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Did India's Ecological Fiscal Transfers Incentivize State Governments to Increase Their Forestry Budgets?

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Abstract

Ecological fiscal transfers (EFTs) involve higher levels of government distributing funds to lower levels of government based on ecological indicators. In 2015 India established the world's largest system of EFTs when its 14th Finance Commission added forest cover to the formula that determines the amount of tax revenue the Union government distributes annually to each state. Here we gather state-by-state data on forestry budgets to assess whether India's EFTs incentivized states to protect and restore forests as evidenced by increases to their forestry budgets. We find that states increased their forestry budgets by 19% in absolute terms in the three years after the introduction of EFTs relative to the three years prior. However, forestry budgets as a share of overall state budgets shrank by 16% after the introduction of EFTs, from 0.99% to 0.83%. Furthermore, states that obtained a larger share of their budget from EFTs did not disproportionately increase their forestry budget. Taken together, this suggests the introduction of EFTs has not yet led states to increase their forestry budgets. We develop a causal chain that suggests two reasons this could be: 1) low expectations on the part of state government officials that EFTs would continue in such a way that *increases* in forest cover would be rewarded with *increases* in revenue; and/or 2) insufficient motivation to increase forestry budgets as an investment in future revenue from EFTs. The 15th Finance Commission has plausibly addressed low expectations by keeping forests in the tax revenue distribution formula for another period and updating the year for which forest cover is measured from 2013 to 2017. It has plausibly addressed insufficient motivation by increasing the weight on forests in the formula from 7.5% to 10%. Future research can show whether these modified EFTs incentivize states to increase forest protection and restoration.

Keywords: Climate Change; Ecological Fiscal Transfers; Fiscal Federalism; Forestry; India; Intergovernmental Fiscal Transfers

JEL Classification: H23, H77, Q23

Introduction

Ecological fiscal transfers (EFTs; Ring 2008) involve higher levels of government (e.g. national) distributing funds to lower levels of government (e.g. state and local) based on ecological indicators. EFTs can help bridge the gap between costs of environmental conservation, which are borne locally, and benefits of environmental conservation, which are dispersed more widely. EFTs have been enacted or proposed in Brazil, China, the EU, France, Germany, India, Indonesia, Poland, and Portugal (Kumar & Managi 2009, Mumbunan *et al.* 2012, Santos *et al.* 2012, Borie *et al.* 2014, Schroter-Schlaack *et al.* 2014, Irawan *et al.* 2014, Li et al 2014, Droste *et al.* 2016, Droste *et al.* 2017).

EFTs serve two potential functions (Droste et al 2017). First, they can be *compensation mechanisms*, compensating state and local governments for forgone economic opportunities that would come from converting ecological land uses such as forest cover to agriculture or mining. Second, they can function as *incentive mechanisms*, incentivizing state and local governments to provide higher levels of environmental services than they would otherwise as an investment in revenue transfers from EFTs.

The world's largest ecological fiscal transfer system was established by India in 2015 when India's 14th Finance Commission added forest cover to the formula that determines the amount of tax revenue the Union government distributes annually to each of India's states, alongside historical population, recent population, poverty and area (Busch and Mukherjee, 2017). From fiscal years 2015-16 through 2019-2020, the Union government distributed 7.5% of the divisible central tax revenue that is devolved to states in proportion to states' area of "very dense" or "moderately dense" forest cover circa 2013, as measured by the India State of Forest Report (2013). These funds are not tied to state forestry budgets and can be spent on any purpose (e.g. health, education, infrastructure) at the discretion of the state government. We have discussed various aspects of India's EFTs in greater depth in two previous papers (Busch and Mukherjee, 2017; Busch 2018).

The Government of India has described the EFTs as both a compensation mechanism and incentive mechanism. When the 14th Finance Commission added forests to the tax revenue devolution formula, it stated that: "We believe that a large forest cover provides huge ecological benefits, but there is also an opportunity cost in terms of area not available for other economic activities and this also serves as an important indicator of fiscal disability" (Government of India, 2014). The following year, India's national climate pledge (its Intended Nationally Determined Contribution; Government of India, 2014) described "the 14th Finance Commission recommendation on incentives for forestry sector" as having "given afforestation a massive boost."

In its November, 2019 report, India's 15th Finance Commission decided to maintain forest cover as an element of the tax revenue devolution formula for fiscal year 2020-21 (Government of India, 2019a). They updated the year of forest cover measurement from the 2013 to the 2017 India State of Forests Report, changed the name of the element from "forest cover" to "forest and ecology," and increased the weight of the element from 7.5% to 10%. They justified a higher weight on forest and ecology "not only because of their impact on the revenue disabilities and expenditure needs of States, but also for the huge ecological benefits to the nation and for meeting our international commitments." Their

decision on the distribution of tax revenue to states for fiscal years 2021-22 through 2024-25 is expected in October, 2020.

It is evident that India's EFTs are compensating states for fiscal disability, having transferred billions of dollars to states based on their forest cover. EFTs have amounted to around $7.4 billion a year between 2015-16 and 2018-19, or around $185 per hectare of very dense or moderately dense forest per year (authors' calculations). The scale of annual funding provided through India's EFTs dwarfs the roughly $1 billion in annual international funding for reducing emissions from deforestation and forest degradation (REDD+; Norman and Nakhooda 2014). It is also many times larger than the incentive grant for forest cover provided by the 13th Finance Commission, which amounted to around $5 billion over five years, came with pre-conditions, and was earmarked for spending on forest-related budget lines (Government of India, 2010).

It is less clear whether India's EFTs are yet fulfilling their potential to incentivize states to protect and restore forests. States in India are "powerful actors" that are "actively shaping policies and programs," including through decisions related to development projects, encroachment on forest lands, India Forest Service personnel, and forest management (Chaturvedi, 2016). States in India have more authority to reduce deforestation than second-tier governments in many other tropical countries (Busch and Amarjargal, 2020).

Previous analyses found that the states that benefited most from EFTs did not have disproportionately large increases in forest cover (Busch and Mukherjee 2017; Busch 2018). However, it's probably too soon to detect an effect of EFTs on forest cover from just 1-3 years of post-reform data, as shown in the causal chain that we have conceptualized (Figure 1).

The effect of EFTs on state budgets, however, might reasonably occur within 1-3 years, rather than 5-10 years for forest cover detection and reporting. This is because three large lags in the causal chain are omitted (Figure 1):

- The lag between budget allocation (step 5) and program or policy implementation (step 6)
- The lag between program or policy implementation (step 6) and forest cover increase (step 7)
- The lag between forest cover increase (step 7) and detection by satellite and reporting in the biennial India State of Forests survey (step 8)

In this paper we examine whether states responded to the introduction of EFTs by increasing their budgets for forestry, as an investment in increased revenue from future transfers. We gather state-by-state data on budgets and test the hypothesis that states where EFTs comprised a larger share of the state budget disproportionately increased their forestry budgets following the introduction of EFTs.

Methods

Data

We compiled data across Indian states for five state budget accounts:

- 2406-01 Forestry (revenue account)
- 4406-01 Forestry (capital account)
- 2406-02 Environmental Forestry and Wild Life (revenue account)
- 4406-02 Environmental Forestry and Wild Life (capital account)
- 2406-04 Afforestation and Ecology Development (revenue account)

The Forestry accounts included budget lines for Direction and Administration; Education and Training; Research; Survey and Utilization of Forest Resources; Statistics; Communications and Buildings; Forest Conservation, Development and Regeneration; Social and Farm Forestry; Forest Produce; Expenditure on management of Ex- Zamindari Forest Estates; Departmental working of Forest Coupes and Depots; Resin and Turpentine Factories; Assistance to Public Sector and Other Undertakings; and Other expenditure (Ministry of Finance, 2017). The Environmental Forestry and Wild Life accounts included budget lines for Wild Life Preservation; Zoological Park; Public Gardens; International Co-operation; Other expenditure. The Afforestation and Ecology Development refers to expenditure incurred on the National Afforestation and Ecology Development program. Afforestation and Ecology Development had only a capital account and not a revenue account. Expenditures incurred in the revenue account refer to all expenditures incurred for day-to-day activities which are not used for the creation of assets or repayment of liabilities. Capital expenditures, on the other hand, usually refer to creation of assets or payment of loans and other liabilities.

It is surprisingly challenging to compile these data across states and years. There is no centrally available data repository on state-level budgets in India. Data on state-level forest budgets are fragmented and can be spread across multiple departments. Each state releases their own state-level budget data. Some do so online; some do not. Some PDFs are machine readable; some are not. Some are in English; some are in other languages. There are also differences in the formats, numbers, and types of different documents. Some provide units in crores, some in hundreds. Some have neat summaries of different expenditure heads; others require manual addition across components. Some states put their budget data online only for a few months or years and then take them down.

We gathered these data for six fiscal years (2012-13 through 2017-18). The first three fiscal years immediately pre-dated the introduction of EFTs; the last three fiscal years immediately followed the introduction of EFTs. To calculate states' budgets for forestry we summed the line items of all five accounts listed above.

Over this time period there were two relevant changes to Centrally Sponsored Schemes (CSSs) co-funded by both the Union government and states, including the National Afforestation Programme (NAP). For fiscal years up through 2013-14, expenditures incurred by states on CSSs were reflected in state budgets while expenditures incurred from central monies were routed off-budget in independently created autonomous societies. Since expenditures for NAP by the Union Government were routed directly to these societies, they did not form a part of the States' Consolidated Fund and thus did not show up in state budget documents. Instead, we had to account for them separately by looking directly at Union government funds released or spent for these programs. We adjusted the budgets for the fiscal years 2012-13 and 2013-14 by adding state-wise releases by the Union

government for the National Afforestation Programme. While we accounted for these releases by the Union government in the year they were released to states, in some cases a small portion of these funds may have been spent by states in a later financial year.

Second, for fiscal years up through 2014-15, the National Afforestation Programme was 100% centrally funded. Beginning in fiscal year 2015-16, the NAP was 90% centrally funded for Northeast States and three hilly states and 60% centrally funded for other states. In principle the increase in state-level contributions to the NAP concurrent to the beginning of EFTs could also have affected states' forestry budget levels. However, financial releases by states for the NAP were two-to-three orders of magnitude smaller than those from the Union government through EFTs, making their potential effect on state budgets negligible by comparison.

While India follows a six-tier accounting system, accounting heads are standardized only up to the third level (officially) and only up to the second level (in practice). Beyond this level, states have significant discretion in how they classify expenditures. Owing to these differences and to ensure comparability across states, it was not possible for us to compile data across states disaggregated to the level of the individual budget lines listed above. This is unfortunate as we would have liked to be able to distinguish, for example, between funding directly for forest establishment versus funding for non-forest-cover-related activities or funding for direction and administration. Nor did we distinguish the amount budgeted for salaries versus other expenses.

We were able to collect these data for 25 of India's 29 states, representing 90% of 2013 forest cover, 91% of fiscal transfers from tax revenue devolution in 2015-16 (Reserve Bank of India, 2016), and 89% of total state revenue in fiscal year 2015-16 (Reserve Bank of India, 2016). We excluded the states of Andhra Pradesh and Telangana because budget data was not consistent for the periods before and after these states bifurcated in 2014. We were also unable to include the states of Goa (for which budget data was unavailable) and Jammu and Kashmir (due to lack of coherence in budget reporting for the time period of our study). In October, 2019, the state of Jammu and Kashmir was changed to two union territories, Jammu and Kashmir, and Ladakh, decreasing the number of states from 29 to 28; this did not affect our analysis.

Analysis

We tested whether states that are currently benefiting the most from EFTs are increasing their forestry budgets by a larger amount than states with less at stake, theorizing that states with a larger financial dependency on the transfers would be most interested in maintaining or expanding them. Specifically, we tested the hypothesis that there was a positive and significant correlation across states in the share of a state's budget that comes from EFTs and the state's increase in their forestry budget after the introduction of EFTs. This correlative analysis is suggestive but not definitive in showing causality. This method follows Busch and Mukherjee (2017) and Busch (2018) but substitutes forestry budget for forest cover as a variable.

In sensitivity analyses, we considered two alternative metrics: EFTs as a percent of total fiscal transfer from the Union government (as an alternative indicator of dependency); and the ratio of states' land

area to budget in 2014-15 (as an indicator of how much each state would have the potential to protect or restore forests to benefit from EFTs). We also examined using 2017-18 vs. 2014-15 as an alternative time period of comparison; including revenue accounts only; and including capital accounts only. Furthermore, we tested whether the change in the rate at which dense forest cover increased between 2011-2013 and 2017-2019 was correlated with the size of a state's EFTs, updating the analyses of Busch and Mukherjee (2017) and Busch (2018) based on new data from the India State of Forest Report 2019, (Government of India, 2019b).

Results

Our analysis produced three key findings. First, we found that states increased their forestry budgets after the introduction of EFTs. Summed across the 25 states for which we compiled data, state-level forestry budgets were 19% higher in the three fiscal years after the introduction of EFTs relative to the three fiscal years prior (161 billion rupees after vs 136 billion rupees before; Figure 2). 21 states increased their forestry budgets, led by a maximum increase of 65% in Maharashtra. 4 states decreased their forestry budgets, led by a maximum decrease of 20% in Manipur. The median state increased its forestry budget by 9%. The general trend of year-on-year increases in absolute budgets (Figure 2) may be explained in part by personnel costs being indexed to rise with inflation.

Second, we found that budget increases for forestry were below overall budget increases. While state forestry budgets increased by 19%, the same states' budgets went up by 42% across the board over the same time period (revised estimates; RBI 2013; RBI 2014; RBI 2015; RBI 2016; RBI 2017; RBI 2019)[1], as a result of India's tax base expanding and the 14th Finance Commission increasing the share of central tax revenue devolved to states from 32% to 42%. The share of states' budgets devoted to forestry decreased by 16% (from 0.99% to 0.83%) following the introduction of EFTs, as shown in Figure 3. Furthermore, there was a significant positive correlation between states' forestry budget increases and overall budget increases (r=0.40; P=0.05; Figure 4). The same states increased expenditures across all social services by 65% over the same time period. And, the same states' GDP increased by 37% over the same time period, meaning that the states' budgets devoted to forestry as a percent of GDP decreased by 13% following the introduction of EFTs.

Third, we found that states that benefitted most from EFTs didn't increase their forestry budgets by systematically more than other states. There was a slight positive correlation (r=0.07) between the share of a state's revenue that came from EFTs in 2015-16 (authors calculations based on Reserve Bank of

[1] While states' budgets nominally increased by 42%, their actual funds increased by less than this because state budgets for 2012-13 and 2013-14 did not include off-budget transfers, which amounted to more than 1 lakh crore (1 trillion) rupees, or roughly 7-8% of states' funds in those years. After considering this change in off-budget transfers, states' actual funds may have only increased by around 39%. Comparing only the fiscal years 2014-15 and 2017-2018 (one year before and three years after the reform), states' forestry budgets increased by 12% while states' overall budgets increased by 44%.

India, 2016) and the increase in the state's forestry budget following the introduction of EFTs, but this correlation was not statistically significant (P=0.74; Figure 5). The slight positive correlation across states was driven by the single state of Arunachal Pradesh where EFTs provided 41% of state revenue in 2015-16 and forestry budget increased by 35% following the reform.

Sensitivity analyses showed that our core result—the lack of a significant positive correlation between the share of a state's budget that came from EFTs and the increase in its forestry budget—was robust to the use a variety of alternative metrics. These included the percent of state fiscal transfer from forest transfer as an alternative measure of how much each state benefits from EFTs (r=−0.04; P=0.85); the ratio of states' land area to budget in 2014-15 as an alternative measure of how much each state would have the potential to protect or restore forests to benefit from EFTs (r=0.12; P=0.56); using 2017-18 vs. 2014-15 as an alternative time period of comparison (r=−0.13; P=0.53); including revenue accounts only (r=0.12; P=0.57); and including capital accounts only (r=−0.29; P=0.17). The change in the rate at which dense forest cover increased between 2011-2013 and 2017-2019 was not correlated with the size of a state's EFTs (r=0.01; P=0.96).

Discussion

States increased their budgets for forestry by 19% in the three years after the introduction of EFTs relative to the three years prior to the introduction of EFTs. However, this increase was probably not due to the introduction of EFTs, for three reasons. First, state budgets went up across the board over the same time period by a considerably larger amount (42%), meaning that the share of state budgets devoted to forestry decreased by 16%. Second, the increase in states' forestry budgets can be at least partially explained by increases in states' overall budgets. And third, the states that benefited the most from EFTs did not disproportionately increase their forestry budgets.

We can't rule out that some of the 21 states that increased their forestry budgets did so at least partially as an investment in future returns from EFTs. But this phenomenon was not sufficiently widespread across states to be visible in statistical tests.

For states, the opportunity to increase forestry budgets as an investment in future revenues from EFTs has yet to be seized *en masse*. The causal chain shown in Figure 1 suggests why this could be so. In principle state government politicians and administrators might simply be unaware of the effect of EFTs on state budgets (step 2). But this seems unlikely—state government officials are typically aware of the sources of their budget revenues. The breakdown between the introduction of ecological fiscal transfers (step 1) and increased state forestry budgets (step 5) is more likely occurring at the stage of *expectations* (step 3) or *motivations* (step 4).

It may have been the case that states did not increase their forestry budgets as an investment in future revenues from EFTs because they do not yet expect that EFTs will continue in such a way that *increases* in forest cover will be rewarded with *increases* in revenue received (step 3). This is because it was not yet certain that the 15th Finance Commission would keep forests in the tax revenue devolution formula and update the year for which forest cover is measured from 2013 to a later date.

It may also have been the case that the amount of funding offered through EFTs was insufficient to motivate states to protect and restore forests (step 4). The financial incentive of around $185 per hectare of forest per year is sizable, amounting to around 2% of states' budgets, with a higher percentage in more-forested states (Busch and Mukherjee, 2017). This is more than twice the 0.78-1.04% of state budgets spent on forestry (Figure 3). Even so, the prospect of increased revenue in the near future might not have been enough to motivate budget increases in the present.

It would be useful to supplement our analysis with qualitative research on the relative importance of various links in the causal chain. For example, interviews with key informants could shed light on state government officials' awareness of the contribution of EFTs to state budgets (causal chain step 2), their expectations that the EFTs will continue in such a way that increases in forest cover will be rewarded by increases in future transfers (causal chain step 3), and the extent to which the financial incentives provided by EFTs are sufficient to motivate state policymakers to protect and restore forests (causal chain step 4). However, such an inquiry is beyond the scope of the current paper.

The recently released recommendations of the 15th Finance Commission (Government of India, 2019) for the 2020-21 fiscal year may plausibly address both expectations and motivations. Their recommendations give states greater certainty that *increases* in forest cover will be rewarded with *increases* in revenue by 1) keeping forests in the horizontal devolution formula; and 2) updating the year for which forest cover is measured from 2013 to a later year (i.e. 2017). The recommendations also address motivations, not through earmarked grants for direct investments in forest protection and restoration, as in the 12th and 13th Finance Commissions, but by increasing the share of forests in the tax sharing formula from 7.5% to 10%. Future research can show whether these changes incentivize states to increase protection and restoration of forest cover.

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Figure 1. Causal chain from introduction of ecological fiscal transfers (EFTs) to outcomes.

Figure 2. Forestry budgets summed across 25 Indian states increased by 19% in the three fiscal years following the introduction of EFTs relative to the three fiscal years prior to the introduction of EFTs.

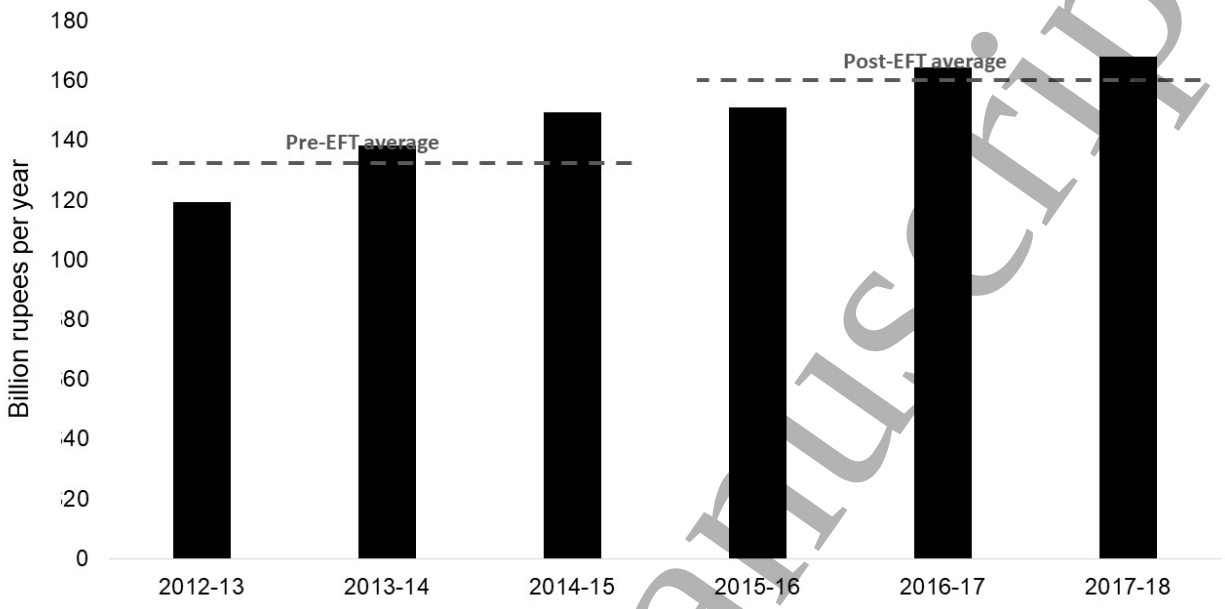

Figure 3. Forestry as share of total budget summed across 25 Indian states decreased by 16% in the three fiscal years following the introduction of EFTs relative to the three fiscal years prior to the introduction of EFTs.

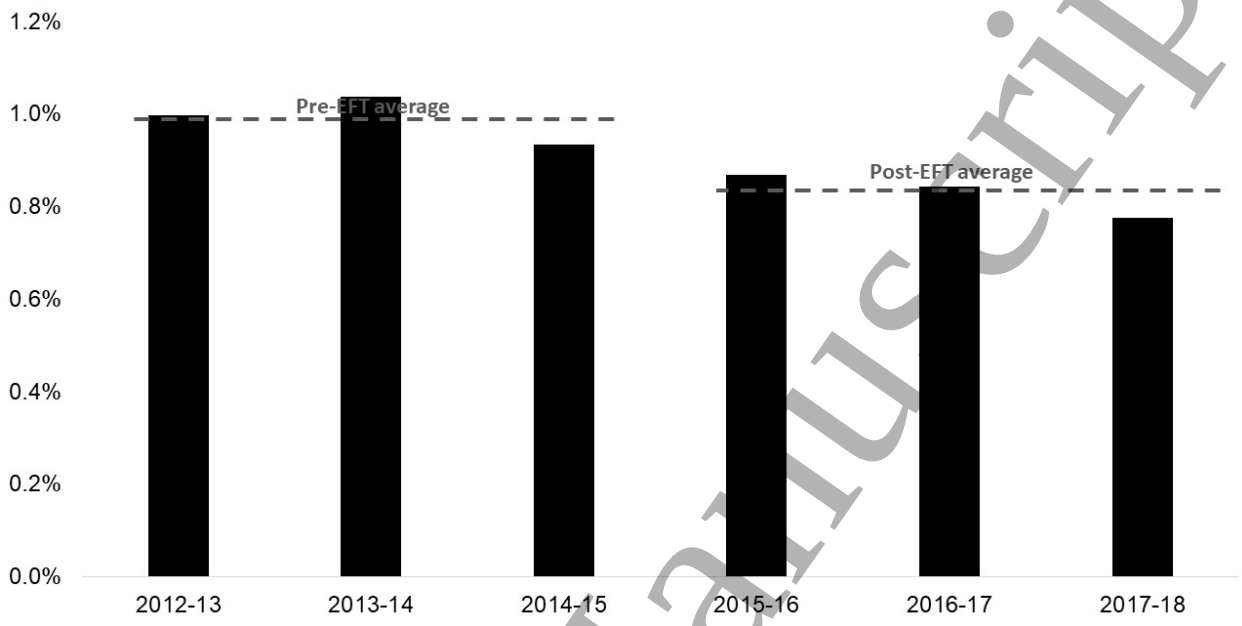

Figure 4. States that increased their forestry budgets by more following the introduction of EFTs also increased their overall budgets by more.

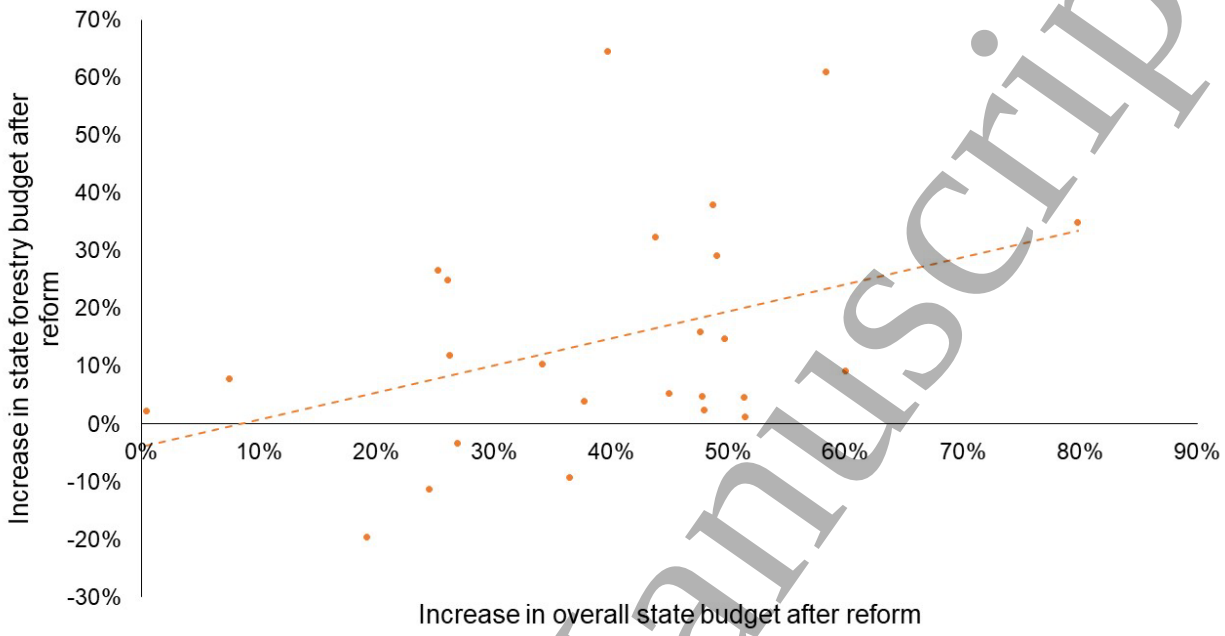

Figure 5. States where EFTs comprised a greater share of state revenue did not increase their forestry budgets by more following the introduction of EFTs.