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Impact of intergovernmental fiscal transfers on gender equality in India: an empirical analysis

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Abstract

Intergovernmental fiscal transfers (IGFT) are, in theory, neither good nor bad for tackling gender inequalities. Fiscal federalism with asymmetry in revenue and expenditure assignments inevitably leads to vertical and horizontal imbalances in public service provisioning. Because the states of India have different capacities for raising taxes and for funding public expenditure, intergovernmental transfers can play a role in equalization of fiscal capacities. Do higher per capita fiscal transfers help in reducing gender inequalities across states in India? Using data from the Finance Accounts of various states, we analyse the impact of fiscal transfers – both conditional and unconditional fiscal transfers – on the gender parity index in education, using panel data models. We find that unconditional transfers have a significant and positive impact on gender parity outcomes in the education sector at the primary and secondary levels, in contrast to tied transfers. The models also control for gender budgeting initiatives across states and find that gender budgeting has a beneficial effect on education equality. The policy implication of these results for the recently constituted Fifteenth Finance Commission in India is to strengthen the “gender equality” criteria in intergovernmental transfers in India.

Keywords: Intergovernmental fiscal transfers (IGFT), gender equality, fiscal federalism, gender budgeting, panel data

JEL codes: H00, I3, J16

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Impact of Intergovernmental Fiscal Transfers on Gender Equality in India: An Empirical Analysis

Fiscal federalism is, in theory, neither good nor bad for gender equality. The impact of fiscal federalism on gender-related outcomes depends on the institutional design of fiscal frameworks and intergovernmental transfer design. Although fiscal federalism is a vast literature, the intersection of fiscal federalism with gender equality is little studied.

India offers a good opportunity for examining the interaction between fiscal federalism and gender equality. Many major public expenditure assignments are at the state level in India and the most productive tax assignments are at the federal or Union level. This asymmetry in expenditure and revenue assignments in India has created vertical imbalances in Indian fiscal relations, and intergovernmental fiscal transfers (IGFT) are designed to address these fiscal asymmetries. This paper tries to test the effectiveness of intergovernmental fiscal transfers – both unconditional and conditional transfers – on gender equality

A few existing studies have tested the impact of gender budgeting efforts on gender outcomes and found a positive link between the two. Stotsky and Zaman (2016) examine gender budgeting in the context of state governments in India, while Chakraborty, Ingrams and Singh (2017) examine countries in the Asia Pacific region. Our paper takes the Stotsky and Zaman (2016) analysis one step further by incorporating the impact of IGFT into an analysis of gender equality outcomes.

The paper is organised into sections. Section 1 looks at the existing literature on the topic, noting the paucity of existing studies on the topic. Section 2 interprets the data. Section 3 explains the econometric model and interprets the results. Section 4 concludes.

1. Review of Theoretical and Empirical Literature

The theoretical literature on intergovernmental transfers largely deals with the conceptual elements and design of intergovernmental fiscal transfers in a context of competitive federalism (Smart 1996, Musgrave 1997, Qian and Weingast 1997, De Mello Jr 2000, Bird and Smart 2002, Boadway and Shah 2007, Hinojosa et al. 2010). The relative effectiveness of intergovernmental transfers on fiscal spending – flypaper effects – is analysed but without a gender perspective. Sarkar et al. (2002) in the context of Argentina analyse the impact of fiscal transfers on human development and find a positive relationship between the two. Lü (2011) analyses the effect of intergovernmental fiscal transfers on education spending in the context of China for the period 1994 to 2000 and does not find strong effects. Litschig and Morrison (2013) analyse the link between fiscal transfers and local public expenditure in Brazil for the education sector. Their results reveal that there is a positive and significant relationship between transfers and local education spending, and between per capita spending and education outcomes.

In India, Rao (2018), Rao and Singh (2007), Isaac and Chakraborty (2008), Chakraborty (2017), Chakraborty (2016), and Chakraborty and Chakraborty (2016) examine fiscal federal relations and subnational state finances. However, the impact of fiscal transfers on women and poverty is unaddressed in these papers.

Only a few of the existing studies on IGFT in India have incorporated gender equity concerns. Chakraborty (2010) and Anand and Chakraborty (2016) examine how integrating gender criteria/principles in the IGFT formula can improve horizontal equalization across jurisdictions. Chakraborty et al. (2018) look at how conditional transfers can alter gender equality outcomes.

The impact of gender budgeting on gender outcomes is a new area of econometric research. Stotsky and Zaman (2016) analyse the impact of gender budgeting on gender equality outcomes in the context of India and find that gender budgeting has a positive effect on gender equality in education at the primary and secondary levels. Chakraborty, Ingrams and Singh (2017) analyse the effectiveness of gender budgeting on sectoral gender outcomes in the context of the Asia Pacific region. They find that gender budgeting has a positive and significant effect on education and health outcomes; but there is no impact on labour force participation rates. This reinforces the view that care economy policies to augur female work force participation have been meagre in the region.

One shortcoming of the existing research on gender budgeting in the Indian context is that it does not incorporate IGFT, a vital part of fiscal relationships. The integration of IGFT into a model examining the determinants of gender equality outcomes and fiscal spending, controlling for gender budgeting, is the main innovation here and provides a more realistic view of subnational decision making in India.

2. Interpreting the Data: The Fiscal Transfers Architecture in India

Chakraborty et al. (2018) analyse the fiscal transfer architecture in India, incorporating the various components and channels of transfers. In India, IGFT can be broadly categorized into unconditional (or untied) and conditional (or tied) transfers. The first channel of unconditional transfers consists mainly of the Finance Commission formula-linked tax transfers from the Union's pool of revenues. The second channel of conditional transfers consists mainly of grants from the Finance Commission and from line ministries of the Union government (or centrally sponsored schemes). India has a three-tiered federal structure, with 29 state governments and 7 centrally administered Union Territories and more than a quarter million local self-governments in states, in both rural and urban areas. The richest province is Goa, with a per-capita income of INR 270,150 and poorest province is Bihar, with a per-capita income of INR 34,168, as per the Central Statistical Office data for the year 2015-16 (Chakraborty, et al. 2018).

In India, the Finance Commission, erstwhile Planning Commission and line ministries of the Union government are responsible for IGFT. India has had 14 Finance Commissions since independence. Recently India has appointed the Fifteenth Finance Commission and it is expected to submit its report by 2019[1].

[1] The duties mandated for the Finance Commissions are as follows:

(a) *the distribution between the Union and the States of the net proceeds of taxes which are to be, or may be, divided between them under this Chapter and the allocation between the States of the respective shares of such proceeds;*

(b) *the principles which should govern the grants in aid of the revenues of the States out of the Consolidated Fund of India; and*

(c) *any other matter referred to the Commission by the President in the interests of sound finance.*

The Finance Commission's recommendations in India have so far been conclusively accepted by the National Parliament. After the Parliament accepts the recommendations, the Finance Commission awards to the states, as per their formula, become mandatory and these transfers are also therefore referred to as 'statutory fiscal transfers'. These statutory transfers are unconditional grants or "general purpose transfers".

Until recently, a substantial flow of transfers in the form of intergovernmental "grants" has been transferred through the erstwhile Planning Commission of India. The Planning Commission was abolished in 2014. In place of the Planning Commission, the National Institute for Transforming India (NITI) Aayog has been constituted as a think tank to foster cooperative federalism in the country, with it having no role for intergovernmental fiscal transfers to the states of India.

The non-statutory transfers are channeled through the line ministries mostly as conditional grants or tied grants for specific purposes. These conditional grants are also referred to as "centrally sponsored schemes".

2.1: The Data Sources

The data are obtained from the IMF Database on gender created in 2016, as part of an IMF initiative on gender budgeting, the State Finance Accounts (for budgeted unconditional transfers[2]), federal government ministry web sites (for budgeted conditional transfers) and the Ministry of Women and Child Development (MWCD) gender budgeting information. The descriptive statistics of the variables are given in Table 1. The data cover the period 1991-2015. During this period, 16 of the states adopted gender budgeting and 13 did not. We do not include Union Territories because they have limited fiscal autonomy.

3. Econometric Model and Results

We econometrically analyse the effects of intergovernmental transfers on gender outcomes across the states of India, controlling for whether states have gender budgeting initiatives in place. Gender budgeting initiatives are difficult to quantify[3]. Specifically targeted allocations for gender development are broadly less than one per cent of the entire budget. There may be other spending targeted towards gender equality. The remaining 99 per cent of the budget often has intrinsic gender-related objectives. Unless we try to quantify this, using specifically targeted public spending on gender equality is potentially misleading. We avoid using spending as a proxy for gender budgeting initiatives for this reason.

Another dimension of effectiveness of gender budgeting in any state is whether it is made mandatory through legal procedures or not. However, in India (unlike in some countries or subnational entities, where gender budgeting is mandatory), gender budgeting was not made mandatory through law. A third dimension is to categorize the states as per the phase of gender budgeting—whether a state is in an early phase of model building, or second phase of developing gender budgeting statements using matrices and institutionalizing it in the Finance Ministry, or third phase of capacity building of sectoral ministries in integrating

[2] In India, there may be a significant discrepancy between budgeted and actual expenditures.
[3] For a summary of gender budgeting initiatives in India, see Stotsky and Zaman (2016) and Chakraborty (2016).

gender budgeting and/or in a final phase of designing accountability mechanisms of gender budgeting to understand its impacts. These four phases are unclear in the state context and therefore we did not try to establish in which phase the different states were, as a measure of gender budgeting in our econometric models.

Table 1: Descriptive Statistics

Variable (all log terms unless otherwise noted)	**N**	**Mean**	**Median**	**Std. Dev.**	**Min**	**Max**
Real per capita income (in millions)	364	64713.76	56485.64	37163.6	13025.78	257354.2
Real per capita income	364	10.93764	10.94174	0.5275736	9.474686	12.45821
Population	364	2.778876	3.333986	1.622623	-0.597837	5.346155
Real per capita aggregate transfer	364	6.213599	5.970776	1.002996	4.053169	8.470734
Real per capita unconditional transfers	364	5.280904	5.319674	0.6497289	3.543932	7.117445
Real per capita conditional transfers	364	5.501858	4.994416	1.342235	3.132279	8.25245
Real per capita total public expenditure	364	9.513909	9.452301	0.6841433	8.035975	11.36367
Real per capita education expenditure	364	7.658612	7.603247	0.6186773	6.37624	9.443997
Real per capita health expenditure	364	6.355814	6.248081	0.7311188	4.848756	8.331764
Real per capita infrastructure expenditure	364	7.491216	7.373991	0.8057505	5.67975	9.841097
Real per capita own revenue	364	6.10313	6.036861	0.8265038	4.062301	8.471641

Sources: IMF database, Finance Accounts of state governments, and federal government ministry websites.

Given the data limitations, following Stotsky and Zaman (2016), we categorize states into gender budgeting and non-gender budgeting states based on the announcement by the government to initiate gender budgeting in any state. We measure the effect of gender budgeting through the use of a dummy variable, where the variable takes a value of 1, if the state has a gender budgeting effort in place and 0, if the state does not. The gender budgeting regime dummies are also matched to the year of implementation of gender budgeting. The

year of implementation is used as a regime changing dummy because gender budgeting has not been rolled back in any of the states of India where it has been initiated.[4]

3.1: Econometric Model

We econometrically estimate the following equations to measure the impact of intergovernmental fiscal transfers and gender budgeting on gender equality outcomes and the fiscal stance respectively.

$$GI_{it} = \beta_1 GB_{it} + \beta_2 IGFT_{it} + \delta X_{it} + \eta_i + \nu_t + \varepsilon_{it}$$

where GI_{it} is the dependent variable in state *i* in year *t*, representing gender inequality (GI), measured as the ratio of female to male enrolment; $IGFT_{it}$ are the intergovernmental fiscal transfers variables, GB_{it} is the gender budgeting dummy that accounts for whether there is an ongoing gender budgeting effort in state *i* in year *t*; and X_{it} is a vector of control variables, representing other factors which might determine the dependent variables; ε_{it} is the random error term; and β and δ are parameters to be estimated.

The models also include state fixed effects, η_i, to control for time-invariant characteristics of state *i*, and time fixed effects, ν_t, to control for state-invariant characteristics of time t. The state fixed effects might capture any of a number of systematic and invariant (at least over the period of the sample) differences across states, such as the religious and cultural traditions. See the example given by Stotsky and Zaman (2016):

"*Kerala is well known in India as a state with a strong matriarchal tradition, where property is inherited through the mother, while most states in India have strong patriarchal traditions, where fathers are the head of the extended family*" (Stotsky and Zaman, 2016).

As noted in Stotsky and Zaman (2016), ideally, we would have other variables for gender inequality in education beyond the gender parity in enrolment index. However, the database unfortunately does not provide any other gender outcome variables for states of India across time in education. The paucity of data on religions and multiplicity of political parties also limit their usefulness in the present models, as independent variables.

We use the following variables as determinants: real income per capita and per capita intergovernmental transfers from the Union government, which is disaggregated in the models into unconditional and conditional fiscal transfers, both measured in the natural log of real per capita amounts; population, measured in millions; and agriculture GDP, manufacturing GDP, and services GDP, all measured as a ratio of subnational GDP. Population is used to control for economies of scale in provision of public services and might also have an effect of gender inequality through indirect means (for instance, states with larger populations might be more exposed to outside influences) (Stotsky and Zaman, 2016). The structural transformation of the economy is captured through the share of the state economy in various types of economic activity. This can affect gender equality outcomes by influencing how women participate in economic activity. In India, "participation income"

[4] In the Asia Pacific context, Chakraborty et al. (2017) use Budget Call Circulars as given in a 2017 UN Women survey to categorize the countries into gender budgeting and non-gender budgeting countries.

(income received by participating in economic activity) is more consequential than universal "basic income" (the income transferred to individuals through public policies, irrespective of their participation in economic activity). Public spending on health and education can reflect the revealed preferences of the state incorporating the median voter's utilities (assuming that there is a "Wicksellian connection", meaning there is a link between one unit of tax paid and one unit of utils derived by citizens). We cannot capture the full richness with our aggregate state specification.

We examine the effect of gender budgeting on gender equality using a panel data approach. For our econometric model, we use Hausman tests to choose the Fixed Effects over Random Effects specifications. We present only the robust Fixed Effects models in this section.[5] In addition to fixed effects models, we also tried generalized method of moments (GMM) approaches – using the Arellano and Bond methodology – to account for a lagged dependent variable and to address potential endogeneity of the independent variables. The lagged dependent variable captured in the GMM models can better measure the dynamic process by which gender equality indicators over time. The following section reports both the static (fixed effects) and the GMM (Arellano Bond estimation) models.

3.2: The Results

We present the results of the various estimations of the link between intergovernmental fiscal transfer variables with the gender equality outcome variables in Tables 2-4. We have attempted different econometric specifications using static and dynamic models - corresponding to one-way (or cross-section) and two-way (or cross-section and time) fixed effects and to GMM. More complex endogeneity issues and the inclusion of additional explanatory variables will be explored in a separate model. However, Stotsky and Zaman (2016) present results based on probit analysis suggesting gender budgeting is not endogenous to economic decisions but driven by political differences.

In Table 2, the results of our basic specification, with the intergovernmental fiscal transfer variables – real per capita conditional transfers ($RPCCT_{it}$) and real per capita unconditional transfers ($RPCUT_{it}$) – and gender budgeting (GRB_{it}) specified as an instantaneous dummy variable, are incorporated. The other variables in the model are real per capita income ($RPCI_{it}$), log of population (log (POP_{it})), and agriculture GDP ($AgriGSDP_{it}$), manufacturing GDP ($ManuGSDP_{it}$), and services GDP ($ServGSDP_{it}$), all measured as a ratio to state GDP.

The first two columns of results (A and B) are for the dependent variable of the gender parity in enrolment for lower primary school, with the one-way effects reported in the first column and the two-way fixed effects reported in the second column. The fixed effects (one-way and two-way) for the gender disparity outcome for upper primary and lower and upper secondary school are reported in the C-H columns, respectively.

Our results show that unconditional transfers have positive effects on gender parity outcomes in enrolment in the primary and secondary education sectors. The conditional transfers are found ineffective in altering gender equality outcomes. The gender budgeting dummy is positive and significant only in the regression equations for lower and upper primary school gender equality indices for the one-way and two-way fixed effects, and also for lower secondary school enrolment, for the one-way effects.

[5] Full results are available from the authors.

Table 2: Impact of Fiscal Transfers on Gender Equity: Fixed Effects Model

Variables	Gender Equality Index Lower Primary School (Female to Male Ratio)		Gender Equality Index Upper Primary School (Female to Male Ratio)		Gender Equality Index Lower Secondary School (Female to Male Ratio)		Gender Equality Index Upper Secondary School (Female to Male Ratio)	
	Panel One-way	Panel Two-way	Panel One-way	Panel Two-way	Panel One-way	Panel Two-way	Panel One-way	Panel Two-way
	A	B	C	D	E	D	G	H
Real per capita unconditional transfers (log terms)	0.112 (0.014)	0.032* (0.169)	0.019 (0.019)	0.069* (0.023)	0.066* (0.394)	-0.016 (0.064)	0.144* (0.040)	0.044 (0.066)
Real per capita conditional transfers (log terms)	0.005 (0.009)	0.007 (0.0107)	0.018 (0.013)	0.0049 (0.0142)	-0.016 (0.029)	0.0015 (0.0360)	-0.016 (0.03)	-0.001 (0.031)
Real per capita income (log terms)	0.028 (0.021)	-0.003 (0.0343)	0.074* (0.029)	-0.059 (0.046)	0.281* (0.079)	0.0925 (0.1314)	0.280* (0.029)	-0.222 (0.134)
Population (log terms)	0.076* (0.037)	0.018 (0.0408)	0.0891* (0.052)	-0.037 (0.054)	-0.364 (0.332)	-0.923* (0.4431)	-0.364 (0.332)	0.011 (0.451)
Agriculture GSDP (% of State GSDP)	0.178 (0.496)	0.157 (0.494)	0.3001 (0.682)	0.408 (0.658)	0.816 (1.02)	0.686 (1.03)	0.817 (1.02)	-0.463 (1.051)
Manuf. GSDP (% of State GSDP)	0.178 (0.496)	0.157 (0.494)	0.299 (0.682)	0.408 (0.658)	0.816 (1.02)	0.687 (1.03)	0.815 (1.02)	-0.463 (1.05)
Services GSDP (% of State GSDP)	0.179 (0.496)	0.158 (0.494)	0.301 (0.682)	0.408 (0.659)	0.819 (1.02)	0.689 (1.033)	0.819 (1.02)	-0.466 (1.05)
Gender budgeting	0.028* (0.008)	0.0221* (0.008)	0.036* (0.011)	0.0304* (0.0104)	0.0027* (0.019)	0.003 (0.019)	0.0027 (0.0187)	0.025 (0.0197)
Constant	-17.39 (49.57)	-14.652 (49.41)	-30.189 (68.214)	-38.891 (65.844)	-83.238 (102.414)	-66.31 (103.61)	-83.239 (102.414)	49.482 (105.502)
Observations	280	280	280	280	280	168	168	168
R-squared	0.233	0.285	0.360	0.44	0.381	0.362	0.446	0.481
No. of States	28	28	28	28	28	28	28	28
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE		Yes		Yes		Yes		Yes

Sources: Our database and estimates.

The real per capita income has significant and positive effects on gender equality outcomes only for the one-way fixed effects for upper primary and secondary (both lower and upper) enrolment ratios. Population is found positive and significant in the lower primary and lower secondary school equations of the one-way fixed effects model; and negative in the lower secondary school equation two-way fixed effects model. The sectoral shares are by and

large not significant.

In Table 3, we present the impact of intergovernmental fiscal transfers along with the lagged gender budgeting variable on gender equality outcomes. Again, we find that there is no effect of real per capita conditional transfers on gender equality outcomes. Like the earlier model, this model shows that unconditional fiscal transfers have positive and significant effects on gender parity in primary and secondary education. Gender budgeting has a positive and significant instantaneous effect on gender parity in primary education as well. Real per capita income has a significant effect on gender parity in primary education in a few models while population has a mixed effect on secondary education.

Table 4 presents the results of the GMM models. The results are in general consistent with the findings of the fixed effects models, instantaneous and lagged gender budgeting models. The unconditional transfers have a positive and significant effect on gender parity in education in the upper secondary levels. Gender budgeting has a positive and significant impact on gender parity in education at the upper primary school and lower secondary school levels. The conditional transfers are not significant. In all the models, the disaggregated components of conditional transfers like Sarbha Siksha Abhiyan (SSA), Mahatma Gandhi National Rural employment Guarantee Scheme (MGNREGS) and National Rural Health Mission (NHRM) are separately incorporated and we analyse their impacts on gender equality outcomes. However, all these disaggregated components of conditional transfers are found insignificant in determining gender equality outcomes. Real income is significant and positive for upper primary school and population is significant and positive for upper secondary school, suggesting some diseconomies of scale.

Overall, the results suggest the unconditional fiscal transfers and gender budgeting efforts in Indian states have a positive effect on gender equality in primary and secondary education. The various specifications differ in terms of significance and size of the effect but do offer a consistent story that these grants and gender budgeting stimulate enrolment equality, an important finding for India. The results also suggest that economic growth per se is insufficient, given the weak impact of real income changes, and therefore that the government needs to take specific and focused public policy planning and budgeting measures to ensure gender equality outcomes in India.

As diagnostic tests, the Hansen test is used for testing over-identifying restrictions in a model. Because we use instrumental variables for endogenous variables, we call it an over-identified model if the number of instruments we have used exceeds the total number of endogenous variables. The Hansen test checks for joint validity of these instrumental variables, ie, if the instruments are exogenous or uncorrelated with the error term. The null hypothesis is that they are exogenous and thus we would like the p value to not reject the null hypothesis. We do not reject the null hypothesis.

4. Conclusions and Policy Implications

The paper examines the impact of IGFT on gender equality outcomes across Indian states, in a context where some states have adopted gender budgeting. Using panel estimations, we found that unconditional transfers have a significant and positive impact on gender parity outcomes, measured as enrolment parity, in the education sector at primary and secondary levels, in comparison to conditional transfers. Gender budgeting is an effective policy tool for promoting gender equality outcomes in education at the state level.

Table 3: Impact of Fiscal Transfers on Gender Equity, with Lagged Gender Budgeting Dummy: Fixed Effects Model

Variables	Gender Equality Index Lower Primary School (Female to Male Ratio)		Gender Equality Index Upper Primary School (Female to Male Ratio)		Gender Equality Index Lower Secondary School (Female to Male Ratio)		Gender Equality Index Upper Secondary School (Female to Male Ratio)	
	Panel One-way	Panel Two-way	Panel One-way	Panel Two-way	Panel One-way	Panel Two-way	Panel One-way	Panel Two-way
Real per capita unconditional transfers (log terms)	-0.07 (0.013)	0.031** (0.017)	0.014 (0.0186)	0.068** (0.023)	0.066* (0.092)	0.0154 (0.065)	0.138** (0.022)	0.050 (0.0661)
Real per capita conditional transfers (log terms)	0.005 (0.010)	0.007 (0.011)	0.018 (0.013)	0.005 (0.014)	-0.016 (0.029)	0.002 (0.031)	-0.022 (0.298)	-0.0012 (0.0314)
Real income per capita (log terms)	0.0221 (0.0212)	-0.006 (0.034)	0.069* (0.029)	-0.059 (0.046)	0.276** (0.081)	0.0934 (0.131)	0.037 (0.08)	-0.215 (0.135)
Population (log terms)	0.0698* (0.0371)	0.018 (0.041)	0.084 (0.0516)	-0.0356 (0.054)	-0.3667 (0.332)	-0.914* (0.444)	0.816* (0.340)	-0.076 (0.455)
Agriculture GSDP (% of State GSDP)	0.326 (0.493)	0.262 (0.494)	0.448 (0.684)	0.5002 (0.663)	0.871 (1.033)	0.719 (1.044)	0.109 (1.057)	-0.247 (1.07)
Manuf. GSDP (% of State GSDP)	0.326 (0.493)	0.262 (0.494)	(0.448) (0.684)	0.500 (0.663)	0.869 (1.033)	0.720 (1.044)	0.107 (1.058)	-0.247 (1.07)
Services GSDP (% of State GSDP)	0.327 (0.493	0.263 (0.494)	(0.450) (0.684)	0.500 (0.663)	0.873 (1.033)	0.721 (1.044)	0.107 (1.058	-0.250 (1.07)
Gender budgeting (lagged variable)	0.034*** (0.008)	0.027** (0.008)	0.038*** (0.011)	0.031** (0.011)	0.067 (0.169)	0.0007 (0.018)	0.0096 (0.0714)	0.001 (0.018)
Constant	-32.13 (49326)	-25.14 (49.351)	-44.96 (68.40)	-48.07 (66.24)	-88.56 (103.25)	-69.62 (104.742)	-13.161 (105.74)	27.615 (107.34)
Observations	280	280	280	280	168	168	168	168
R-squared	0.25	0.29	0.37	0.439	0.37	0.363	0.45	0.47
No. of States	28	28	28	28	28	28	28	28
State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Year FE		Yes		Yes		Yes		Yes

Sources: Our databases and estimates.

Table 4: Impact of Intergovernmental Fiscal Transfers on Gender Equality, with Lagged Gender Budgeting Dependent Variable: GMM Estimates

Variables	Gender Equality Index Lower Primary School (Female to Male Ratio)	Gender Equality Index Upper Primary School (Female to Male Ratio)	Gender Equality Index Lower Secondary School (Female to Male Ratio)	Gender Equality Index Upper Secondary School (Female to Male Ratio)
L_1	-0.2722 ((0.122)	0.3058* (0.137)	-0.297* (0.257)	-0.258 (0.0217)
Real per capita unconditional transfers (log terms)	0.0157 (0.0150)	0.005 (0.0176)	0.074 (0.047)	0.127** (0.041)
Real per capita conditional transfers (log terms)	0.0088 (0.1156)	-0.0079 (0.0140)	-0.037 (0.035)	-0.012 (0.033)
Real income per capita (log terms)	0.0029 (0.0225)	0.0609** (0.0275)	0.1996 (0.1217)	-0.0133 (0.098)
Population (log terms)	0.074 (0.057)	0.0675 (0.067)	0.622 (0.442)	1.211** (0.515)
Agriculture GSDP (% of State GSDP)	-0.305 (0.475)	0.2602 (0.558)	0.370 (1.011)	0.304 (0.992)
Manuf. GSDP (% of State GSDP)	-0.306 (0.475)	0.2588 (0.558)	0.369 (1.011)	0.304 (0.992)
Services GSDP (% of State GSDP)	-0.306 (0.475)	0.2598 (0.5579)	0.374 (1.012)	0.303 (0.992)
Gender budgeting	0.009 (0.102)	0.0218** (0.012)	0.0399** (0.0206)	0.028 (0.0198)
Constant	30.92 (47.51)	-26.148 (55.78)	-38.65 (101.14)	-33.09 (99.22)
Number of Instruments	45	45	19	19
Sargan Test Statistic (p-value)	38.57008 (0.3113)	57.29992 (0.0101)	13.15692 (0.1556)	11.85714 (0.2215)

Sources: Our databases and estimates.

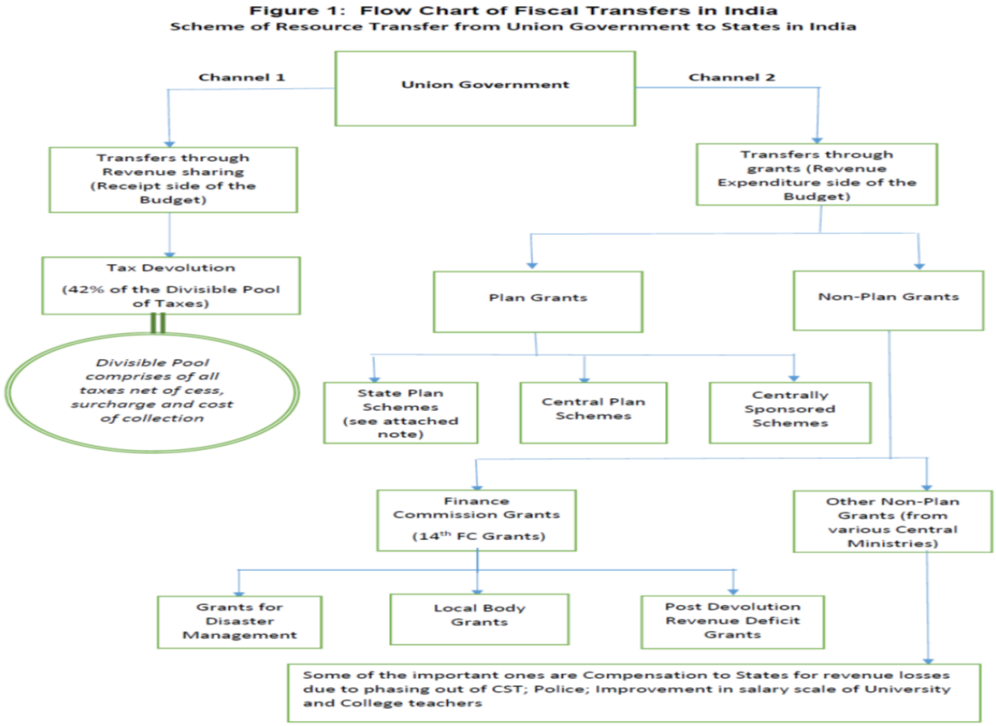
The overall conclusion is that unconditional fiscal transfers seem to have a direct effect on gender equality outcomes measured by parity in enrolment compared to conditional transfers and therefore integrating gender criteria in intergovernmental formula-linked fiscal devolution would have positive effects on gender equality, even though the exact mechanism is unclear. Income gains are not sufficient to generate equality of outcomes. Gender budgeting has also been found to have been useful in promoting gender equality. These are

important conclusions that the 15th Finance Commission of India can take note of from our findings. However, given the exact mechanism of influence, further investigation with more detailed fiscal and demographic data and at a finer level for transfer programs is called for.

APPENDIX

Figure 1 in Appendix shows the channels of intergovernmental fiscal transfers.

Appendix: Figure 1: The Channels of Intergovernmental Fiscal Transfers in India



Source: Chakraborty *et al.* (2018)

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