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Composite Development Index: An Explanatory Note

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1. Introduction

In May 2013, the Government of India constituted a committee to evolve a composite development index of states. The Committee was directed to suggest methods for identifying the backward states that could then be reflected in the devolution of funds from the Central Government to the States. The terms of reference also included a qualifier: the devolution formula must also incentivize performance by including variables that measure the ability of States to use funds productively.

The committee submitted its report on September 1, 2013 (available at http://www.finmin.nic.in/reports/index.asp). The document popularly known as the Rajan panel report (after the Chair, Raghuram Rajan) drew much attention. The report has been controversial.

The purpose of this article is primarily expository. I served as a member of this committee and I found that a superficial familiarity was the source of much criticism. So my hope is that this note will serve as the basis for more informed critiques.

2. The Principal Idea

The simplest scheme would be to look at per capita income. Economic growth is measured by the growth in per capita income and surely the idea of balanced regional development would include some notion of parity in per capita income.

The committee was, however, of the view, that the object of a development index is to capture the well being of an average individual in a state. Hardly anyone would contest the view that development is not synonymous with income growth. Indeed, the widespread acceptance of the human development index that combines income with indicators of health and education testifies to the strength of this view.

This suggests that a development index ought to be a composite of income and other social indicators. However, economists have long preferred average consumption expenditures per capita as a better measure of economic welfare. Consumption is less sensitive than income to shocks coming from droughts, prices or policy changes. Secondly, as inequality in consumption is less than the inequality in income, the consumption average is more representative of average standards of living.

To illustrate, consider an example. Suppose state domestic product is relatively high because of a few industries such as mining or oil refining. However, as these industries employ relatively few people, the direct impacts on consumption expenditures will be limited. The state GDP per capita would then be a misleading measure of the well being of an average individual.

However, in this example, even consumption expenditures may not fully capture economic welfare. This is because there could be indirect impacts of higher state GDP. A richer state would have more tax resources that could be invested in infrastructure, public services and subsidies to essential goods. All of these clearly matter to economic welfare. While subsidies could be captured by consumption expenditures, infrastructure and public services would need additional indicators. A comprehensive development index would therefore have to be averaged across consumption per capita and these other indicators of economic welfare. This is the principal idea that underlies the development index proposed by the Committee.

3. Method

We begin with a short summary. The development index has two components: a needs index and a performance index. The needs index is a simple average of consumption per capita and other relevant variables (following the discussion in the earlier section). The performance index is essentially the change in the needs index (towards development). The performance index receives a weight of 25% in the overall development index. The performance index is included so that states that use funds productively to further economic welfare (as measured by the needs index) are not penalized in future allocations of funds.

The needs index is a simple average of per capita consumption expenditures, the poverty ratio (which accounts for the inequality in consumption) and 8 other variables measuring access to public services and infrastructures. Six of these variables are education, health, household amenities (provided by public services), rate of urbanization, financial services and a connectivity index (comprising rail and road). The seventh variable is the female literacy rate – the only variable in the index that captures gender specific outcomes. The last variable is the percentage of population that is either Scheduled Caste (SC) or Scheduled Tribe (ST). Unlike other variables, this is not an outcome variable. However, it was included in the index because it is widely recognized in Indian public policy that additional resources are needed to overcome the disadvantages of these populations because of the visible legacy of discrimination.

The performance index is the change in the needs index with minor modifications. In particular, the SC/ST variable is excluded. So are the variables in the connectivity index that relate to Central government investments.

Before the indices are constructed, all the variables are suitably normalized to a 0-1 scale where a smaller score indicates a higher level of development relative to the other states.

The next step converts the indices to points to each state based on need and on performance. The points also take into account the state's population and area. The final step is to compute a state's share in the overall funds to be disbursed. As the points tally favours large states, each state gets a fixed basic allocation of 0.3%. This totals to 8.4% of funds. To allocate the remainder 91.6%, the following procedure is adopted. A state's share based on need is the ratio of the points scored according to need divided by the sum of all points across the states. Similarly, a state's share according to performance is computed. The sum of these two plus the fixed allocation of 0.3% is the state's overall share in funds.

4. Features

It is important to note that the index does not propose a binary classification of states into developed and under-developed. Rather it recommends an allocation of funds based on the development index. As is well known, a binary classification tends to be arbitrary because it is typically not clear where the dividing line ought to be drawn. States that are close to each other in the development index might well fall on either side of the dividing line. The index based allocation avoids such issues.

Second, the intent was to construct a transparent index that can be revised with time. To achieve this intent, the Committee restricted itself to those indicators that are contained in official data and about which information is routinely collected from time to time. The needs and performance indices are therefore dynamic and so would the formula for allocation of funds.

Turning to the findings, Goa has the lowest value on the under-development index and its share according to both need and performance is zero. So it receives only the fixed share of 0.3%. Despite this, its per capita allocation (Rs. 20.6) in Rs. 1000 crores is high because of its small population (Table 4 of report). For a similar reason, other small states also gain. Arunachal Pradesh, Manipur, Meghalaya, Mizoram, Nagaland, Sikkim and Tripura receive small shares; yet their per capita allocations are higher than that of the other states.

An easy way of summarizing the implications of the Committee's report is to look at the ratio of the state's share in funds to its share in population (Table 3 of report). If this value is above one, then a state receives more than its share of population. If this value is below one, then a state receives less than its share of population.

The states with shares less than their shares in population, in increasing order, are Kerala, Tamil Nadu, Maharashtra, Punjab, Haryana, West Bengal, Gujarat, Karnataka and Uttarakhand. Andhra Pradesh and Uttar Pradesh have fund shares that are about the same as their share in population. The states with fund shares more than their shares in population include Goa, Himachal Pradesh, Sikkim and the North-Eastern States. The larger states in this category, in increasing order of fund share, are Assam, Bihar, Jharkhand, Rajasthan, Madhya

Pradesh, Chhattisgarh, Jammu & Kashmir and Odisha. These are the states that would gain from the application of a development index.

Questions

There are several questions that need to be addressed in constructing an index: what variables should comprise the index, how should they be weighted and whether and to what extent performance should be weighted. Much of the criticism of the index surrounds these questions.

The most persistent criticism of the index was the decision to use consumption per capita rather than income per capita. This was the principal objection of the dissenting note to the report. Why should a state like Kerala that has high consumption expenditures only because of remittances rank high in the index? Notice that by this reasoning, India's export of software services cannot be seen as `development' either.

Another criticism was why should the indicators be equally weighted. In the technical literature, the method of principal components is often used to compute weights in the construction of indices. The Committee used this method as well and found that the principal components method suggested weights close to the equal weights allocation. A third kind of criticism relates to the ranking of states according to the development index and their shares in funds. The report has been criticized for giving too little to the North-eastern states (even though their fund shares are well above their shares in population) arguing that this would jeopardise their development. In the same breath, commentators (and often the same ones) have chastised the committee for reducing the shares of the states that have done well on the development index. A fourth criticism is that the Committee should have recommended transfers to offset fiscal disabilities. This was not the mandate of the Committee and doing so would have encroached on the domain of the Finance Commission.

Finally, a fundamental criticism has been about the place of this report in the wider framework of Centre-State federal transfers. As is well known, much of the devolution of funds happens through the Finance Commission or through central assistance to state plans through the Planning Commission. The Finance Commission is constitutionally mandated and clearly their recommendations do not have to be based on a development index. The Planning Commission allocations are fixed in consultations with states and only a small part of their disbursement is guided by the Gadgil-Mukherjee formula. Therefore, it is not clear what Central funds will be guided by a development index.

Perhaps one reason for some of the discomfort with the Committee's findings is that the report has insufficient documentation about the raw data that was used to produce the indicators. Although the raw numbers are sourced from official data available in the public domain, it is a formidable task for individual researchers to assemble the entire data themselves. The data used for the needs index is available at http://www.finmin.nic.in/reports/index.asp, (see also the news feature in the Hindu, http://www.thehindu.com/news/national/rajan-

panel-report-its-a-battle-of-the-states/article5190290.ece). The spreadsheet at this site does not, however, contain the base year data. Table 1 contains the base year raw data that was supplied to the Committee.[1] For obvious reasons, it cannot be guaranteed that these tables accurately represent the data used in the index computations. Hopefully, the government would put up the base year data as well.

Concluding Remarks

In this short article, I have attempted to convey the thinking behind the report on the composite development index and also a flavor of its findings. The report itself contains greater detail about the data sources, the correlation between the various indicators, the formula for assigning points, and the findings and how they relate to fund shares through Finance and Planning Commission.

Perhaps because of the media coverage, there has been insufficient appreciation that the index is transparent and based on official verifiable data. The index is not based on *a priori* views about whether a particular state is less developed or not. It is equally important to note that the index and therefore the allocation of funds is relative. Everybody cannot do well on the index. For this reason, some states that are higher ranked on the development scale would receive less funds less than a lower ranked state. This is the logic of a development index.

[1] The raw data was assembled by a team at the Ministry of Finance that also computed the index. The primary task of the Committee was to develop the methodology. The index computations with state identifiers and the raw data were not seen by the Committee until after the methodology was finalized.

Table 1: Base Year Values

States	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T
Jammu & Kashmir	50	13.1	18.5	46.9	25.8	883.3	88.1	67.9	22	6.1	31.6	80.6	6.8	43.0	24.8	36.5	0.06	0.37	0.01	3.95
Himachal Pradesh	49	22.9	28.7	66.6	28.6	891.1	95	72.9	20.6	10.1	32.6	94.8	16.5	67.4	9.8	59.5	0.51	2.17	3.57	29.25
Punjab	44	20.9	28.9	43.2	11.4	1034.2	89	49.8	11	2.9	85.5	91.9	18.9	63.4	33.9	48.5	4.17	3.09	2.89	71.18
Uttarakhand	42	32.7	20.9	54.8	25.7	737.4	87.6	63.3	19.7	8.6	44.8	60.3	9.9	59.6	25.7	59.8	0.65	3.72	0.82	25.82
Haryana	60	24.1	19.3	55.5	24.1	979.3	87.2	55.5	13.6	2.7	44.5	82.9	12.7	55.7	28.9	45.2	3.61	3.32	5.74	51.49
Rajasthan	68	34.4	29.7	71.0	40.3	675.4	78	40.8	9.5	5.4	32.9	54.7	8.0	43.9	23.4	28.9	1.71	1.63	2.85	24.95
Uttar Pradesh	73	40.9	21.2	68.6	20.3	606.2	77.5	44.5	10.3	3.5	46.0	31.9	5.6	42.2	20.8	44.1	3.55	2.32	3.69	64.09
Bihar	61	54.4	16.6	80.8	49.5	471.3	65.2	42.7	8.6	2.1	39.6	10.3	2.2	33.1	10.5	21.3	3.59	3.59	4.00	53.80
Sikkim	30	30.9	25.6	36.6	49.2	789.1	94.1	68.7	20.9	6.4	45.7	77.8	13.2	60.4	11.1	29.7	0.00	0.87	2.62	19.81
Arunachal Pradesh	37	31.4	64.8	43.7	46.1	766.8	72.1	61.1	22.6	6.1	32.4	54.7	9.2	43.5	20.8	37.3	0.00	0.47	0.00	11.86
Nagaland	18	8.8	89.1	29.4	56.9	1206.6	93.3	79.9	32.7	3.7	22.9	63.6	5.2	61.5	17.2	15.9	0.08	2.98	2.44	58.44
Manipur	13	37.9	37.0	18.0	39.7	676.9	93.2	79.8	44.3	6.7	11.9	60.0	5.3	60.5	26.6	8.7	0.00	4.30	4.26	21.37
Mizoram	20	15.4	94.5	11.0	50.9	1009.9	95.3	68.7	20.8	11.4	19.6	69.6	14.1	86.7	49.6	31.8	0.01	4.24	0.57	10.44
Tripura	31	40.0	48.4	18.6	49.9	579.2	88.2	59.6	11.9	3.6	21.8	41.8	5.2	64.9	17.1	26.5	0.61	3.81	6.48	105.86
Meghalaya	49	16.1	86.4	48.8	55.1	757.9	86.9	52.6	14.3	11.6	20.1	42.7	6.0	59.6	19.6	20.8	0.00	3.61	4.95	19.27
Assam	68	34.4	19.3	35.4	40.6	627.9	87.1	53.2	12.8	5.5	37.9	24.9	4.3	54.6	12.9	20.5	3.19	3.62	3.07	24.38
West Bengal	38	34.2	28.5	56.3	30.1	718.4	82.9	41.6	11.8	2.7	32.1	37.5	6.7	59.6	28.0	36.8	4.34	2.62	1.65	39.93
Jharkhand	50	45.3	38.1	80.3	39.6	532.5	76.7	45.4	13.3	2.9	20.0	24.3	3.3	38.9	22.2	30.1	2.43	2.26	2.37	7.98
Odisha	75	57.2	38.7	85.1	41.0	472.3	80.2	29	6.1	7.1	19.0	26.9	3.9	50.5	15.0	24.2	1.46	2.38	2.58	14.52
Chhattisgarh	63	49.4	43.4	85.8	32.2	524.2	81	44.4	12	8.5	19.0	53.1	3.8	51.9	20.1	24.1	0.86	1.62	2.30	26.17
Madhya Pradesh	76	48.6	35.4	76.0	42.2	562.3	78.4	41	8.7	8.3	24.6	70.0	6.2	50.3	26.5	27.9	1.59	1.69	2.61	21.40
Gujarat	54	31.6	21.9	55.4	37.3	838.3	85.6	36.5	10.9	3.4	46.5	80.4	12.5	57.8	37.4	37.8	2.69	1.45	9.46	55.19
Maharashtra	36	38.2	19.1	64.9	36.8	851.3	89.1	51.7	14	3.2	53.4	77.5	14.1	67.0	42.4	48.1	1.80	1.36	10.78	44.84

Andhra Pradesh	57	29.6	22.8	67.0	45.9	728.6	87.6	36.4	8.9	4.4	31.3	67.2	8.6	50.4	27.3	31.0	1.89	1.63	3.29	42.39
Karnataka	50	33.3	22.8	62.5	34.9	726.1	88.3	41.7	11	4.5	31.7	78.5	12.8	56.9	34.0	40.0	1.55	2.00	8.97	57.86
Goa	16	24.9	1.8	41.4	19.6	1127.3	94.6	62.2	8.3	4.7	61.7	93.6	29.1	75.4	49.8	72.8	1.86	7.27	7.54	186.06
Kerala	14	19.6	11.0	16.0	27.2	1106.7	97.6	68.7	16.4	1.8	71.6	70.2	19.1	87.7	26.0	51.1	2.70	3.71	9.74	221.71
Tamil Nadu	37	29.4	20.0	64.8	32.4	818.8	96.1	48.7	11.8	3.5	27.1	78.2	11.2	64.4	44.0	22.8	3.21	3.22	5.54	97.91

Notes:

A IMR (2005-06)
B %of people below poverty line (2004-05)
C % of ST-SC population (2001)
D % of Households with no sanitation facilities (2001)
E % of Households with no specified assets (2001)
F Monthly per capita expenditure (combined) (2004-05)
G Attendance ratio in age group 5-14 (2004-05)
H Attendance ratio in age group 15-19 (2004-05)
I Attendance ratio in age group 20-24 (2004-05)
J No. of Education institution in primary/junior basic school & middle/sr. basic school per 1000 population (2007-08)
K % of Households with drinking water within premises (2001)
L % of Households with electricity as primary source of lighting (2001)
M % of Households having landline phone, mobile or both (2001)
N Female Literacy rate (%) (2001)
O Urbanization Rate (2001)
P % of Households with banking services (2001)
Q Rail Route per 100 Sq Km (2004-05)
R Length of surfaced National Highway per 100 Sq Km (2010)
S Length of surface State Highway per 100 Sq Km (2010)
T Other surface roads per 100 Sq Km (2010)