings

This was calculated using residual method. The savings of all other institutions was estimated first and alongside, we were able to arrive at Gross Savings of the economy which is equal to Aggregate Investment in the economy. The difference between Gross Savings (Aggregate Investment) and savings of all other institutions helped us derive Foreign Savings of the state.

Rest of the World Accounts (ROW)

Foreign Exchange Payments

This was derived through summation method, and this is equivalent to the imports in the economy.

Taxes on exports: This was taken as zero as the Karnataka state government did not tax exports in the 2013-14 period.

Based on the methodology described above, we finish the construction of the Input-Output table and Social Accounting Matrix for Karnataka for 2013-14.

Annexure 6: Tools to estimate Multiplier

Supply side versus Demand side theories of Growth

A brief description of growth and respective theories in the discipline of economics would help provide us with understanding and validation for the use of respective methods in our research.

The commotion around Growth or GDP (Gross Domestic Product) statistics in itself reflects the significance of the variable. More importantly, growth signifies availability of goods and services for the population to consume and also implies growth in incomes though contingent on factors like nature of employment, political structure, and other legal, socio, economic structures. National Income or GDP is the surplus of annual output of goods and services over and above the needs of annual input replacement that can be used either for present consumption or for investment. Growth implies transformation process in economic processes. To induce the transformation, the discipline presents largely two broad theories, supply based growth theories and demand-based growth theories.

Supply based growth theories as the name suggests is based on a belief that the free enterprise economy is self-regulating with growth in the market economy consequently expected to have a trickle-down effect and subsequently leading to increase in aggregate incomes. The theories provide no scope for government intervention or made provision for a passive government role in stimulating the economy because it assumes that in societies and economies, growth can be path independent and therefore ahistorical. Supply based growth theories are based primarily on Solow Growth Model and Endogenous Growth theories.

Demand based growth theories believe that growth process is path dependent and cumulative. Past affects the present and the future and therefore history is imperative in the economy's growth process. They view the growth process as non-linear, and therefore historical. This implies that demand-based growth theories call for active government intervention in stimulating growth that could be far away from natural rate of growth. In these theories, demand deficiency is a structural problem that can be corrected only with government intervention through policies that increase aggregate demand. These theories depend on a frame that understands economy as an integrated system and production as a social activity. Demand based growth theories are based on the multiplier effects of autonomous demand components.

Conventional versus alternative approaches

The tools that can be employed to study the multiplier effect can be broadly categorised to be based on two approaches: Neo-classical approach and Alternative (Heterodox) approach. A brief account of the basic differences between these approached is discussed further. 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 provided the base to analyse growth or accumulation. On the other hand, Neo-classical approach originating in the late 19th century with the works of Jevons, Walrus and Marshall changed the scope of economic analysis from production to exchange (markets/circulation) and from accumulation to allocation as the base idea was scarcity rather than surplus. The focus of neo-classical framework was on the problem of choice and the idea of utility, given the resources; and it applied the marginalist principles of supply and demand apparatus to economic questions.

There are various methods and tools to estimate multiplier and broadly these can be classified as mentioned above into conventional approaches (neoclassical) and alternative approaches. 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. Alternative approaches on the other hand include Input-Output Model (IOM) and Social Accounting Matrix (SAM) which believes in integrated economic system and investment as an autonomous variable.

Annexure 7: Leontief Inverse Matrix to calculate Multiplier

$X_i = a_{i1}x_1 + a_{i2}x_2 + \ldots + a_{in}x_n + b_i$

For i = 1,2, …… , n. In matrix form this can be expressed as

$X = AX + B$

and,

A is called technical coefficient matrix. To find the level of total output (sum of intermediate and final demand), we can solve for X in terms of the matrix of technical coefficients and the column vector of final demand, both of which are given.

$X - AX = B$

$(I - A) X = B$

$X = (I - A)^{-1}B$

Where the $(I - A)^{-1}$ matrix is called Leontief Matrix.

Annexure 8: List of Universities and Hospitals

Universities	Hospitals
Bangalore University	Sri Jayadeva Institute of Cardiovascular Sciences and Research
Gulbarga University	Victoria Hospital, BMCRI
Kannada University	Kidwai Institute of Oncology
Karnataka Janapadha University	NIMHANS
Karnataka State Music University	Udupi General Hospital
Karnataka State Open University	
Karnataka State Women University	
Karnataka University, Dharwad	
Mangalore University	
Rani Channamma University	
University of Mysore	

Annexure 9: Input-Output Table for Karnataka 2013-14 (In Excel Sheets)

Annexure 10: Social Accounting Matrix for Karnataka 2013-14 (In Excel Sheets)

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