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IN SEARCH OF LONG RUN STABILITY FOR FISCAL TRANSFERS IN INDIAN FEDERALISM

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JEL Classifications: C32, H11, H77

Intergovernmental transfers of financial resources have long been a dominant feature in the federally structured countries. The most critical aspect of such federal transfers is to deal with the existing imbalances between different levels of governments that have assigned different fiscal powers. In India, the structural imbalance of financial resource mobilization between central (national) and state (subnational) governments, referred as vertical imbalance, has existed right from the beginning because the Constitution provides quasi-federation with more power to the centre for allocation of resources. In contrast, the states at subnational level have assigned major expenditure responsibilities such as law and public order, agriculture, public health and education, several infrastructural contraction, etc. due to their proximity to the local issues. Furthermore, with the adoption of developmental planning and emphasis on decentralized fiscal activities, the role of subnational governments to provide better social and economic services has widened. Seeing that the resource mobilization powers assigned to subnational states fall short of their expenditure responsibilities, the states are therefore dependent on central government for financial resources. Consequently, the fiscal management of states to a large extent is shaped by the central devolution of funds and expenditure commitments that arise from time to time.

Nevertheless, the states are themselves unequal in terms of resource mobilizations at subnational level. Such an inequality is termed as horizontal imbalance and is caused by the statewide variations in revenue generations and expenditure responsibilities since there are region-specific disparities and diverse socioeconomic structure among them. In spite of that the fiscal stance of state governments in general is attained focus in most public debates since later half of the eighties when states are started experiencing fiscal imbalances. Notably, the fiscal policy of states deems as imperative in national macroeconomic policies because the states account for around sixty percent in combined expenditure by central and states governments. In view of the growing importance of subnational financial patterns in economy as well as reformative intergovernmental transfer systems over time, there are very extensive researches on the issue of fiscal federalism in India. In fact, there are enormous studies over the last two decades to review critically the existing patterns of vertical and horizontal devolution of resources (Bagchi and Chakraborty, 2004; Chakraborty, 2010; Chalam and Mishra, 1997; Ghosh, et al., 2011; Hajra, et al., 2008; Kurian, 2008; Ramalingom and Kurup, 1991; Rangarajan and Srivastava, 2008; Rao, 2002; Srivastava, 2010; Vidwans, 1999; etc.). The present study is rather different from those since our endeavor here is to offer an estimate for statewide contribution in central resource pool and compare it to their receipt as central transfers. This is indeed an important moral economic issue that the study attempts to find out using budgetary data of national and subnational governments over the last three decades. Clearly, the study intends to identify whether there exists any long run stability in the pattern of federal transfers of financial resource between *centre to state* (flow of funds from the centre to a state's revenue) and *state to centre* (flow of funds from a state to the centre's revenue)? In econometric sense, this is to be accomplished by examining the cointegration of state specific contribution in and return from central resource pool. The remainder part is organized as follows. First, we offer a brief review of statewide comparative fiscal health involving the deficit indicators, and then realize

the trend of federal transfers for growing expenditures need of states in India. Nevertheless, the modeling of statewide contribution in central resource pool, and the empirical methodologies on advanced time series econometrics to deal with the issue of long run equilibrium of fiscal transfers are explored thereafter. Subsequently, the results and discussion on stability of fiscal transfers are presented, followed by the conclusions.

Review of fiscal stance and pattern of federal transfers for the states in India

Pattern of states fiscal health

The fiscal shape of constitutional states at subnational level may well be observed by the two broad indicators – revenue and fiscal deficits¹ – in their public budget. Accordingly, the states are ranked on their average scores for the indicators normalized by state level output (GSDP) in two reference periods – first half of 1980s (may be marked as the before scenario of major fiscal imbalances for states) and second half of 2000s (referred as current scenario of enacting fiscal responsibility and budgetary management for the states). As depicted in table 1, Kerala, Punjab and West Bengal are the bottom three states in RD-GSDP term during current period (second half of 2000s). However, in first half of 1980s, the state of Orissa placed in bottom position instead of Punjab during 2000s: II. Interestingly, Orissa reaches to the top from bottom over time. Further, Madhya Pradesh is the only state that consistently scored as toper in both 1980s: I and 2000s: II. In GFD-GSDP term, however, Tamil Nadu is maintained the toptness over time. On the other hand, Utter Pradesh retains in the bottomness over time. Again interestingly, West Bengal currently drops to the bottomness from its toptness in 1980s: I.

Table 1: Ranking of states as per the deficit indicators

	As per RD-GSDP ratio		As per GFD-GSDP ratio	
	2000s: II	1980s: I	2000s: II	1980s: I
Top-3	Bihar Madhya Pradesh Orissa	Madhya Pradesh Haryana Gujarat	Orissa Haryana Tamil Nadu	Tamil Nadu Kerala West Bengal
Middle-8	Karnataka Uttar Pradesh Tamil Nadu Haryana Andhra Pradesh Maharashtra Gujarat Rajasthan	Punjab Tamil Nadu Uttar Pradesh Karnataka Bihar Rajasthan Maharashtra Andhra Pradesh	Maharashtra Karnataka Gujarat Madhya Pradesh Andhra Pradesh Rajasthan Kerala Bihar	Andhra Pradesh Maharashtra Karnataka Gujarat Haryana Orissa Punjab Rajasthan
Bottom-3	Kerala Punjab West Bengal	Orissa Kerala West Bengal	Punjab Uttar Pradesh West Bengal	Uttar Pradesh Madhya Pradesh Bihar

The study therefore considers seven states, namely Kerala, Punjab, West Bengal, Uttar Pradesh, Orissa, Madhya Pradesh and Tamil Nadu for comparative analysis of long run equilibrium for federal transfers involving time series econometrics. However, prior to analyze

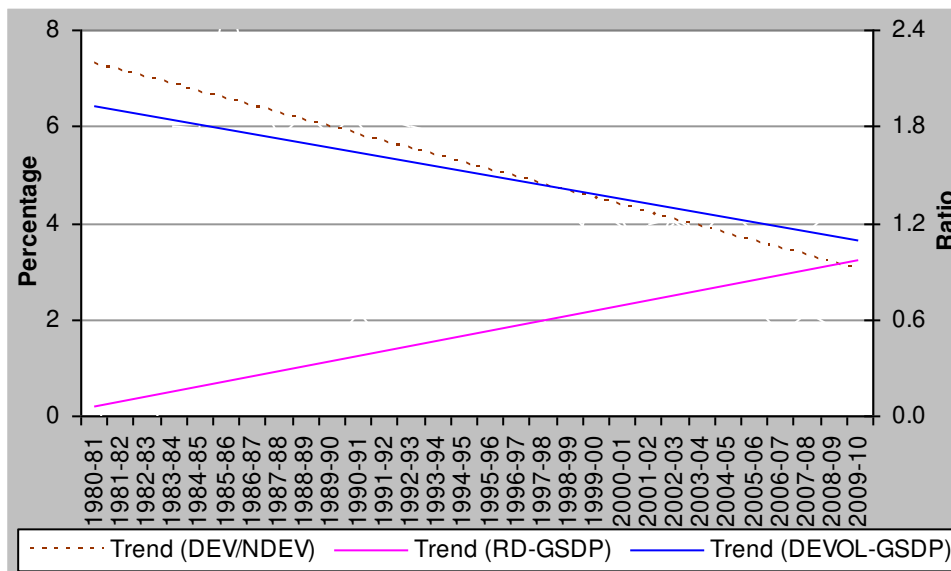
¹ The current resource gap between receipt and expenditure on revenue account is known as revenue deficit (RD), and the overall receipt-expenditure gap involving both revenue and capital accounts in government budget is gross fiscal deficit (GFD) on which the primary deficit is computed by less of interest payment.

the stability of resource transfers, we now quickly look into the observed pattern of federal transfers for selected states over the study period of 30 years from 1980-81 to 2009-10.

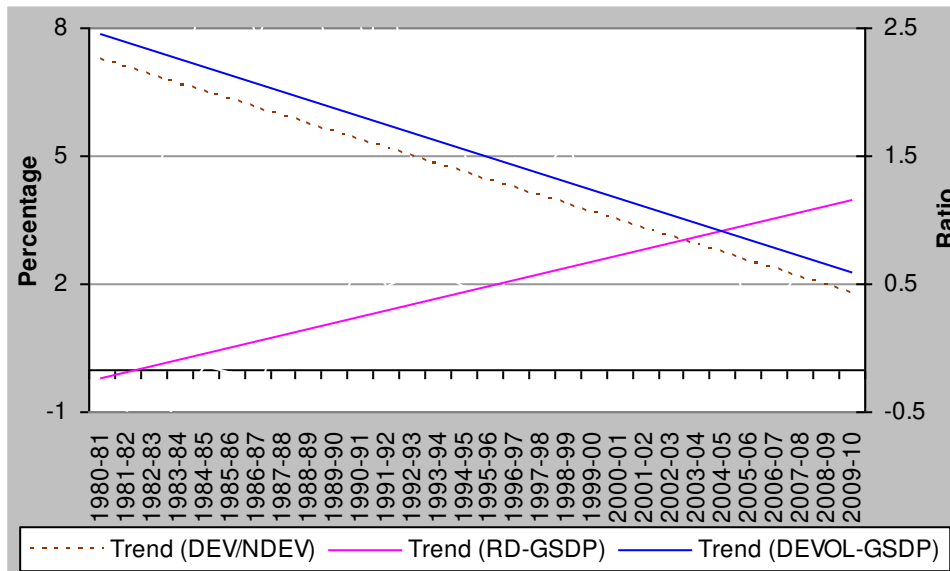
Pattern of federal transfers

The centre-state resource transfers are characterized by statutory plus discretionary in nature, and the same are realized in three channels: Finance Commission recommendation for sharable central taxes as well as general purpose grants, Planning Commission grants for developmental plan expenditures and Central Ministerial grants for centrally sponsored schemes. Focusing on the positive analysis of distributional aspects of intergovernmental transfer patterns however highlight some political economy features of transfers such as the faulty design and implementation of a transfer system by the realm of political bargaining. The central ministries are often wished to influence the states outlays on selected items of expenditure using highly discretionary transfers, and also there are evidences that the Planning Commission transfers involve temporal variations (ref.). On the other hand, the working of statutory Finance Commissions towards the design of transfer system as well as the approach and methodology adopted by them has come in for criticism. Much of the policy discussions and research in this regard falls under the normative categorization as a remedy for horizontal imbalances, though there has been some analysis of equity outcomes that cuts across positive and normative concerns (ref.). We therefore review the observed trend of central transfers (DEVOL) to the selected states with their deficit situation and expenditure pattern over time. Notably, while devolution of central resources and revenue deficit of state are normalized by the state level output, a ratio of development (DEV) to non-development (NDEV) expenditures is considered mainly to recognize the statewide effectiveness for social and economic services.

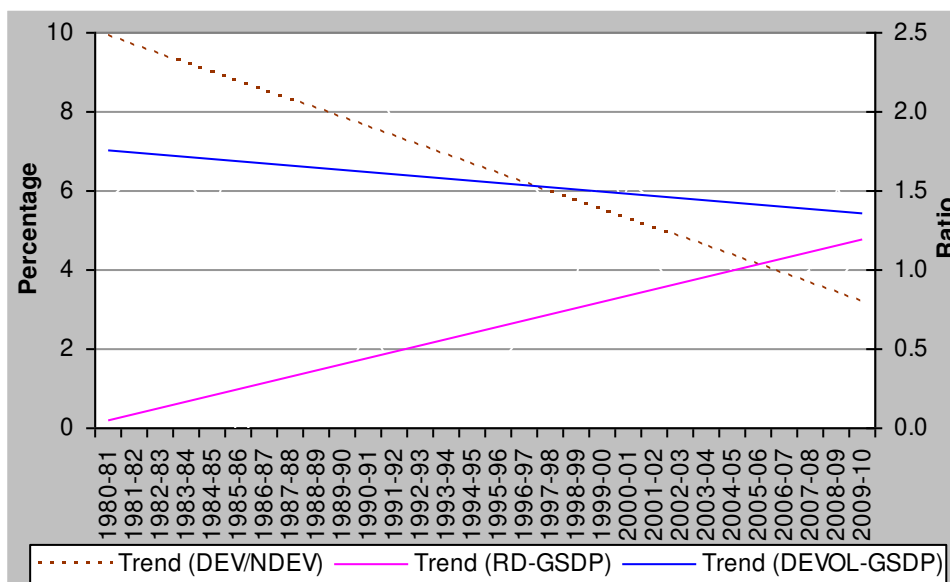
Kerala



Punjab



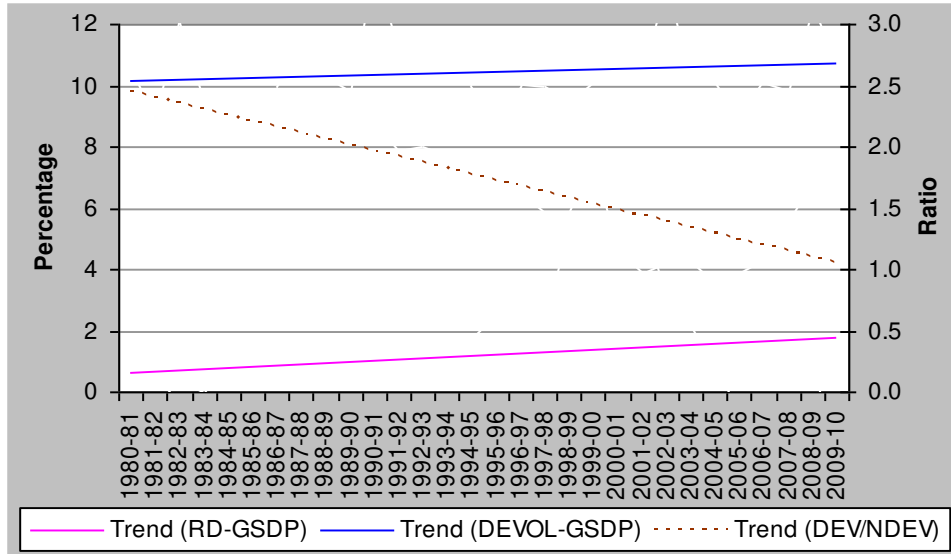
West Bengal



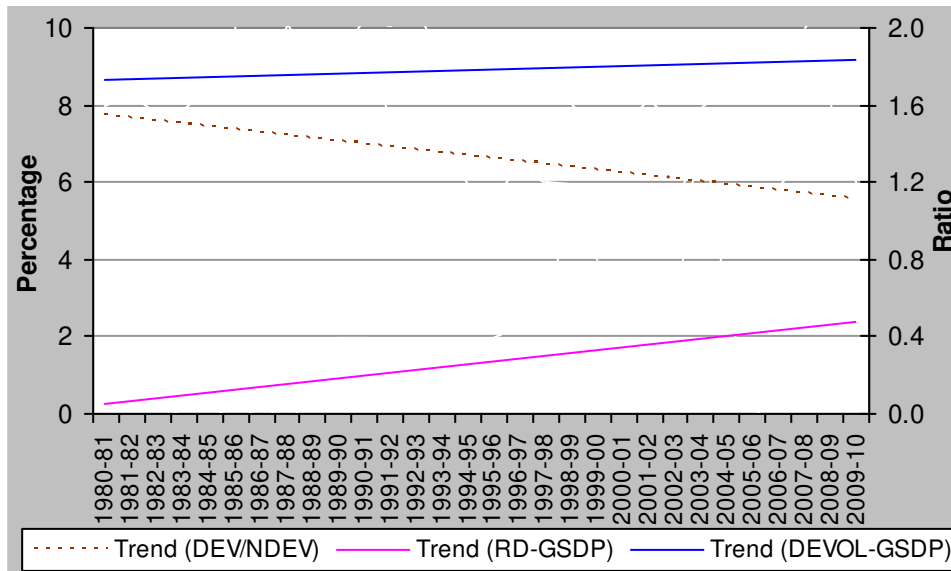
We found a falling trend of fiscal devolution except for Orissa and Uttar Pradesh over the period of last three decades. However, a serious fall in DEVOL-GSDP proportion is observed for Kerala, Punjab and Tamil Nadu, and West Bengal to some extent. Likewise, a serious level of RD-GSDP proportion is viewed in Kerala, Punjab and West Bengal, and that is varied between 3 to 5 percentage points. All other states experience it as almost below 2 percent level. In spite of that the studied states are nearly same in one respect which is essentially the ratio of development to non-development expenditures. Clearly, a fall in the DEV/NDEV ratio implies that the states are unable to maintain their spending on social and economic development.

Alternatively, it might suggest that the states in general at subnational level are incurred a relatively higher non-development expenditure committed for administrative services, pension and interest payment. It is therefore the more central devolution of resources that indeed help states for effective expenditure on the development purposes.

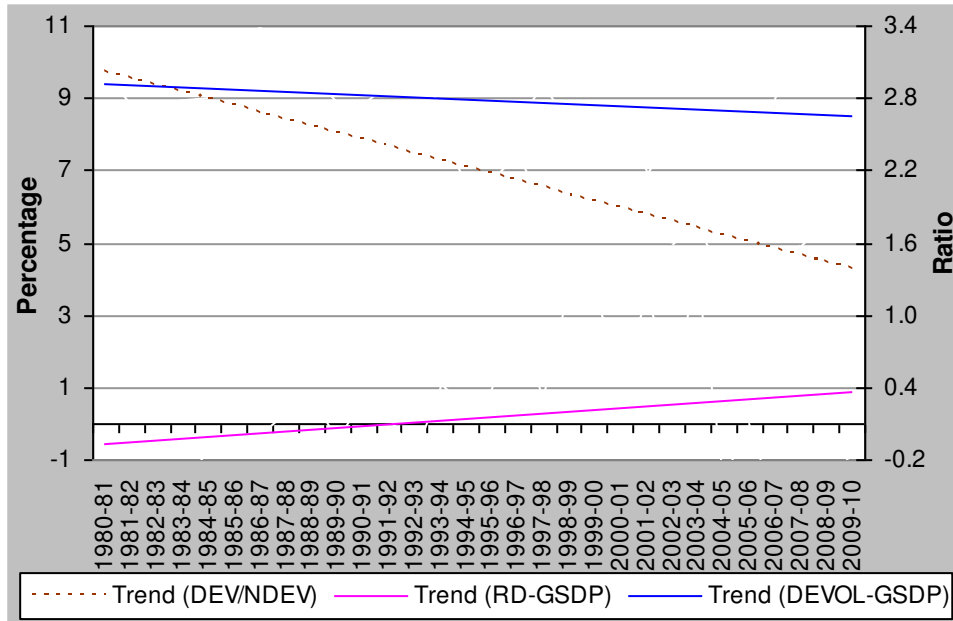
Orissa



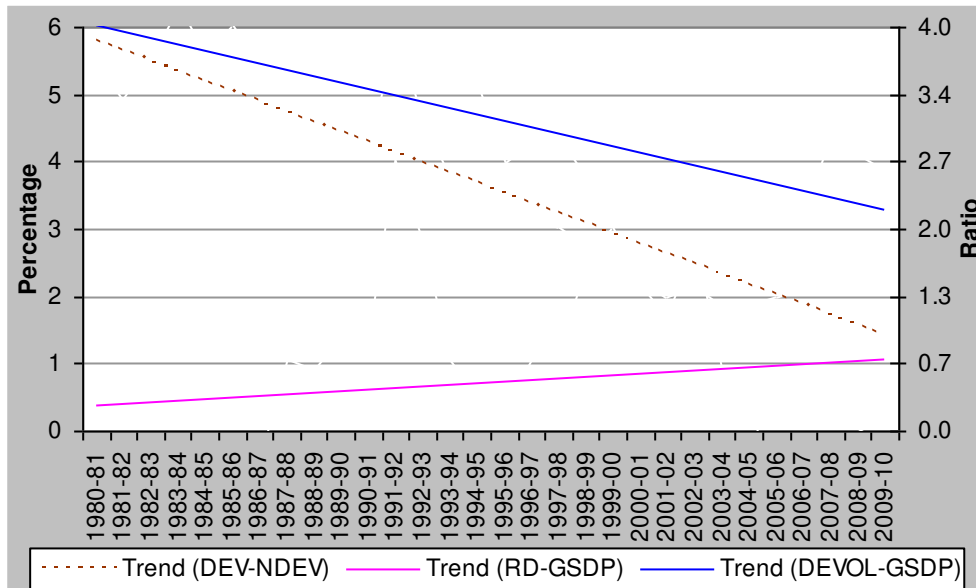
Utter Pradesh



Madhya Pradesh



Tamil Nadu



Estimate of state to centre resource transfers and test for the long run stability

In a federal country like India, whatever the funds accumulated as tax revenue in central resource pool are essentially originated from the activities of its constitutional states. However, the information on state specific resource transfers to the centre is not publicly recorded. Our endeavor here is to offer an indirect estimation of such transfers reasonably. In this modeling,

we start from the basic principle that national income (output) is a sum total of states income (output). In standard practice, it implies: if the tax to GDP ratio is t^c , then $t^c \times \text{GSDP}_i$ gives the contribution by i^{th} state to centre tax revenue in average term. Of course, the actual contribution will be different from this average value since the states are subject to unequal resource mobilization activities. Clearly, the state level relative performance should be taken as a weight (w_i) to determine the actual contribution. In a priory sense, there may be two possible variables, namely per capita GSDP or state own tax effort that seem to be used for the weight. Even so, the state tax to GSDP ratio is deemed as the most suitable one since it involves both income generating activity as well as revenue accumulation capability of the state².

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Clearly, if the devolution of resource from centre to state is R_i^c , then $(R_i^c - R_i^s)$ would be the net gain from federal transfers to i^{th} state.

Now, the question arises whether there is any stability in the pattern of federal transfers? The long run stability of transfers in econometric sense is examined by the test of cointegration between R_i^c and R_i^s series. Our conclusion is that if R_i^c and R_i^s are cointegrated, there exists a long run equilibrium in the federal transfers system. In literature, however, the standard test involves in two-step procedures, and starts first by examining the unit root for each individual series of R^c and R^s . Further, it is argued that the structural break in a series biases results toward non-rejection of null hypothesis of a unit root (Perron, 1989). Since, structural break in macroeconomic data is present in most of the countries including India (Uctum, et al., 2006; Hatekar and Dongre, 2005; Jha and Sharma, 2004; Raju, 2011; Wallack, 2003) the usual tests such as augmented version of Dickey-Fuller test for unit root and Engle-Granger test for cointegration seem to be misleading results. To deal with the problems, there are advanced approaches in econometric literate such as Zivot-Andrews test of unit root and Gregory-Hansen test of cointegration (Keho, 2010; Aslan and Taşdemir, 2009; Chang and Ho, 2002; Uctum, et al., 2006; Jha and Sharma, 2004; Raju, 2011). These test procedures are essentially the modified version of standard unit root test and cointegration test that can deal with the unknown structural break by introducing dummy variables for drift change and/or slope change. Zivot and Andrews (1992) propose a test procedure in which the candidate break point (μ) is treated as an outcome of the estimation procedure deigned for a series R_t with the generalized specification³ is:

² It is of course the fact that state taxes are relatively inelastic and less buoyant, we observed a very high correlation between state own tax revenue and GSDP as 0.983 in India.

³ The original version of Zivot-Andrews test involves three models: A (only one dummy in the regression for drift shift), B (only one dummy in the regression for slope shift) and C (both drift shift and slope shift by two dummies in the regression). Nevertheless, the appropriate model may be based on the significance of dummy coefficient(s) in the regression. Here we start with the generalized form that is model C.

$$\Delta R_t = \gamma + \theta t + \beta_1 D_{dt} + \beta_2 D_{st} + \phi R_{t-1} + \sum_{m=1}^p \sigma_m \Delta R_{t-m} + e_t \dots\dots\dots (1)$$

Here, D_d and D_s are respective dummy variables for drift and trend shifts. The possible values for dummy variables can be summarized as: drift dummy equals 1 if $t > \mu$ and 0 otherwise; slope dummy equals $t - \mu$ if $t > \mu$ and 0 otherwise. The null hypothesis of unit root with structural break in the series is that $\phi = 1$. Prior to estimate the above model specified in equation (1), there are two basic problems: determination of break date μ and choice of lag length p . So as to determine the break point in the series, Zivot-Andrews applied a sequential ADF test for equation (1) over the range of sample excluding the two extreme points of the data to search each possible break point. That is to say $\mu \in [2, T-1]$, where $t = 1, 2, 3 \dots T$. Therefore, by solving equation (1) for ADF test we get $T-2$ number of ADF statistics ($\tau_h, h \in [2, T-1]$), which are of course biased towards Dickey-Fuller τ -distribution since the model specified in (1) differs from the original ADF model (Zivot and Andrews, 1992). We select the break date (μ) associated with the value $\hat{\tau}$ that reject null hypothesis of unit root strongly⁴. That is to say the break point (μ) = $\inf(\hat{\tau}_h)$. Once the break point is given, we follow general-to-specific criterion proposed by Perron (1989) for selection of lag length. That is, we set $p_{max} = 6$ and keep reducing the lag until the null that the coefficients of last p lags are jointly significant towards the critical value of 1.60 for t/F statistic in absolute term. Finally, given the break date and lag choice, the Zivot-Andrews model in equation (1) to be estimated for unit root test of $\hat{\phi}$. Notably, for the cointegration analysis we have to run this test for both R^c and R^s series to find out whether they are integrated in the same order $I(d)$. The Gregory and Hansen (1996a) version of cointegrating regression for R^c and R^s in general form of regime shift⁵ may be specified as:

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In this model, D_t is dummy variable, which takes value 1 if $t > \pi$ and 0 otherwise. That is, a_1 and b_1 are the respective coefficients for drift and slope before break point (π), and a_2 and b_2 are the corresponding changes after the break. We now estimate the cointegrating equation (2) by OLS for each possible break point in grid search procedure with the central seventy percent observations (Gregory and Hansen, 1996b: 557). That is to say $\pi \in [0.15T, 0.85T]$ and we have to run regressions, which in number are the nearest integer of value $[T - 0.3T]$. Clearly, it provides the \hat{w}_t^π series for each possible π . Finally, the standard residual-based ADF test is applied for each \hat{w}_t^π series as follows:

⁴ We reject the H_0 : unit root, if $\hat{\tau}$ is less than the critical value from the asymptotic distribution reproduced by Zivot and Andrews (1992).

⁵ Like Zivot-Andrews test, the original version of Gregory-Hansen test involves also three models: 2 (level shift), 3 (level shift with trend) and 3 (regime shift). All the models are modified from the original cointegration model 1, developed by Engle and Granger (1987).

Here the null of no cointegration is tested using the asymptotic critical values provided by Gregory and Hansen (1996a) for date-dependent ADF statistic [$ADF^* = \inf ADF(\pi)$, where the break point is associated too].

Results and discussion on stability of federal financial transfers

The stability of federal transfers system in long run to be achieved if both the forms of transfers, that is to say central devolution (centre to state) and state contribution (state to centre) are stationary and cointegrated. Prior to analyze this issue, we offer a comparative picture of the states with net gain/loss from federal transfers over time. Table 2 portrays the arrangement of states from looser to gainer for federal transfers in net basis (central devolution – state contribution). Further, the net transfer deems to be normalized either on output or on population at state level to arrive in the standard comparative analysis sine the states are essentially diverse in size. States are ranked on their average value of net transfer in two reference times: entire study period, that is 1980-81 to 2009-10, and current period covering last five years from 2005-06 to 2009-10. Interestingly, there is hardly any perceptible change for a state in the order of ranking between two reference times. Of course, there is a change in the ranking between per capita and GSDP terms of net transfer. Nevertheless, all the special category states are net gainer from federal transfers, except for newly established state of Uttaranchal. In contrast, all the general category states are net looser, with the exception of Bihar and currently Orissa. There is indeed no signal in the fiscal devolution patterns toward financially unhealthy general category states observed earlier in table 1, such as Kerala, Punjab and West Bengal⁶. Albeit, the central resource pools are constantly welled-off by their resource mobilizations, the financial devolution patterns are failed to address any corrective measures in favor of these fiscally unhealthy states.

Table 2: Rank of states as per net transfer (central devolution – state contribution)

Net transfer normalized by GSDP		Net transfer normalized by population	
1980-81 to 2009-10	2005-06 to 2009-10	1980-81 to 2009-10	2005-06 to 2009-10
Karnataka	Karnataka	Goa	Goa
Tamil Nadu	Tamil Nadu	Haryana	Haryana
Haryana	Haryana	Maharashtra	Tamil Nadu
Maharashtra	Goa	Tamil Nadu	Karnataka
Gujarat	Kerala	Karnataka	Maharashtra
Kerala	Punjab	Punjab	Punjab
Punjab	Andhra Pradesh	Kerala	Kerala
Andhra Pradesh	Maharashtra	Gujarat	Gujarat
Goa	Gujarat	Andhra Pradesh	Andhra Pradesh
Chattisgarh	Rajasthan	Chattisgarh	Rajasthan
Madhya Pradesh	Chattisgarh	Rajasthan	Chattisgarh
West Bengal	Madhya Pradesh	Madhya Pradesh	West Bengal

⁶ The fact is as well true if we choose an alternative weight, namely per capita GSDP instead of tax to GSDP ratio. Ranking of the states as per net transfer with per capital GSDP weight is reported in appendix. As may be seen in table 2A, apart from the special category states excluding Uttaranchal, there are five general category states, namely Bihar, Jharkhand, Madhya Pradesh, Orissa and Utter Pradesh gained from the federal transfers.

Rajasthan	West Bengal	West Bengal	Madhya Pradesh
Uttar Pradesh	Uttar Pradesh	Uttaranchal*	Uttaranchal*
Jharkhand	Jharkhand	Jharkhand	Uttar Pradesh
Uttaranchal*	Uttaranchal*	Uttar Pradesh	Jharkhand
Orissa	Orissa	Orissa	Orissa
Assam*	Himachal Pradesh*	Bihar	Bihar
Bihar	Assam*	Assam*	Assam*
Himachal Pradesh*	Bihar	Himachal Pradesh*	Himachal Pradesh*
Meghalaya*	Meghalaya*	Meghalaya*	Jammu & Kashmir*
Jammu & Kashmir*	Jammu & Kashmir*	Jammu & Kashmir*	Meghalaya*
Tripura*	Tripura*	Tripura*	Tripura*
Manipur*	Sikkim*	Manipur*	Nagaland*
Sikkim*	Nagaland*	Nagaland*	Manipur*
Nagaland*	Manipur*	Sikkim*	Sikkim*
Arunachal Pradesh*	Arunachal Pradesh*	Arunachal Pradesh*	Mizoram*
Mizoram*	Mizoram*	Mizoram*	Arunachal Pradesh*

*Special category states; Shaded states are net gainers from the federal transfers.

Results on cointegration are under progress ...

Conclusions

To be added ...

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Appendix

Table 2A: Rank of states as per net transfer with weight as per capita own output

Net transfer in GSDP term		Net transfer in per capita term	
1980-81 to 2009-10	2005-06 to 2009-10	1980-81 to 2009-10	2005-06 to 2009-10
Goa	Goa	Goa	Goa
Haryana	Haryana	Haryana	Haryana
Maharashtra	Maharashtra	Maharashtra	Maharashtra
Punjab	Gujarat	Punjab	Gujarat
Gujarat	Punjab	Gujarat	Punjab
Tamil Nadu	Tamil Nadu	Tamil Nadu	Tamil Nadu
Kerala	Kerala	Kerala	Kerala
Karnataka	Karnataka	Karnataka	Karnataka
Andhra Pradesh	Andhra Pradesh	Uttaranchal*	Andhra Pradesh
West Bengal	West Bengal	Andhra Pradesh	Uttaranchal*
Uttaranchal*	Uttaranchal*	West Bengal	West Bengal
Chattisgarh	Rajasthan	Chattisgarh	Rajasthan
Rajasthan	Chattisgarh	Rajasthan	Chattisgarh
Jharkhand	Jharkhand	Madhya Pradesh	Jharkhand
Madhya Pradesh	Himachal Pradesh*	Uttar Pradesh	Orissa
Uttar Pradesh	Orissa	Orissa	Madhya Pradesh
Orissa	Madhya Pradesh	Jharkhand	Himachal Pradesh*
Assam*	Uttar Pradesh	Assam*	Uttar Pradesh
Himachal Pradesh*	Assam*	Bihar	Bihar
Bihar	Meghalaya*	Himachal Pradesh*	Assam*
Meghalaya*	Bihar	Meghalaya*	Meghalaya*
Jammu & Kashmir*	Tripura*	Tripura*	Tripura*
Tripura*	Jammu & Kashmir*	Jammu & Kashmir*	Jammu & Kashmir*
Manipur*	Nagaland*	Manipur*	Nagaland*
Nagaland*	Sikkim*	Nagaland*	Manipur*
Sikkim*	Manipur*	Sikkim*	Sikkim*
Arunachal Pradesh*	Arunachal Pradesh*	Arunachal Pradesh*	Mizoram*
Mizoram*	Mizoram*	Mizoram*	Arunachal Pradesh*

*Special category states; Shaded states are net gainers from the federal transfers.