REGIONAL ACCOUNTS OF INDIA: METHODS, NEW ESTIMATES, AND THEIR USES

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For large economies with substantial regional variation, it is of great importance for policymakers and economic analysis that macro-economic statistics are broken down by region. This paper reviews the regional accounts in India, discusses their role in Indian federal and state policies, and provides new estimates to cover major data gaps. Statistics on domestic product by Indian state, broken down by industry, are regularly published. But despite demands and recommendations by various commissions and policymakers, a comprehensive system of regional accounts is yet to be developed. New estimates for the period 1993–2010 are presented for saving and the macro-economic expenditure by Indian states, like final consumption, capital formation, and trade balance. They show, for example, that some of the fastest growing Indian states have increased their saving and investment rates to 50 percent of their domestic product.

1. Introduction

Regional imbalances in economic growth and development have always drawn the attention of policymakers in federal systems. A system of economic accounts at regional level can provide valuable inputs to policymakers for analysis of regional disparities, public finances, and interstate linkages through trade, labor, and capital flows. The System of National Accounts (SNA, 2008) also recognized that "regional accounts are of special importance when there are important disparities between the economic and social development of the various regions of the country." Despite recognizing the utility of regional accounts, SNA (2008) had largely neglected this issue, and left it for countries themselves to devise their regional accounts. Major public policy issues such as globalization, innovation, ageing, taxation, poverty, unemployment, and the environment often have a regional economic dimension (ESA, 2010). Acknowledging this, new European guidelines on national accounting (European System of Accounts; ESA, 2010) have devoted a separate chapter to regional accounts. Regional disparities in

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developing countries with federal systems are far larger than those in developed federal countries. For example, the ratio of per capita income between the richest and the poorest subnational regions in Canada, Australia, and the U.S. is usually of the order of 1.5 to 2.5 only.[1] In contrast, this ratio is around 4 to 5 in the Indian federal system. Other than the usual justifications of significant regional disparities, comprehensive regional accounts for India are also important in their own right because many Indian states are comparable to or even larger than most countries, in terms of both area and population.

The Indian statistical system at the regional level has come a long way since independence in 1947. At present all states prepare and release estimates of state domestic product (SDP), which are widely used by policymakers. Reduction in regional disparities has been an explicit goal of the Indian policymakers. Given such explicit focus on regional imbalances, one would also expect a sound statistical system at the regional level, providing estimates of macroeconomic aggregates such as consumption, capital formation, savings, and interstate trade and capital flows. These macroeconomic aggregates get maximum attention in the economic growth literature, and are heavily used by Indian policymakers for planning at the national level. Unfortunately, Indian policymakers and researchers have been working on regional planning without having a proper macroeconomic framework at the regional level. Various committees and expert groups have been formed to review the status of the Indian statistical system and regional accounts, that explored and made recommendations to improve the regional statistical system. The most important of these, the Committee on Regional Accounts (CRA, 1976) and the National Statistical Commission (NSC, 2001), recommended that state statistical bureaus (also known as the Department of Economics and Statistics) should develop a comprehensive system of regional accounts to improve regional planning. Despite recommendations by the CRA and the NSC, most state bureaus are currently preparing estimates of SDP only.

In this paper, we review and attempt to address some of the data gaps in the regional accounts of India. Specifically, we prepare estimates of consumption, savings, investment, and interstate trade at the state level using the expenditure side approach of economic accounting. The paper is organized as follows. Section 2 reviews the current status of regional accounts and their uses by policymakers and researchers. It also briefly reviews the challenges involved in preparing regional accounts. Section 3 discusses the methodology and data sources used to prepare macroeconomic aggregates with the expenditure side approach. Section 4 explores some of the interesting features of state economies, which can be identified from the new estimates prepared. The last section concludes, with some important observations and policy implications.

2. Indian Regional Accounts and Existing Data Gaps

The Indian federal structure currently comprises 28 states and seven Union Territories (UTs). As with the federal structure of governance, the statistical

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[1]See Table 1 in Section 2.

system in India also follows a decentralized setup with shared responsibility between central and state statistical agencies. At the national level, the Central Statistical Organization (CSO) is the nodal agency providing estimates of national accounts. At the state level, the Department of Economics and Statistics (DES) bears the responsibility for preparing estimates of regional accounts. The CSO also plays an important role in providing guidance to state DESs. Unfortunately, not much work has been done on state level macroeconomic aggregates except for estimates of Gross State Domestic Product (GSDP). In this section, we briefly review the availability of macroeconomic estimates at the regional level, their uses by policymakers, and challenges involved in addressing the data gaps.

2.1. *Current Status*

Work on state income estimation started around 1948–49, with the states of Bihar, Uttar Pradesh, West Bengal, and Maharashtra taking initiatives to prepare such estimates. Subsequent to publication of reports by the National Income Committee in the early 1950s, other state statistical bureaus also started preparing state income estimates, broadly following the methodology adopted by the Committee for national level estimates (CSO, 1984). However, owing to differences in methodologies adopted and data sources used by state bureaus, these estimates were not comparable across states. Various committees/expert groups[2] were formed to address these issues, which along with the coordination efforts/guidance by the CSO led to the development of a uniform methodology to be followed by state bureaus.

Currently, all the DESs prepare estimates of domestic product by industry of origin, using a mix of production and income approaches. While the production approach is followed for most of the commodity producing sectors (agriculture, forestry, mining, registered manufacturing, etc.), the income approach is used for unregistered manufacturing and service sectors. Two additional terminologies, namely supra-regional and super-regional sectors, are used in the context of state domestic product. Activities like railways, banking and insurance, communication, and central government administration have their operations beyond geographical boundaries of individual states. SDP estimates for these sectors, termed supra-regional sectors, are allocated by the CSO among states based on relevant indicators such as number of employees and physical assets. Some of the activities such as foreign embassies, defense, paramilitary forces, the border security force, and high sea drilling are termed super-regional sectors, which are not included in the SDP of any state. Hence, the sum total of SDP for all states does not tally with the corresponding all-India GDP figures.

Despite convergence in the methodology, SDP estimates across states are not strictly comparable. First, the coverage/quality of data sources for unorganized

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[2]These are: the Working Group on State Income (WGSI) set up by the CSO in 1957; (ii) the Committee on Regional Accounts (CRA) appointed in May 1972; (iii) the Technical Working Group (TWG) for improvement of database for state income and related aggregates set up in July 1981; and (iv) the sub-group on State Gross Domestic Product and Expenditure Account set up by the above TWG in December 1982.

sector and service sector vary across states depending upon development of statistical capability at the state level. Second, price levels differ across states, hence the same level of per capita SDP (at both current and constant prices[3]) may indicate different levels of purchasing power. The CRA recommended pursuing a project along the lines of an International Comparison Program to compare the purchasing power of the rupee (Indian national rupee: INR) in different states. However, no effort has been made so far to address this issue.[4] Anecdotal evidence indicates differences in rural–urban price levels and variation in purchasing power of the rupee across states. Moreover, SDP deflators have also shown varying trends of intertemporal price movement across states (Roychoudhury, 1992). Clearly, interstate price variation raises many questions regarding the comparability of SDP estimates, especially when used for analyzing regional disparities.

Another major limitation of SDP for interstate comparison is the conceptual approach by which these estimates are prepared. In India, state income is estimated through the income originating approach (domestic product) which is conceptually comparable to GDP at national level. Estimates of state income with the income accruing approach, which is conceptually comparable to GNP, are not available. In a federal economy with open state boundaries, significant interstate migration of factors of production and factor income may take place (interestingly migration is also the basis of many political movements, but without underlying data). Accordingly, there can be substantial differences between income originating (due to factors of production located in a particular state) and income accruing to normal residents of the state. It is the former for which SDP estimates are available, but the latter is more suitable for comparing interregional disparities in well-being. Despite all these limitations, SDP estimates are the sole macroeconomic aggregate available for understanding regional dynamics of growth and development.

2.2. *Interstate Comparison and Uses of SDP Estimates*

Production/income approach based SDP estimates reveal some interesting aspects of the patterns of regional development in India. Table 1 shows huge interstate variations in per capita income in India compared to other large federal economies. All four developed federal countries (the U.S., Canada, Australia, and Germany) show much lower regional disparities when measured as the ratio between per capita income of the richest and the poorest state. This ratio simply doubles from 1.5 to 2.5 in developed countries to 4 to 5 in developing countries (China, Brazil, and India). It can also be noted that poorer regions in developed countries are smaller in terms of population, in contrast to India, where poorer states are also the most populous ones.

Regional disparities offer another challenge for managing public finances in federal systems. Subnational governments in low income states also have a lower

[3]Constant price SDP estimates are also not comparable across states because interstate variation in the prices for base year remains there.
[4]The Sixth Finance Commission (SFC) released SDP estimates for all states (provided by the CSO) at all-India prices for 1967–68 to 1969–70 (SFC, 1973). Since then, no SDP estimates are available at comparable prices across states. Also, the methodology used to prepare these estimates is not available in the public domain to check the reliability of these estimates in capturing interstate price variations.

TABLE 1

Per Capita Income (PCI) in the Richest and Poorest States ($ PPP) in 2010

S. No.	Item	U.S.	Canada	Australia	Germany	China	Brazil	India
1	PCI	45983	40747	39529	40398	7691	10980	2905
2	Richest state							
a	Name	Connecticut	Alberta	W. Australia	Hamburg	Jiangsu	São Paulo	Haryana
b	PCI	62048	60302	53662	68444	12381	16798	5279
c	% population	1.14	10.98	10.88	2.13	5.87	21.63	2.12
3	Poorest state							
a	Name	South Carolina	Nova Scotia	Tasmania	Meck-Pomm	Guizhou	Maranhão	Bihar
b	PCI	35087	32793	30845	27547	3148	3824	1132
c	% population	1.48	2.77	2.21	2.01	2.59	3.45	8.20
4	Ratio (2b/3b)	1.77	1.84	1.74	2.48	3.93	4.39	4.66

Notes: % population denotes population share of the state in respective countries. High income city states/provinces have been excluded for comparison. Also, states having a population share below 1% are excluded.

Source: Compiled based on data from official statistical agencies of respective countries. PPP Exchange Rate: World Bank Database.

tax base, which limits their ability to provide public services comparable to the levels in high income states. Given the open subnational boundaries in the federal system, these differences in levels of public services may lead to fiscally induced migration from low income states to high income states. Also, any attempt of redistribution by the subnational governments through higher taxes on richer residents would lead to migration of the tax base to other regions. The literature on fiscal federalism broadly agrees on the need of interregional fiscal transfers to avoid fiscally induced migration and allow redistribution policies to function (Buchanan, 1952; Oates, 1968; Courchene, 1981). Driven by the objectives of reducing regional disparities and addressing interstate fiscal disparities, the Indian central government allocates funds among state governments through two main channels, the Finance Commission and the Planning Commission. The Finance Commission transfers are explicitly meant to address interstate fiscal disparities, which inevitably links interstate allocation of funds to the criteria of regional disparities. The Planning Commission funds are also allocated based on consideration of regional disparities. In addition to these two channels, many central ministries also provide grants to state governments for implementing various central sector programs and schemes for education, health, poverty alleviation, infrastructure development, etc.

For the purpose of central fiscal transfers, states in India are divided into two categories, general category and special category states. Special category states have hilly terrains and are located on international boundaries. Given the fiscal disabilities faced by these states, more generous central transfers are provided to them. Another classification followed is that of major and minor states, depending solely on size of the population. Seventeen major states account for around 95 percent of the Indian population, with the remainder living in 11 minor states and seven UTs. Grouping of general and special category states is broadly comparable
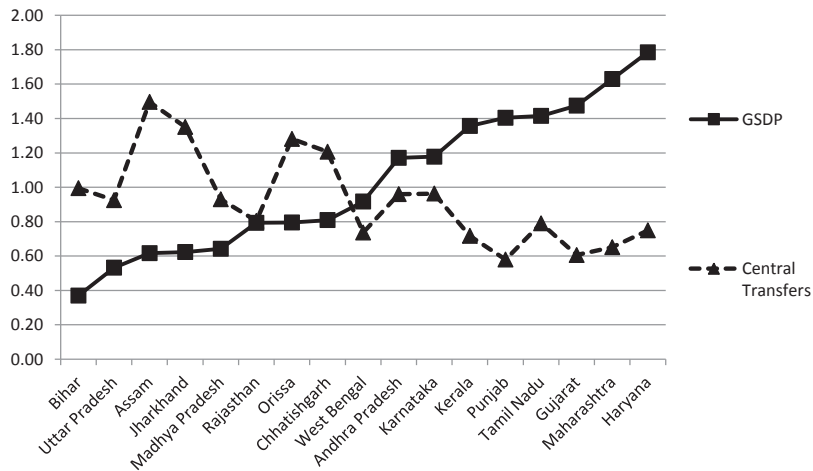
Figure 1. Per Capita GSDP at Factor Cost and Central Fiscal Transfers to the States (as ratio of national average, national average = 1)

Notes: National average is taken as 1. State figures are expressed as relative to the national average. States are arranged in the ascending order of per capita GSDP on the horizontal axis from left to right.

Source: Based on data from columns 3 and 7 of Table 2.

to the major and minor categories, respectively.[5] In this paper we limit our analysis in the figures to major states, though the tables provide detailed data on both major and minor states.

Figure 1 clearly shows that central transfers provide larger funds to poorer states on a per capita basis. The corresponding data in column 7 of Table 2 also show that per capita central transfers are higher for poorer states as an absolute amount (and implicitly as a share of their income as well). Sub-national governments in poorer states are heavily dependent on central transfers, deriving 50–70 percent of their fiscal resources from central transfers as opposed to only 20–30 percent for most high income states (column 8, Table 2). High central transfers to minor states (except Goa, a general category state) and their fiscal dependency on central government is also noticeable. At this juncture, we can logically assume that richer states contribute more to the central tax pool available for sharing among states, since income and consumption form the tax base for central government. Higher tax collection from richer regions and transfer to poorer regions leads to interregional fiscal flows undertaken through the central fiscal policy.[6] Understandably, some of the richer states such as Maharashtra,

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[5]The two classifications have the following differences: (i) Assam is a special category state but part of major category states; and (ii) Goa is a general category state but included in minor category states.

[6]In addition to the transfers to state governments, central government also spends on areas such as health, education, infrastructure, and poverty alleviation programs. All these expenditures have implications on regional redistribution but comprehensive estimates of interstate allocation of direct central spending are not currently available. However, given the redistributive nature of these programs and the possibility of higher central tax collection from high income states, it is clear that the claim of significant interregional fiscal flows is valid and requires attention.

TABLE 2

SNAPSHOT OF THE AVAILABLE REGIONAL ACCOUNTS STATISTICS FOR YEAR 2009–10 (GSDP AND FISCAL TRANSFERS IN INR PER CAPITA, ALL OTHERS IN %)

1	2	3	4	5	6			7	8
					Sectoral Composition			Central Fiscal	Fiscal
No. S.	State	GSDP	Decadal Growth Rate	Population	Agri.	Industry	Services	Transfers	Dependency
	Major states								
1	Bihar	18,523	4.0	8.20	23.9	15.4	60.7	2,688	72.5
2	Uttar Pradesh	26,651	3.2	16.75	28.0	22.9	49.1	2,499	50.8
3	Assam	30,874	3.1	2.57	26.1	24.0	49.9	4,043	61.1
4	Jharkhand	31,209	3.3	2.64	15.7	42.3	42.0	3,650	56.8
5	Madhya Pradesh	32,152	4.1	6.04	26.0	29.5	44.5	2,513	42.9
6	Rajasthan	39,701	3.7	5.67	23.4	30.3	46.3	2,174	40.7
7	Orissa	39,810	5.8	3.52	21.0	35.0	44.1	3,461	53.9
8	Chhattisgarh	40,515	5.9	2.10	19.9	43.3	36.9	3,260	44.0
9	West Bengal	45,910	4.7	7.55	23.3	18.9	57.8	1,991	47.6
10	Andhra Pradesh	58,627	6.3	7.15	22.9	27.2	49.9	2,594	33.5
11	Karnataka	58,962	5.3	5.01	16.3	29.3	54.5	2,603	31.0
12	Kerala	67,916	6.8	2.93	14.1	22.6	63.3	1,938	25.4
13	Punjab	70,292	4.0	2.44	30.9	27.1	42.0	1,566	20.1
14	Tamil Nadu	70,848	5.4	5.72	12.7	27.0	60.3	2,135	25.6
15	Gujarat	73,831	6.4	4.95	16.0	39.9	44.1	1,637	22.7
16	Maharashtra	81,579	6.1	9.45	10.2	30.9	58.9	1,761	22.4
17	Haryana	89,352	6.7	2.12	21.4	29.4	49.2	2,025	24.0
	Minor states								
18	Manipur	30,558	2.9	0.23	24.8	31.6	43.6	12,634	88.7
19	Jammu and Kashmir	41,889	3.2	0.98	20.9	29.7	49.4	13,196	77.7
20	Tripura	43,149	6.6	0.30	20.4	27.9	51.7	13,966	88.4
21	Mizoram	47,847	5.6	0.09	20.0	21.0	59.0	24,715	92.1
22	Meghalaya	51,266	4.2	0.22	18.7	33.4	47.9	10,582	79.1
23	Arunachal Pradesh	52,874	3.5	0.11	29.2	30.6	40.2	26,942	84.1
24	Nagaland	53,172	7.4	0.17	26.2	18.3	55.5	17,665	91.8
25	Uttarakhand	68,158	9.3	0.83	14.7	33.4	51.9	5,435	55.8
26	Himachal Pradesh	70,082	6.1	0.57	18.9	43.2	37.9	8,935	57.9
27	Sikkim	78,614	9.6	0.05	11.2	38.0	50.8	27,778	51.5
28	Delhi (UT)	137,208	6.4	1.39	0.9	17.4	81.7	2,168	17.3
29	Goa	174,557	5.5	0.14	5.7	49.3	45.0	3,588	14.8
	India	50,070	5.11	100	18.5	28.3	53.3	2,702	41.1

Notes: Major states cover 95% of the national population. Delhi (national capital) is a Union Territory. Fiscal dependency is defined as % share of central transfers in total revenue resources of the states.
Source: Based on SDP series from CSO website and RBI (2012).

Gujarat, and Tamil Nadu have been resenting the criteria used by central government for interstate allocation of fiscal resources.

Recently there has been some work on political factors influencing interstate allocation of discretionary central transfers routed through state budgets (Rao and Singh, 2002; Singh and Vasishtha, 2004; Biswas *et al.*, 2010). These studies suggest some influence of political variables (alliance between ruling coalition at centre and state, number of ministers/members of parliament from the state, etc.) on distribution of central transfers among states. However, the evidence is weak, probably due to the dynamic and volatile nature of coalition politics in India, where opposition parties often support the government bills while coalition partners play spoilsport for the government. Also, these studies fail to capture central transfer and spending undertaken directly, bypassing the state budgets, which are even larger than the transfers routed through state governments. Unfortunately, this very important aspect of the Indian federal system has not been explored due to lack of data on direct central spending and tax collection.

Production based SDP estimates have also been used to analyze sectoral composition of state economies and trends in regional growth. Column 6 of Table 2 shows the sectoral composition of SDP for Indian states. Economic growth and rising income levels are usually associated with a declining share of agriculture in total output. Indian states also show a trend of declining share of agriculture with increase in state income.[7] However, unlike neighboring East Asian countries including China, the Indian economy has experienced service led economic growth rather than growth from the manufacturing sector at the comparable level of economic development. This well-known fact is also visible as a low share of industry for most of the state economies.

Decadal growth estimates shown in column 4 (Table 2) show a broad trend where high income states have also shown higher growth performance. This aspect has been highlighted in the literature on regional disparities in India; many studies, using data for major states (the number of states varies across studies from 14 upwards), support the case of absolute divergence (Rao *et al.*, 1999; Sachs *et al.*, 2002; Nayyar, 2008), especially after economic liberalization in 1991. However, studies covering a larger number of states (including minor states as well) show evidence of absolute convergence (Dholakia, 1994; Cashin and Sahay, 1996). The literature also suggests that while there is no conclusive evidence for absolute convergence/divergence, there seems to be evidence for conditional convergence (Purfield, 2006; Misra, 2007; Cherodian and Thirlwall, 2013). In the absence of data on state level capital formation, all these studies have usually assumed a uniform rate of capital formation across states. It should also be noted that the available literature has used origin based income estimates (equivalent to GDP) rather than a destination based approach (equivalent to GNP) for comparison of interstate disparities. While examining household consumption expenditure data from National Sample Surveys (NSS), Roychoudhury (1992) provides evidence of a reduction in consumption disparities, and attributes it to interregional flow of

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[7]Except for two rich agriculturist states, Haryana and Punjab, which were the main beneficiaries of the green revolution in India.

capital through public and private channels. Although this paper does not explore issues related to regional growth dynamics, it provides estimates of consumption, savings, investment, and trade flows; which would be useful for researchers examining regional disparities and growth dynamics.

2.3. *Challenges and Existing Data Gaps*

The inability of the DESs to prepare detailed regional accounts is mainly because of the unavailability of data on three crucial components of interregional linkages between state economies: (i) interstate trade; (ii) interstate capital flows; and (iii) interstate labor movement (and associated remittance flow). Data on these three components are available at national level, mainly due to the presence of accounting mechanisms for transactions with the rest of the world (RoW). However, due to open boundaries at the state level, interstate transactions are currently not measured. The basic macroeconomic identity of the expenditure side approach for estimating national/regional income, shown in equation (1), can also be used to analyze some important macroeconomic aggregates such as private and government final consumption expenditure, savings, investment, and trade with the RoW:

$$(1) \qquad GSDP_{MP} = C_S + I_S + G_S + X_S - M_S$$

where: $GSDP_{MP}$ = gross state domestic product at market prices, C = private final consumption expenditure (PFCE), I = gross capital formation (GCF), G = government final consumption expenditure (GFCE), X = export to the RoW, M = import from the RoW, subscript s refers to the state, and the RoW at state level includes foreign countries as well as all other states.

At the national level, estimates of capital formation are prepared using three approaches: (i) flow of fund approach; (ii) commodity flow approach; and (iii) expenditure approach. Use of the first two approaches at the state level requires data on interstate flows of capital and commodities respectively (which are not available). The only possible approach is to collect data on various final expenditures at the state level, made by the three institutional sectors, namely households, the public sector, and the private corporate sector. Realizing these data limitations, the CRA (1976) also recommended using direct data at the state level for preparing macroeconomic aggregates of income and expenditure (state income, final consumption expenditure, and capital formation) which could be further used to obtain estimates of savings and interstate trade & capital flows as residuals.

Following recommendations of the CRA, researchers and state bureaus have made some progress in estimating components of the regional accounts. Some state bureaus (currently ten) prepare estimates of capital formation; however they have largely focused on the public sector only. Efforts to generate comparable estimates of gross fixed capital formation (GFCF) across states have been made by the CSO (GoI, 2009) and a few researchers (Lakhchaura, 2004; Rajeswari *et al.*, 2009). A common approach among all these studies is use of the expenditure approach at industry level for allocating national totals among states. This approach requires use of various data sources such as the Annual Survey of Industries (ASI), the All India Debt and Investment Survey (AIDIS), and the

National Sample Survey (NSS). These data sources are also used at the national level for estimating capital formation with the expenditure side approach.

Final consumption expenditure at the state level includes private and government final consumption expenditure. The Indian federal structure has a three-tier governance system, with central, state, and local governments having independent as well as shared functional jurisdictions. Nearly all DESs prepare estimates of government final consumption expenditure (GFCE) by respective state governments. The CSO allocates estimates of net value added (NVA) by central government among states based on state-wise shares in the number of central government employees. Some state bureaus are also preparing accounts for local bodies. Data gaps in part of GFCE are much less compared to private final consumption expenditure (PFCE), which accounts for nearly 60 percent of national income. PFCE, at the national level, is estimated residually by deducting use of commodities and services for GFCE and gross capital formation (GCF) from the overall availability in the domestic market (production adjusted for net export). This commodity flow approach is not suitable at the state level due to the absence of data on interstate trade. So far there has only been a single study attempting estimates of PFCE for all states (Sharma and Yadav, 2010). The authors allocated national level PFCE among states for various commodity/service groups by using direct data, mostly obtained from household consumption expenditure survey conducted by the National Sample Survey Office (NSSO). This approach of "item specific adjustments" of NSS estimates to the national totals from NAS (National Accounts Statistics), for estimating PFCE at the state level, has also been suggested by other researchers and state bureaus (Kar *et al.*, 2004; GoP, 2011).

Until now, no study has attempted the estimates of savings covering all states. In the absence of estimates for savings, it is also not feasible to estimate interstate trade, which is one of the uses of savings (the other being capital formation). However, there have been few studies attempting state specific regional accounts using the expenditure side approach (Telang and Wagle, 1976 for Maharashtra; Majumdar *et al.*, 1984 for West Bengal; Dholakia, 2006 for Gujarat; and GoK, 2011 for Karnataka). Data sources and the approaches used in these studies are broadly based on the NSS for private final consumption expenditure, various surveys for capital formation at sectoral level, and data from state bureaus for government final consumption expenditure. From the above discussion, it can be concluded that there has not been much progress toward availability of data on interstate trade and capital flows, since the recommendations by the CRA (1976). Hence, use of the expenditure side approach remains the sole possible approach for estimating savings, investment, consumption, and interstate trade at the state level.

3. Methodology and Data Sources

To prepare regional accounts with the expenditure side approach, we focus on the components of basic macroeconomic identity shown in equation (1). Specifically, we prepare estimates of state income, private final consumption expenditure, government final consumption expenditure, and gross capital formation using

direct data from various official sources. Estimates of savings and interstate trade have been prepared as residuals with some rearrangement of equation (1). Although implicit state specific SDP deflators can be obtained from current and constant price series available officially, similar deflators for consumption, investment, and interstate trade cannot be prepared without knowing price movements for the associated baskets at state level. Discussion on interstate price variation in Section 2.1 suggests that both current and constant price estimates across states are not comparable for state income, consumption, and investment. However, spatial comparison of savings and interstate trade is most meaningful when estimated at current prices rather than constant price. Hence, we have estimated all macroeconomic aggregates at current prices only. These estimates have been prepared for the period 1993–94 to 2009–10. The choice of lower point (1993–94) is largely based on availability of suitable and comparable indicators for estimating capital formation at state level; for which studies by the CSO and its officials are available from 1993–94 onward only. Detailed methodology and data sources used for estimating each of the macroeconomic aggregates are given below.

3.1. GSDP at Market Prices ($GSDP_{MP}$)

Official estimates of GSDP are published at factor cost only; however, final uses of goods and services for consumption, investment, export, and import (shown in equation (1)) are always at market prices. Despite consistent demand by policymakers (recently the 12th and 13th Finance Commissions) for GSDP at market prices, official estimates of state income in this format are not available. As shown in equation (2), $GSDP_{MP}$ is the sum of $GSDP_{FC}$ and indirect taxes net of subsidies:

$$(2) \qquad GSDP_{MP} = GSDP_{FC} + Indirect\ Taxes - Subsidies$$

where: GSDP = Gross State Domestic Product, subscript MP = market prices, and subscript FC = factor cost.

To estimate $GSDP_{MP}$, we focus on components of the right-hand side of equation (2).

3.1.1. GSDP at Factor Cost

For the study period from 1993–94 to 2009–10, $GSDP_{FC}$ is available from the CSO in three different segmented series with base years 1993–94, 1999–2000, and 2004–05. We rebased 1993–94 and 1999–2000 series estimates to 2004–05 base year, using the splicing method at 16-sector classification and then aggregating revised sectoral estimates to obtain the total $GSDP_{FC}$. Another adjustment required in $GSDP_{FC}$ is to ensure comparability of the sum total for all states with estimates of GDP_{FC} at national level.[8] Factor income in the super-regional sectors (mainly defense, paramilitary forces, and embassies) is not included in the $GSDP_{FC}$

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[8]Comparability of national GDP_{FC} with the sum total of $GSDP_{FC}$ is required because estimates of PFCE, GFCE, and GCF at state level have also been prepared by state-wise allocation of national totals (Sections 3.2, 3.3, and 3.5 respectively).

of any state/UTs, but is part of national GDP_{FC}. We deducted factor income[9] in these sectors from GDP_{FC}; and state/UT $GSDP_{FC}$ has been *pro rata* adjusted to the allocable national total GDP_{FC}. These estimates of $GSDP_{FC}$ were used to prepare $GSDP_{MP}$ by adding indirect taxes net of subsidies.

3.1.2. Indirect Taxes

Indirect taxes levied by all the three tiers of government—central, state, and local bodies—need to be considered when estimating $GSDP_{MP}$. State-wise contributions in central indirect tax collection can be estimated with either the origin based or destination based principle. Under origin based taxation, central excise collection is allocated to the state where production has taken place (the approach followed by China and Australia for estimating Gross Regional Products at market prices). However, this approach may be problematic when some of the high tax yielding commodities are produced or processed in few states but are consumed across the country (e.g., refining of petroleum products in India takes place largely in a few coastal states). This problem is further complicated in the case of customs where goods are imported at ports of coastal states only, but the tax burden is borne by consumers and producers across the country. Another possible approach is the destination based principle, where it is assumed that taxes are paid by the final consumers, and should be attributed to location where consumption is taking place (the approach followed by Canada to estimate Gross Provincial Product (GPP) at market prices).

The destination based approach assumes that either the elasticity of demand for all goods and services in all states is zero or the elasticity of supply of all goods and services is infinite. On the other hand, use of the origin based approach implies opposite values of the two elasticities. Clearly, both origin and destination based approaches require unrealistic assumptions. In the absence of data on commodity specific state-wise supply and demand elasticities, we assume that both producers and consumers bear an equal incidence of central indirect taxes, implying numerically equal demand and supply elasticities. Accordingly, central indirect taxes have been allocated among states based on their shares in national totals of production and final consumption expenditure, with 50 percent weight for both production and consumption shares. GSDP at factor cost has been taken as the indicator for estimating production shares. Final consumption expenditure includes PFCE and net purchase of goods and services (NPCS) for GFCE, which we estimate in Sections 3.2 and 3.3, respectively.

Given the interstate differences in tax rates and tax efforts for indirect taxes levied by state governments, we take data on their actual state-level indirect tax collection from RBI's study on State Finances (RBI, 2012). Indirect taxes levied by local governments form a smaller part of overall indirect tax collection. Also, coverage of local bodies in Indian national accounts is much poorer compared to other two tiers of governments. Since it is the large cities which collect most of the

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[9]National Accounts provide estimates of value added in defense, the largest non-allocable category. For other non-allocable sectors, we have applied the share of valued added to total current expenditure of central government on these items (obtained from budget documents). Fraction for share of value added is based on average share of wages in overall GFCE.

local indirect taxes, we use population of million plus cities to allocate local indirect taxes. Combining central, state, and local taxes, we obtain the total indirect taxes at the state level.

3.1.3. Subsidies

In the National Accounts, other than subsidies on commodities (mainly food, fertilizer, and petroleum products), operating losses of government owned irrigation departments, electricity boards, and transport bodies are also treated as imputed subsidy. As per the NAS, agriculture (food, fertilizer, irrigation), energy (electricity and petroleum), transport, mining, manufacturing, construction, and social security account for nearly 95 percent of total subsidies. Table 3 shows the shares of these sectors in total subsidies, and the indicators used for interstate allocation of the national total.

Using estimates of GSDP at factor cost, indirect taxes, and subsidies, we prepared series for GSDP at market prices from 1993–94 to 2009–2010 for all states.

3.2. *Private Final Consumption Expenditure*

PFCE refers to expenditure on final consumption of goods and services by resident households and non-profit institutions serving households (NPISH). The CRA (1976) recommended two alternative methods for estimation of PFCE at the state level: (i) the commodity flow method using data on net availability of goods and services; and (ii) a direct method using data of households' consumption expenditure. The first approach is the one used by the CSO at national level but cannot be replicated at state level due to the absence of data on interstate trade. The NSSO carries out household consumption expenditure surveys (HCES) covering almost all items of household consumption. In contrast to NAS estimates, NSSO estimates are available separately for rural and urban populations of the states and union territories (UTs). Hence, this data can be used to attempt the second method recommended by the CRA (1976).

Although NSSO surveys are the sole data source of household consumption expenditure at the state level, consumption estimates from NSSO have been consistently lower than NAS estimates. The earlier history of adjustment of NSSO estimates with NAS belongs to the measurement of poverty lines. Survey based household consumption estimates from NSSO is the main data source for determining poverty lines and distribution of households at different levels of consumption. However, increasing discrepancy between two data sources raised the possibility of underestimation by NSSO surveys, since the commodity flow approach was believed to provide firmer estimates (Planning Commission, 1993). Based on this argument, NSSO consumption estimates for all monthly per capita expenditure (MPCE) household classes were adjusted *pro rata* to NAS estimates by the Planning Commission. This *pro rata* adjustment for estimating the poverty line was, however, criticized based on the argument that discrepancies between NAS and NSSO estimates are higher for items which typically occupy higher weights in consumption baskets of higher expenditure classes (Minhas, 1988; Minhas and Kansal, 1989). Based on the recommendations of an Expert Group

TABLE 3

FUNCTIONAL CLASSIFICATION OF GOVERNMENT SUBSIDIES (AS % OF TOTAL SUBSIDIES)

S. No.	Function	2004–05	2009–10	Indicators Used for Interstate Allocation
1	Economic affairs and services	96.04	93.08	
1.1	Food	27.67	23.27	Price differential between subsidized food grains issued from center to state governments and market prices of the food grains at state level has been taken as measure of per unit subsidy. This is multiplied with the quantity of subsidized grains supplied.
1.2	Fertilizer	17.03	24.40	State-wise consumption of fertilizer products/nutrient inputs, with subsidy allocated separately for three nutrients, namely, nitrogen, phosphorus, and potassium.
1.3	Irrigation and other purposes	6.91	8.25	State governments' funding for operating expenditure of irrigation department.
1.4	Electricity, gas, and other sources of energy	20.02	11.36	Electricity: State governments' funding for operating expenditure of electricity departments. Petroleum subsidies: Since petroleum products are largely used for intermediate consumption, we take state-wise final consumption expenditure on goods and services as indicator for allocation, assuming that subsidies get embedded in the final goods and services.
1.5	Mining, manufacturing, and construction	19.16	18.74	Based on state governments' current expenditure on mining and industries.
1.6	Transport and communication	2.48	3.52	Based on state governments' funding for operating expenditure of transport and communication departments.
1.7	Other economic services	2.76	3.54	States' share in all other items allocated here based on relevant indicators, covering 95% subsidies.
2	Social security and welfare	2.58	4.88	Based on state governments' current expenditure on social security.
3	Other misc. services	1.38	2.04	States' share in all other items allocated here based on relevant indicators, covering 95% subsidies.
	Total	100	100	
	Total subsidy (as % of GDP)	2.85	3.86	

Source: Based on National Accounts (CSO, 2012a) and Union Budgets (GoI, 2012).

under the chairmanship of Prof. D. T. Lakadwala, the Planning Commission started estimating poverty ratios based on NSSO data, without any adjustments for discrepancy between two data sources (Planning Commission, 1993).

Discrepancy between the two consumption estimates and its implications on measurement of poverty lines has attracted the attention of several scholars as well as official agencies preparing these estimates (Mukherjee and Chatterjee, 1972;

Minhas, 1988; Sundaram and Tendulkar, 2001; CSO and NSSO, 2005, 2008). This rich literature provides many important insights into the nature and causes of discrepancy between two data sources. Relevant issues identified include: (i) differences in the coverage of two data sources; (ii) recall bias and other non-sampling errors in survey data; and (iii) quality of data used for deriving commodity flow approach based consumption estimates for national accounts. Appendix 1 provides a brief review of composition and sources of discrepancy between consumption estimates from the two data sources.

Examination of the composition of discrepancy shows that *pro rata* adjustment at item level rather than at aggregate level should automatically take care of differing consumption patterns by different MPCE classes. This approach of item specific adjustments of NSS estimates to NAS has also been discussed and attempted by researchers and state bureaus for estimating PFCE at state level (Kar *et al.*, 2004; Sharma and Yadav, 2010; GoP, 2011). For our exercise of state-wise allocation of national PFCE, we have made item specific adjustments of NSS estimates to NAS estimates for 159 comparable item groups. Results of NSSO surveys can provide reasonable indicators for interstate allocation of PFCE for several items/commodity groups. However, this approach may not be suitable for those item groups where the gap between the NAS and NSS estimates, and the contribution to divergence is large. For this reason, PFCE for the transport sector has been allocated based on indicators for number of vehicles and per vehicle fuel consumption.[10] PFCE for imputed items (financial intermediation services indirectly measured (FISIM) and Gross Rental) have been allocated separately, using methodology similar to one followed at national level. Combining state-wise allocation of PFCE for different item groups, we obtained state-wise total PFCE at market prices from 1993–94 to 2009–10.

3.3. *Government Final Consumption Expenditure*

GFCE in the National Accounts is estimated as the sum of expenditure incurred on provision of government services by administrative departments. It consists of: (i) compensation of employees (CE); (ii) net purchase of goods and services (NPCS); (iii) consumption of fixed capital (CFC); and (iv) other indirect taxes on production net of subsidies. Table 4 shows the shares of different tiers of government and different components of GFCE as percentages of national GDP.

State governments account for the largest share (40–45 percent) of GFCE at national level. This is also expected because of their constitutionally assigned role to provide services in expenditure intensive areas such as education, health, and agriculture. Since NVA (net valued added which essentially reflects compensation of employees) constitutes nearly 65–70 percent of GFCE, we use this to allocate GFCE (including CFC) at state level, separately for the three tiers of government. NAS provides data on NVA for state governments' public administration (individually for each state). In addition, we obtained state-wise NVA for central government's public administration from the CSO, which it estimates based on the

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[10]The state-wise number of various types of vehicles has been taken from the *Road Transport Year Book* (GoI, 2011). IEA (2004) provides category specific fuel consumption for Indian vehicles.

TABLE 4

Composition of Government Final Consumption Expenditure (as % of GDP)

	2004–05	2005–06	2006–07	2007–08	2008–09	2009–10
Tiers						
Central government	2.79	2.71	2.49	2.51	2.83	3.04
State government	4.46	4.45	4.36	4.47	4.73	5.61
Local authorities	1.92	1.89	1.77	1.69	1.66	1.59
Autonomous institutions	0.78	0.87	0.80	0.72	0.93	0.89
Components						
Compensation of employee	7.30	7.14	6.72	6.55	7.49	8.37
Net purchase of goods and services	2.66	2.78	2.69	2.84	2.66	2.75
Consumption of fixed capital	0.97	0.95	0.91	0.89	0.89	0.87
Total GFCE	10.93	10.88	10.33	10.29	11.04	11.99

Source: Based on CSO (2012a).

state-wise number of central government employees. By deducting central and state governments' NVA from the total NVA for public administration (available from state domestic product series), we estimated the share of local bodies. State-wise shares in the NVA for central, state, and local bodies have been further used to allocate national GFCE for public administration by respective levels of governments.[11] In addition to public administration, a large part of government expenditure on health, education, and water supply is also accounted as GFCE. These expenditures are mainly incurred by state governments, for which aggregate data (combined for all states) at national level have been obtained from NAS. These NAS estimates have been further allocated among states based on their shares in current expenditure on relevant sectors (health, education, and water supply), available from RBI's study on state finances (RBI, 2012). Combining estimates of GFCE by different tiers of government, total estimates of GFCE at the state level have been prepared.

3.4. *Estimation of Savings at State Level*

With state level estimates of GSDP$_{MP}$, PFCE, and GFCE prepared in Sections 3.1–3.3, it is now possible to rearrange equation (1) to estimate savings using the expenditure side approach:

$$(3) \qquad GDS_S = GSDP_{MP} - C_S - G_S$$

where GDS = gross domestic savings.

State level estimates of saving rate, based on equation (3), differ from the national estimates of savings published in NAS in two respects: (i) NAS estimates

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[11]Production of goods and services used for NPCS by the defense sector and other pure public goods are part of state income/import and need to be deducted from the state income to estimate savings. We recognize that expenditure on NPCS for pure public good items is non-allocable among states, but to maintain the basic income–expenditure identity, we allocate expenditure on NPCS for pure public good items based on state-wise GSDP. Use of GSDP$_{FC}$ as an indicator for demand of defense expenditure is suitable compared to other alternatives (such as population or area) as it links tax base and productive capacity with the government expenditure. This approach implicitly assumes unitary income elasticity of demand for pure public goods.

of gross domestic savings (GDS) are based on gross national disposable income (GNDI) rather than gross domestic product at market prices; and (ii) instead of the expenditure side approach, estimates of savings published in NAS are based on a mix of the commodity flow approach and the flow of fund approach. Despite these differences, estimates of savings prepared in this paper represent an important macroeconomic aggregate of the state economy, which is the savings generated from productive resources located within the state's geographical boundary. This measure of savings estimates resource availability for investment within the state/other states and interregional transfers of capital through public and private channels. Estimates of origin based savings are especially important in federal systems where such savings are also used by central government for interregional fiscal redistribution.

3.5. *Gross Capital Formation*

Capital formation, at the national level, is estimated by three approaches: the commodity flow approach, the flow of fund approach, and the expenditure approach. The first two approaches require data on interregional trade and capital flows, respectively (which are not available). Lakhchaura (2004) and Rajeswari *et al.* (2009) have allocated national estimates of GFCF among states based on suitable indicators at sectoral level. These indicators were in turn related to the expenditure approach for estimation of capital formation (for example, state-wise allocation of national totals at sectoral level based on direct data from AIDIS, ASI, and NSS surveys). A similar methodology of classifying state economy into industrial groups and then using various approaches such as direct estimation or capital–output ratios has also been suggested by the High Level Committee on Estimation of Savings and Investment (GoI, 2009). It should be noted that previous studies focused only on fixed investment (GFCF), mainly because reliable data for change in stock/inventory (CIS) are not available for all sectors.[12] However, we require estimates of GCF (inclusive of fixed investment and CIS) to ensure comparability with other macroeconomic aggregates. Registered manufacturing accounts for nearly 50 percent of CIS, for which data are available from ASI. In the absence of suitable indicators for CIS in other sectors, we use GFCF itself as an indicator to allocate CIS.

We have followed the above approach of allocating national estimates among states based on relevant indicators. For this, state economies have been classified into 16 industrial sectors and two institutional sectors. Industrial classification is similar to one used for estimation of GSDP. The two institutional sectors used are: (i) private sector, and (ii) public sector. For three supra-regional sectors (railways, communication, and banking and insurance), combined allocation has been attempted for the public and private sectors. This practice of institutional and sectoral classification is comparable to the earlier attempts (Lakhchaura, 2004; GoI, 2009; Rajeswari *et al.*, 2009). We use state-wise proportions, taken from these three studies, to allocate national totals at sectoral level up to 2004–05 (last year

[12]Average annual share of CIS in GCF has been around 6 percent during 1993–94 to 2009–10.

covered by these studies).[13] For subsequent years, we update their state-wise proportions for the private sector based on recent surveys and relevant indicators. These surveys broadly form the basis for all previous studies, this paper, and national level estimates of private sector capital formation estimated through the expenditure approach.

Estimates for public sector and supra-regional sectors, up to 2004–05, are also based on previous studies (Lakhchaura, 2004; GoI, 2009).[14] Subsequent estimates for supra-regional sectors and central public administration were provided by the CSO on request. For GCF by state governments and commercial undertakings directly under their control, we have used state-wise budgetary capital outlay of respective governments. In the absence of any suitable indicator for other government enterprises (termed as non-departmental commercial undertakings in the Indian NAS), we have used proportions for 2004–05 estimates available from the CSO (GoI, 2009). Adding sectoral and institutional capital formation estimates, we prepared overall GCF at the state level.

3.6. *Interregional Trade and Capital Flows in Regional Accounts*

From the national income identity, savings is equal to the sum of gross capital formation and net export from the country. A comparable equation at the state level with the income originating approach is as follows:

$$(4) \qquad GDS_S = GSDP_{MP} - C_S - G_S = I_S + X_S - M_S.$$

Using estimates of savings and investment at state level, trade balance can be estimated as:

$$(5) \qquad S_S - Is = X_S - M_S.$$

Following equivalence of current and capital account identity in the open economy macroeconomics, trade and capital flows are linked together. If we ignore the component of factor income flows and unilateral transfers, capital flows are equal in magnitude of trade balance but opposite in direction. At this stage, it is not possible to estimate the current account balance, because estimates of transfer payments and factor income from the RoW are simply not available for the state as an economic boundary. Table 5 provides estimates of all

[13]There is one minor departure in our approach compared to previous studies. For the electricity sector, previous studies have used GSDP as an indicator for interstate allocation. However, GSDP reflects past investments rather than current and future investments. Moreover, investments in the electricity sector are lumpy in nature; hence GSDP cannot be used as a suitable indicator. The CMIE (Centre for Monitoring Indian Economy) database on capital expenditure captures projects with capital expenditure of INR10 million or more. Since investments in the electricity sector are usually above this limit, the CMIE database is expected to cover most of the capital expenditure in this sector. We have taken investments envisaged in the projects under implementation to prepare a state-wise ratio for allocation of the national total in the electricity sector.

[14]Lakhchaura (2004) provides estimates up to 1999–2000 and GoI (2009) provides estimates for only 2004–05. We have taken the state-wise share in the national total from these two studies and interpolated estimates between 1999–2000 and 2004–05 with the compounded annual growth rate (CAGR) observed during this period.

TABLE 5

ESTIMATES OF EXPENDITURE SIDE MACROECONOMIC AGGREGATES FOR INDIAN STATES

(Y = PER CAPITA GSDP$_{MP}$ IN INR AT CURRENT PRICES, OTHERS AS % SHARE OF Y)

S. No.	State	1993–94						1999–00					
		Y	C	G	S	I	X-M	Y	C	G	S	I	X-M
	Major States												
1	Bihar (U)	5,665	71.1	10.7	18.3	13.3	4.9	9,520	81.8	12.2	6.0	9.4	-3.4
2	Uttar Pradesh (U)	6,734	80.2	9.5	10.3	20.0	-9.7	12,695	81.2	9.8	9.0	24.0	-14.9
3	Assam	7,843	65.3	12.3	22.4	17.6	4.8	14,304	66.0	14.7	19.3	15.4	3.9
4	Madhya Pradesh (U)	8,633	66.2	9.1	24.7	19.9	4.8	15,717	65.4	9.5	25.1	20.9	4.2
5	Orissa	7,018	63.9	10.2	25.9	31.8	-6.0	14,052	58.9	11.6	29.5	22.4	7.1
6	Rajasthan	8,473	80.7	10.2	9.1	17.9	-8.7	17,946	75.6	10.2	14.2	26.9	-12.7
7	West Bengal	8,605	74.2	12.2	13.6	18.4	-4.8	18,792	63.8	12.9	23.3	12.8	10.5
8	Andhra Pradesh	9,563	64.5	10.7	24.7	17.9	6.9	20,024	59.7	11.3	29.0	24.8	4.2
9	Karnataka	10,539	63.1	10.4	26.6	24.1	2.5	22,609	65.3	10.0	24.7	33.5	-8.7
10	Tamil Nadu	12,051	56.8	9.5	33.8	24.3	9.5	26,170	58.2	10.7	31.0	33.3	-2.3
11	Gujarat	13,345	63.3	8.8	28.0	25.2	2.8	26,169	66.0	10.9	23.1	43.3	-20.2
12	Kerala	11,354	86.8	10.3	2.9	21.4	-18.5	26,617	78.2	9.6	12.3	29.8	-17.6
13	Punjab	16,458	57.5	8.8	33.7	15.2	18.6	31,022	56.7	10.3	33.1	22.1	11.0
14	Maharashtra	15,694	52.5	9.4	38.1	26.8	11.3	31,147	54.3	10.4	35.3	30.9	4.5
15	Haryana	14,406	54.7	5.7	39.6	15.5	24.1	28,252	59.7	7.7	32.5	39.9	-7.4
	Minor States												
16	Manipur	8,011	70.9	25.2	3.9	21.2	-17.3	16,412	71.0	33.1	-4.1	40.3	-44.3
17	Jammu and Kashmir	9,791	87.1	19.3	-6.4	26.6	-33.1	17,763	95.5	26.6	-22.1	23.1	-45.2
18	Tripura	6,825	109.4	29.0	-38.4	14.9	-53.2	16,994	81.3	26.7	-8.0	13.9	-21.9
19	Meghalaya	9,645	101.2	26.5	-27.7	17.1	-44.8	18,596	95.8	27.3	-23.1	13.3	-36.5
20	Mizoram	13,530	91.4	23.7	-15.1	18.2	-33.4	19,090	125.9	33.0	-58.9	30.3	-89.3
21	Nagaland	12,232	111.2	28.6	-39.8	27.3	-67.0	17,377	153.2	20.9	-74.1	23.0	-97.1
22	Arunachal Pradesh	19,523	37.3	12.1	50.7	50.7	0.0	23,100	72.3	20.7	7.0	39.7	-32.7
23	Himachal Pradesh	11,094	71.0	15.7	13.3	36.1	-22.8	26,011	66.0	16.1	17.9	41.8	-24.0
24	Sikkim	9,994	64.4	30.4	5.2	46.7	-41.6	18,965	72.4	36.8	-9.2	39.9	-49.1
25	Delhi (UT)	26,091	86.1	11.4	2.5	23.2	-20.8	51,833	70.8	14.2	15.0	18.4	-3.4
26	Goa	21,592	63.9	12.1	24.0	29.2	-5.2	56,265	52.6	12.5	34.9	49.8	-14.9
	India	9,882	67.4	10.2	22.4	21.6	0.8	19,761	66.5	11.1	22.3	26.7	-4.4

Notes:
1. C = private final consumption expenditure, G = government final consumption expenditure, S = gross domestic savings, I = gross capital formation, X-M = net export to the RoW.
2. GDP figures for India are net of unallocable component of national GDP. Hence, sum total for state/UTs GSDP would tally with all India figures.
3. Three states, namely, Uttar Pradesh, Madhya Pradesh, and Bihar were divided in 2000 to create six states. Estimates given here are for undivided states, which is shown here as (U) after the state name.

Source: Author's calculation. Refer section 3 of the paper for estimation procedure.

Table 5 continued on next page

TABLE 5 (continued)

S. No.	State	2004–05						2009–10					
		Y	C	G	S	I	X-M	Y	C	G	S	I	X-M
		Major States											
1	Bihar	9,726	92.0	11.9	−4.0	17.3	−21.3	18,398	86.6	12.0	1.3	21.8	−20.5
2	Uttar Pradesh	16,686	81.6	10.5	7.9	30.4	−22.5	28,829	76.8	13.1	10.1	31.5	−21.5
3	Assam	20,963	69.1	13.2	17.7	24.5	−6.8	31,910	73.0	13.7	13.3	24.8	−11.5
4	Jharkhand	22,860	55.3	8.0	36.7	24.4	12.3	32,114	67.7	9.0	23.3	35.1	−11.8
5	Madhya Pradesh	19,941	68.4	9.1	22.5	27.6	−5.1	34,672	71.6	9.9	18.5	29.2	−10.7
6	Orissa	22,678	48.6	9.1	42.3	25.5	16.8	42,433	49.6	9.4	41.1	49.4	−8.3
7	Chhattisgarh	24,178	56.0	7.6	36.4	35.9	0.5	42,772	56.8	8.4	34.8	39.3	−4.5
8	Rajasthan	24,149	71.2	9.3	19.6	29.8	−10.2	42,868	72.0	10.2	17.8	29.3	−11.4
9	West Bengal	27,856	59.8	10.5	29.6	22.8	6.9	47,777	57.2	11.1	31.7	27.3	4.4
10	Andhra Pradesh	32,336	56.2	8.7	35.1	27.8	7.3	62,822	57.7	7.6	34.7	33.1	1.6
11	Karnataka	34,531	54.2	8.6	37.2	35.3	1.9	62,915	54.0	7.4	38.6	40.1	−1.5
12	Tamil Nadu	38,602	54.8	8.3	36.9	44.1	−7.3	72,551	52.8	7.9	39.3	42.1	−2.9
13	Gujarat	42,858	52.6	7.6	39.8	36.1	3.7	78,508	48.6	6.9	44.6	46.4	−1.8
14	Kerala	43,590	72.1	8.1	19.8	37.9	−18.1	78,840	71.3	8.6	20.1	38.5	−18.5
15	Punjab	43,043	56.8	9.1	34.1	26.9	7.2	78,943	55.6	8.7	35.8	26.2	9.5
16	Maharashtra	46,602	48.2	10.1	41.7	30.5	11.1	89,386	48.3	10.3	41.5	31.1	10.4
17	Haryana	48,597	47.6	5.4	47.0	37.5	9.5	96,715	43.8	6.1	50.1	43.6	6.4
		Minor States											
18	Manipur	22,309	65.2	21.1	13.6	55.0	−41.3	30,973	70.3	23.6	6.1	75.8	−69.7
19	Jammu and Kashmir	26,721	82.5	19.8	−2.3	44.9	−47.2	41,075	82.2	26.9	−9.2	46.8	−56.0
20	Tripura	28,587	54.2	19.7	26.1	16.5	9.6	44,619	70.6	21.3	8.1	34.7	−26.5
21	Meghalaya	27,355	78.7	22.8	−1.5	22.5	−24.0	45,831	71.9	26.4	1.7	32.8	−31.1
22	Mizoram	27,796	101.9	32.9	−34.8	100	−135.7	49,014	94.8	32.5	−27.4	45.4	−72.7
23	Nagaland	30,900	107.1	16.3	−23.3	26.4	−49.8	51,797	95.9	21.5	−17.5	37.7	−55.2
24	Arunachal Pradesh	30,092	57.4	22.0	20.6	80.6	−60.0	52,608	63.2	30.9	6.0	89.4	−83.5
25	Uttarakhand	30,937	58.3	11.6	30.1	50.0	−19.9	72,212	50.6	13.8	35.6	60.5	−24.9
26	Himachal Pradesh	42,176	51.5	11.5	37.1	42.9	−5.8	74,646	53.4	12.7	33.9	50.9	−17.1
27	Sikkim	32,690	60.6	25.8	13.6	102	−89.0	82,260	46.2	36.7	17.1	88.9	−71.8
28	Delhi (UT)	79,757	54.1	11.3	34.6	24.4	10.2	152,398	54.8	10.7	34.5	21.8	12.7
29	Goa	103,598	45.1	7.7	47.2	44.5	2.7	215,373	40.4	10.1	49.5	59.4	−10.0
	India	29,357	60.1	9.5	30.4	31.7	−1.3	53,401	58.8	9.8	31.3	35.2	−3.8

Notes:
1. C = private final consumption expenditure, G = government final consumption expenditure, S = gross domestic savings, I = gross capital formation, X-M = net export to the RoW.
2. GDP figures for India are net of unallocable component of national GDP. Hence, sum total for state/UTs GSDP would tally with all India figures.
Source: Author's calculation. Refer section 3 of the paper for estimation procedure.

macroeconomic aggregates estimated so far for four years, namely 1993–94, 1999–2000, 2004–05, and 2009–10. Although estimates have been prepared for all other years as well, these four years have been chosen to preserve space while providing intertemporal trends.

4. Results and Analysis

In this section, we explore some of the interesting aspects of state economies using macroeconomic aggregates based on the expenditure side approach. Detailed data on these aggregates are given in Table 5, but the figures presented here are limited to major states only, covering 95 percent of the Indian population. We have divided the time period of 1993–94 to 2009–10 into three time frames: (i) 1993–94 to 1999–2000; (ii) 2000–01 to 2004–05; and (iii) 2005–06 to 2009–10. The figures shown below (except Figure 3) contain three lines, showing the average value of the relevant macroeconomic aggregates estimated for the years covered. States are arranged in ascending order of per capita GSDP (average for 2005–06 to 2009–10) on the horizontal axis from left to right. Accordingly, the poorest state, Bihar, is on the leftmost part of the horizontal axis while the richest state, Haryana, is on the right-hand side of the axis. Three Indian states, namely Uttar Pradesh, Bihar, and Madhya Pradesh, were bifurcated in the year 2000. To understand the inter-temporal trends, we have shown undivided states in the figures, though the tables provide details for the new states also.

Table 5 clearly shows that in most low income states, PFCE as a share of $GSDP_{MP}$ is higher than the national average. Figure 2 also shows this trend, where PFCE as share of $GSDP_{MP}$ continues to decline with rising per capita income, except for three major deviations, namely Kerala, Rajasthan, and Orissa. Kerala and Rajasthan show higher private consumption than the general trend at
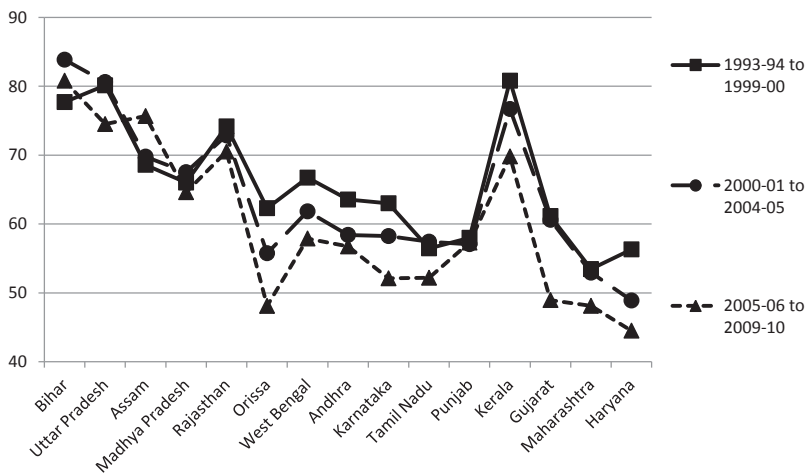

Figure 2. PFCE as Percentage Share of $GSDP_{MP}$

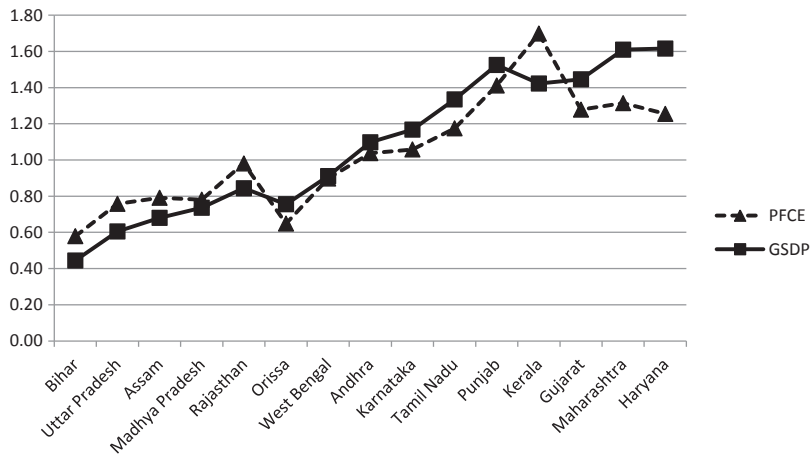*Notes*: Average of estimated value for the years covered.

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Figure 3. Per Capita GSDP$_{MP}$ and PFCE During 1993–94 to 2009–10 (as a ratio of national average)

Notes: Average value of PFCE for 1993–94 to 2009–10 has been estimated by multiplying average GSDP with the average share of PFCE in GSDP over the time frame covered.

comparable levels of GSDP$_{MP}$. It is well known that Kerala receives large remittances from middle-east countries, which could significantly raise its state disposable income over and above the GSDP produced (Jeromi, 2003). The anomaly of Rajasthan is also an old one, where consumption was relatively higher during the 1970s and 1980s (Roychoudhury, 1992). People of this desert state are known for their entrepreneurial skills across the country, which may result in remittances to residents of this state. Orissa shows a different scenario, where private consumption is lower than the trend at a comparable level of GSDP$_{MP}$. This mineral rich state attracts investments from both domestic and foreign investors. The resulting outflow of factor payment to capital may lead to lower disposable income than the income generated. Unfortunately, there are no other reliable data available through which size of remittances and other factor income flows could be measured.

Figure 3 shows two visible trends. First, per capita consumption increases with income level. Second, consumption disparities are lower than income disparities, because interstate variations in state relatives (to the national level) are higher for GSDP$_{MP}$ than private consumption. Figures 2 and 3, taken together, indicate a possibility that income elasticity of consumption is likely to be positive but below unity, which is in sync with consumption theories. Unfortunately, without having income data based on the accruing approach, it is not feasible to examine the life cycle hypothesis or consumption smoothing theories at the regional level. Policymakers clearly require estimates of GSDP with the income accruing approach for analyzing regional disparities and recommending interregional fiscal transfers. Until such a database is prepared, disparities in PFCE rather than SDP alone should also be given consideration while determining central transfers. This approach would give a better measure of regional disparities in living standards.

The high share of GFCE in GSDP$_{MP}$ for minor category states, shown in Table 5, is not a surprising feature of these economies. In fact, the overall size of
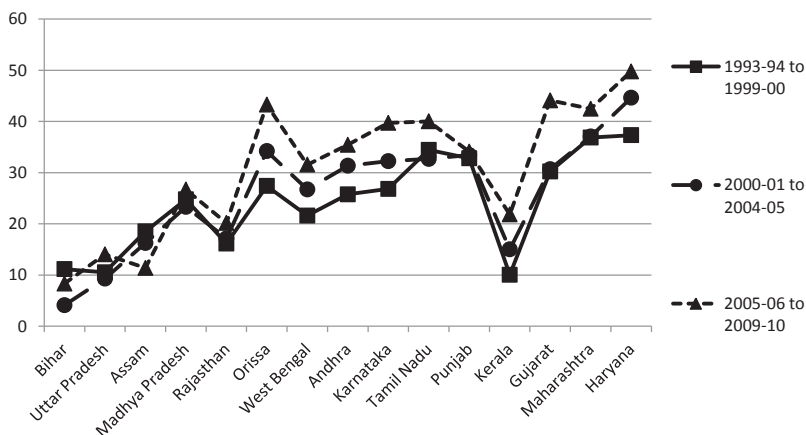
Figure 4. Gross Domestic Savings (GDS) as Percentage Share of GSDP$_{MP}$

Notes: Average of estimated value for the years covered.

government in minor states would be even higher if transfer payments are also included in GFCE. For most major states, GFCE has remained around 10 percent of GSDP$_{MP}$, with Assam and Bihar having slightly higher figures. Although GFCE does not include transfer payments by government, expenditure on government schools and hospitals is part of GFCE. Comparable percentage shares of GFCE across states suggests that per capita government expenditure on these items is likely to be substantially lower in poorer states. The presence of such trends, despite equalization transfers by the Finance Commissions and the Planning Commission, indicate that those transfers may end up in subsidies, transfer payments, or capital formation. It is not feasible to further analyze these aspects without having detailed accounts of public sector transactions at the regional level.

Estimates of state level savings, presented in Table 5 and Figure 4, reveal stark variations in saving rates across states. Most minor states in the north-eastern region have shown negative saving rates, reflecting the presence of capital inflows to finance both consumption and investment. In general category states, Bihar has shown a negative saving rate immediately after Jharkhand was carved from it in the year 2000. However, it has recently turned into a state with a positive saving rate. The last two decades have seen rising saving rates at the national level; however there are intertemporal divergence in saving rates across states. Most of the fast growing rich states (Gujarat, Haryana, Maharashtra, Tamil Nadu, and Karnataka) have raised their saving rates. However, Madhya Pradesh, Punjab, and Jharkhand have not been able to follow the national trend of rising saving rates.

Trends of capital formation (GCF) are presented in Figure 5. While there had been a general trend of rising investment rates across the nation, fast growing rich states such as Tamil Nadu, Gujarat, and Haryana have been able to raise their investment rates above 40 percent of GSDP$_{MP}$. It is also interesting to note that low income states such as Orissa and Chhattisgarh (both rich in minerals) have also raised their investment rates in recent decades to around 40 percent of their
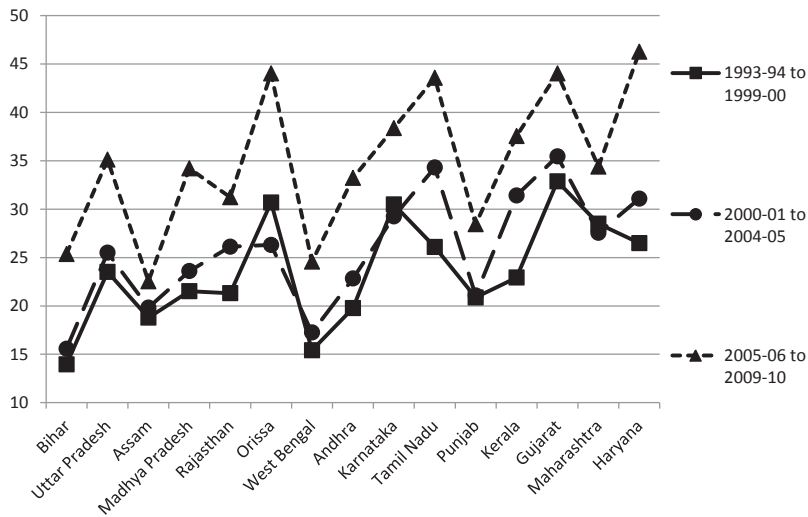
Figure 5. Gross Capital Formation (GCF) as Percentage Share of GSDP$_{MP}$

Notes: Average of estimated value for the years covered.

GSDP$_{MP}$. Overall, capital formation in all the low income states appears to be rising over time; indicating the potential of higher growth in these states. With these estimates of capital formation at the state level, it should not be surprising that current growth rates of some of the low income states such as Orissa, Chhattisgarh, and Bihar are comparable to those in the fast growing richer states.

In regional accounts, trade balance at the state level is an important macro-economic aggregate in terms of its direction and magnitude. Theoretically, richer states are expected to have trade surpluses because poorer regions are likely to purchase goods and services from richer regions using net interregional transfers (fiscal redistribution) by central government. From this view, the negative trade balance for special category states, shown in Table 5, is on expected lines since they receive generous transfers from both the Finance Commission and the Planning Commission. This reasoning is also followed by general category states, where poorer states show large net imports while the trend is opposite for high income states, with Kerala as a major exception (Figure 6). Essentially, remittances received from abroad by Kerala fund its net import from the RoW. The magnitude of trade balance at the state level essentially indicates sizable interregional capital flows in India. At this juncture, one would also like to analyze public and private components of interregional capital flows in India. Direction of interstate trade flows gives some evidence of interregional fiscal transfers funding net imports of poorer states. However, given the unavailability of data on either public or private capital flows individually, we could not explore this issue.

5. Conclusion

The primary focus of this paper was to prepare estimates of regional accounts for Indian states. We admit the use of several assumptions in preparation of
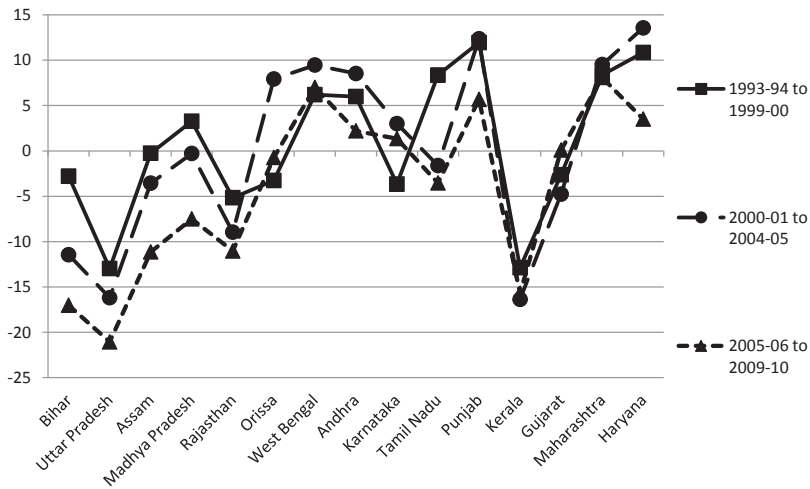
Figure 6. Trade Balance (+trade surplus/−trade deficit) as Percentage Share of GSDP$_{MP}$

Notes: Average of estimated value for the years covered.

regional estimates of income, consumption, and savings; but the final estimates show stark interstate variations which should hold even if these assumptions are to be replaced with more reliable data whenever available. Other than providing first such estimates of regional accounts for India, this paper also makes some important methodological contributions. The approach of allocating central indirect taxes based on regional contributions in both production and consumption is a departure from the conventional practice followed in other federal economies. For example, China, Australia, and Canada follow either the origin based or the destination based approach for allocating indirect taxes among subnational units, which implicitly require extreme assumptions for demand and supply elasticities. The concept of gross regional savings (GDSs), defined based on the origin based approach, is also a conceptual departure from the approach used for estimating national savings. The concept of origin based regional savings is especially important in federal systems, since this saving is used for various purposes such as domestic investment, private capital flows, and interregional fiscal redistribution by federal government.

In the process of preparing these estimates, we identified several data gaps which should be addressed as a priority to improve the estimates of regional accounts. Most important among them is PFCE on account of the transport sector. This sector alone contributes nearly 25 percent of the discrepancy between NAS and NSSO estimates. A separate survey, focused on estimating consumption of transport fuel and services should be designed, which can be applied on vehicle stock (population) to obtain PFCE in the transport sector. The CSO already uses similar approaches to estimate overall workforce and GDP in unorganized sectors of the economy. Another low hanging fruit in data gaps is on account of capital formation. Many crucial construction materials, such as cement and steel, are manufactured by large industrial units, and data on interstate trade can reasonably

be captured. This, along with state level data on construction workers, may help in preparing estimates of capital formation with the commodity flow approach.

Despite regional economies of low income states being dominated by private final consumption expenditure (PFCE), there has been a welcome trend of rising saving and investment rates across states. It should be noted that some of the fast growing states have increased their saving and investment rates to 50 percent of their GSDP. Clearly, saving and investment rates in these states are comparable to the heyday of East Asian tigers. Even some of the poorer states (two of the BIMARU states, namely, Bihar and Rajasthan) have raised their saving rates by nearly 10 percentage points during last decade. The overall rate of capital formation in all poorer states appears to be rising over time, indicating the potential of higher growth in these states. Given that a part of savings of richer states is channeled by central government to poorer states for horizontal fiscal equalization, growth and savings in richer states contribute to upliftment of consumption and investment across the nation.

The state level trade balance has shown some interesting trends in our analysis. Most richer states are found to be net exporters, indicating overall direction of capital flows to poorer states. Trade surpluses of richer states essentially result in interregional capital outflows of equal magnitude through factor income flows, fiscal redistribution by central government, interregional lending, and net unilateral transfers. While large interregional trade and capital flows indicate integration of state economies, comprehensive analysis of interlinkages between state economies require data on various components of interregional trade and capital flows. There is a clear need to segregate public and private capital flows, which would allow better understanding and policymaking for both fiscal federalism and regional imbalances.

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SUPPORTING INFORMATION

Additional Supporting Information may be found in the online version of this article at the publisher's web-site:

Appendix 1: Sources and Composition of Discrepancy between NAS-NSS Consumption Estimates

Table A1.1: Item group level comparison between NAS and NSSO consumption estimates (food items) (INR billion)

Table A1.2: Item group level comparison between NAS and NSSO consumption estimates (non-food group) (INR billion)