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ABSTRACT

This paper models the perverse impact of increased devolution of funds from higher to lower level governments (village councils or *Panchayats*) on tax revenues collected by the latter. We show that transfers that do not adhere to the fiscal equalization rule will crowd out *Panchayats'* revenue raising efforts. The extant literature has so far been unable to adequately explain the reaction of local effort to transfers from the higher level governments. Using a unique data set for India we theoretically model and measure the cost of taxation and use this and the ratio of transfers that augment the local wage rate to those that do not, after controlling for a number of village level characteristics, to explain tax collected at the village level. The estimation allows for mutual endogeneity of tax collected and transfers. We find that the cost of tax collection and the ratio of transfers that augment the local wage rate (to block grants) have a significant negative effect on tax collection, thus validating the conclusions of the theoretical model developed in this paper. Higher tax collection at the *Panchayat* level is associated with higher availability of village-level public goods. Several policy conclusions are advanced.

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The good work being done by the Pani Panchayat in ridding the villages of its woes related to water was exemplified by another community member Mr. Suresh Jadhav, who mentioned that most of the households in the village were happy at paying the water taxes to the Pani Panchayat and not a single case of default has occurred since the initiation of activities by the Panchayat. "All of us pay our taxes regularly – even those who are accessing water from the community taps. I believe that there would be no resistance in case the Pani Panchayat deems it necessary to increase the taxes, as it would only add to the pool of resources that can be used later for addressing any pressing issues in the future"[2] - *Mr. Suresh Jadhav: a member of a village in Maharashtra attempting to link improved quality of governance with willingness to pay taxes.*

I. Introduction

This paper focuses on two problems associated with fiscal decentralization viz., 1) the impact of non equalizing labor generating transfers from higher level governments to local governments (in particular village councils henceforth *Panchayats)* in terms of the ability of the latter to raise taxes and, 2) the long-term growth consequences of the vertical fiscal imbalances brought about by (1). Using the ARIS/REDS data sets of NCAER, we are able to show that non equalizing transfers of funds from higher level governments create disincentives for *Panchayats* to raise revenues. Apart from creating a disincentive to raise tax revenues, these transfers also lead to a shrinking of the tax base on which any future tax may be raised. The resulting vertical fiscal imbalance is shown to result in a reduction in the per capita availability of public goods. However any discussion on the provision of public goods by *Panchayats* must be tempered by the presence of political institutions created by reservations to the posts of the elected bodies in *Panchayats*. We show that even after controlling for the presence of female leaders; the impact of vertical fiscal imbalance is significant in explaining the per capita availability of public goods.

Why should villages raise taxes? In fact why should any sub national agency raise taxes? In the extreme centrist models of public finance and practiced in some countries, e.g., Germany, the central government indeed raises most taxes. However, in other countries (e.g. in Canada) and even cities (e.g. New York City in the US) levy income taxes. In India there exists a legal and administrative framework for a local government, e.g., a *Panchayat*, to be formed on the basis of democratic elections and be entrusted to raise revenues. Moreover, since such a body is likely to meet local preferences for public goods better than that by a centrally appointed agent, the rationale for *Panchayats* taking expenditure decisions follows. This, in turn, provides further rationale for *Panchayats* to raise taxes. Given exogenous

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[2] NCAER-IDRC Report on "Varieties of Governance and Varieties of Outcomes"(2012)

revenue requirement, a wider tax base will be associated with lower tax rates. Under such conditions either tax rates have to rise or external transfers should increase. Typically, local governments tax relatively immobile tax bases whereas higher level governments are ideally suited for taxing more mobile tax bases.

From an administrative point of view, a *Panchayat* will be a more responsible administrative body if at least part of its budget is financed by its own activities, i.e., taxation. If it merely spends money handed down by a higher level this incentive will be missing. Hence, there are important economic reasons for suggesting that Panchayats should tax.

In this context the quote at the beginning of this essay by a participant in one of the focused group discussion is worth amplifying. This quote, excerpted from a focused group discussion, underscores the role that quality of governance, service delivery and the ability to participate in the process of governance could play in influencing village level revenue collection and tax buoyancy and *vice versa*. *Pani Panchayats* are parallel bodies often created by state governments in India to improve the quality of management and delivery of water to rural households and involve significant participation by the households and reliance on local revenues. This quote also suggests that revenues raised by such institutions could become fungible and that the willingness to pay is significantly tied to the quality of service delivery.

In line with the preceding set of arguments, we test the following hypotheses.

    i)   Non equalizing transfers to *Panchayats* will leave the tax base intact.

    ii) The impact of labor generating transfers from higher level governments will be neutral.

    iii) There is no relationship between vertical fiscal imbalance and public service delivery.

    iv) Vertical fiscal balance improves the efficiency of the local bureaucracy in the context of service delivery.

We are able to partially reject hypothesis (i) and fully reject hypothesis (ii). While non equalizing transfers do tend to crowd out local taxes, the tax base is not entirely eroded. However non equalizing, labor augmenting transfers tend to increase the cost of raising taxes as well as reduce the generation of public goods and are non neutral. Hypotheses (iii) and (iv) are rejected. Vertical fiscal balances increases the resource base, increases the per capita availability of public goods and augment the efficiency of the elected representatives.

In this paper we inquire into these issues using a unique data set, the ARIS/REDS data set of the NCAER. The *Panchayat* as a constitutional body with administrative and financial powers under the 73rd Amendment to the Constitution of India (Art. 243-H) is assumed to be operating in the fiscal domain to maximize the utility of a representative resident. The *Panchayat* faces two types of transfers from higher level government: those that increase the local wage rate and those that do not and functions under certain requirements reserving the post of pradhan for women and faces cost of collecting taxes from returns to capital. We show that transfers that raise the wage rate, and hence lower the tax base, lower the tax collected as do higher costs of collecting taxes. This then confirms the perverse incentive effects of transfers that lower the local tax base. We then show that higher local taxes lead to higher supply of local public goods and, hence, enhanced development, thus underscoring the point made above that tax and expenditure responsibilities mutually augment each other.

Keeping in view the parametric invariance literature argues that the tax response by *Panchyats* would be conditional on the structure of devolution, such devolution should ideally lead to a response that would increase and widen the tax base so that the gap between revenues and expenditures is narrowed. In this paper we substantially generalize the extant literature to test whether, in the presence of increased devolution, rational economic agents at the village level will collect more tax revenue.

Central to this paper is also the idea that an expansion of welfare in rural areas requires increasing the productivity of rural workers. Ultimately workers' productivity will depend on their having reasonably well paid employment and access to public goods. This will happen if they have explicit or implicit ownership of productive assets, including their own labor and also physical assets such as land, financial assets such as access to working capital, human assets such as education or experience, public assets such as access to electricity or low-cost transportation infrastructure, or social assets such as the ability to organize and coordinate with other people. Moreover, how the returns to these different assets changes depends importantly on the composition of local employment and the extent to which product and labor markets are integrated with other markets, and whether there is adequate access to credit markets, effective transportation and other forms of basic infrastructure. In particular, the implications of farm and non-farm productivity growth are quite different depending on whether non-farm activity is present at all and, if so, whether it is dominated by the provision

of local services, the production of tradable factory-produced goods, or the production of value-added goods in agriculture.

This paper seeks to inquire governance and the quality of service delivery affect tax collected by *Panchayats*. This question meshes in well with a long held view on the relationship between fiscal decentralization and local tax revenue in the fiscal federalism literature: the former allows the latter to be raised. This paper also models the impact of government investment on *Panchayat* tax revenue buoyancy and tests for the importance of local tax collection for the provision of village level local public goods.

We develop a theoretical model to explain the incentive to collect taxes in the presence of enhanced grants from higher level governments to villages. We then provide empirical support for both the tax collected and public goods surmises of this paper using micro data from Indian villages spanning three *Panchayat* periods (i.e. 15 years).

In the Indian context there are several disincentives to collect local taxes. The continued transfers from higher level of government, without any reference to local preferences, change the composition of local expenditures, in particular, between those that raise wages and those that do not. In particular, employment generating expenditure will raise the rental rate of capital, thus creating a negative profit shock. Further, the cost of collecting taxes may deter efforts to increase local revenues.[3]

In our model the representative household's consumption is a function of incomes arising out of supply of labor to private capital as well as to "public capital". The first stream of income is significantly affected by the market wage rate, determined by the marginal product of labor. The wage rate for the second stream of income does not have any direct relationship with marginal product; and instead is an outcome of policy decided by an outside agent. The wage rate for public capital is set higher than the market wage rate. Households choose between supplying labor to private capital and public capital. The tax base of the village is assumed to be private capital implying that if households switch their labor supply away from private capital, the tax base will be reduced and, consequently, tax collected will drop.

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[3] The extant literature suggests that, within a federal structure, transfers to local governments will in general follow the principle of fiscal equalization. This principle postulates that transfers are meant to fill the gap between local taxes and local expenditures, and not to act as a substitute for locally generated tax revenue However, in India devolution has merely enhanced the responsibility for expenditure decisions. Even though the 11th Schedule of the Indian Constitution suggests that the responsibility for raising revenue from local sources is to be transferred to the Panchayats, in practice there has only been a transfer of the authority to spend with no concomitant responsibility to increase local revenues.

There are at least two more innovative features of this paper. First, we estimate the impact of cost of collecting taxes on the actual tax revenue collected.[4] To do this we begin by providing an explanation for marginal cost of raising taxes being a function of government expenditures. Since government expenditures can create productivity shocks, it is important to understand the exact channel of the impact of government expenditures on taxes. This paper shows that employment generating expenditures (i.e. augmentation of public capital) in particular can create negative productivity shocks which will lead to lower profits through an adverse impact on labor markets. We provide an explanation for why welfare expenditures related to employment sponsored by the government can have such a negative impact on local taxes. From this we proceed to show that tax revenue collected is inversely related to the cost of collecting taxes.[5]

Second, the paper uses the structure of governance as an important variable determining tax revenue. Deininger et al (2012a, b) have shown that households' willingness to contribute monetarily to local developmental efforts is conditioned by the quality of local governance. Elected representatives who are able to solve problems, and follow the rules of governance enshrined are more likely to create preconditions for revenue buoyancy. In this paper we include several instruments of local governance including (i) the presence of a dynasty (either re elected representatives or a member of the same family being elected over different Panchayat periods). Being re elected will obviously affect the amount of taxes collected. However, the tax collected could also influence the probability of re-election.[6] (ii) Following from Deininger et al (2012 b) who show that political agency of women is beneficial in many ways since they are more likely to follow the rules of governance whence the revenue buoyancy in villages headed by women is also likely to be higher, we condition our regressions on regime changes that reflect gender. (iii) In villages the functioning of the constitutionally mandated councils (Gram Sabhas) is important. The Gram Sabhas are meant to discuss village plans, issues that reflect the preferences of households and are therefore important instruments for engendering participation in the process of governance by all sections of the village community. We include the number of meetings in our regressions.

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[4] The basic estimation procedure is explained in the Data and Methodology section and elaborated upon in the Appendix.
[5] The methodology for doing this is explained in the Data and Methodology section and elaborated upon in the Appendix.

[6] Hence there is no endogeneity between tax collected and election of a Pradhan in the current Panchayat. In any case we are using a dummy variable for re-election, and not the probability thereof, as one of the explanatory variables.

The plan of this paper is as follows. The background and the relationship to the literature are discussed in section II. Section III describes the theoretical model. Section IV discusses the data and the empirical methodology used. Section V presents and discusses the empirical results. Section VI concludes.

II. Background and literature

i) Background

The 73rd Constitutional Amendment Act (CAA) accorded a constitutional status to *Gram Panchayats*, envisaging them to function as an independent tier of governance. In order to enable *Panchayats* to perform their functions with respect to the subjects enlisted in the XIth schedule, the constitution enjoins upon state governments to devolve specific powers and responsibilities to *Panchayats* by passing appropriate acts. In order to make local self-governments effective and self-sufficient in governance this CAA has provided local *Panchayats* with specific revenue raising powers.

The Act provides for a constitution of a separate fund for every *Panchayat,* comprising revenues collected by *Panchayats* through taxes, duties, cess, surcharges and various other sources of income such as license fees, lease rents royalties from minerals, donations and contributions from other public entities. In addition the fund also includes various grants given by the state government for implementation of schemes, projects and plans formulated by the *Panchayat*. The village *Panchayat* shall have power to direct the usage of these funds and a separate account for the credits to this fund will be maintained for this. Similar funds are to be constituted at the intermediate and district level. The village *Panchayat* can administer a separate fund at the behest of the state government.

Panchayats can utilize the fund according to the provisions of CAA and rules specified under the Act. The grants released by the state government have to be utilized for the specific purpose only for which it was released. The *Panchayat* has to adhere to the annual limit imposed by the state government with respect to expenditure for a purpose not directly related to the functions specified in the act. The CAA also specifies various tax handles and fixed fees which can be collected by village *Panchayats*.

Despite these provisions some pathologies are part of the system. The near permanent lack of financial resources at the *Panchayat* and consequently at the village level is one such pathology. Recognizing this, in 2004, the central government decided to transfer resources directly to *Panchayats*. Significant impediments to both resource transfer as well as delegation of powers to *Panchayats* are created by the state governments who have unconditional access to monies from the Finance Commission as well as controlling the conditional transfers by the Planning Commission. State governments have shown a disinclination towards transfer of powers of raising taxes to the *Panchayats* since this will negatively impact their own revenues from central agencies.[7] Singh (2004) has advocated increasing the powers of *Panchayats* to raise taxes as well improving their abilities to do so.

The cross country evidence on the impact of vertical transfers to local governments is relevant here. While in all countries lower level governments depend on higher level governments for transfers, the main difference is in the magnitude of such reliance. Bahl and Wallace (2004) show that the data for the 1990's and the 2000's (up to 2003 which makes this data nearly congruent with the period for which the REDS data have been used) suggest that for the developed nations the average dependency was 2 percent while it was 7 percent for the developing nations. Fiscal dependency seems to have gone up in most of the developing nations. Hence the pathologies outlined by Singh (2004) above seem to be part of a pervasive problem.

ii)   Literature Review

Literature on the impacts of various types of equalizing transfers, both vertical as well as horizontal, is abundant. Buettner (2006), Snoddon (2003), Courchene (1994) and Dahlby and Warren (2003) provide evidence from Germany, Canada and a cross section of countries and states to suggest that non equalizing transfers in the case of vertical transfers lead to crowding out of local tax efforts. Snoddon (2003) concludes that there are marginal benefits that accrue to local governments in the form of improved fiscal efficiency if transfers are equalizing.

Zhuravaskya (2000) ascertains a crowding-out effect of transfers in Russia, where each monetary unit raised in own revenues by a local government is offset by 0.9 units in revenue sources from the higher-tier government leaving no incentive for the local governments to

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[7] In fact in most countries, central governments have not shown significant willingness to decentralize the power to tax and instead have decentralized spending of the centrally raised taxes.

exert any tax-generating efforts when transfers increase. Buettner and Wildasin (2006) find that in the US the adjustment of local governments to an increase in external grants leads to reductions in subsequent own-revenue generation. Dahlberg et al. (2007) address the potential endogeneity of grants but do not find any conclusive evidence for either crowding-in or crowding-out effect of intergovernmental transfers on the local tax rate as well as on tax revenues. Skidmore (1999) however, identifies a positive (crowding-in) effect on US State and local governments in which grants are a control variable and the main issue is the effectiveness of statutory revenue and expenditure limitations in reining in local government size. Mogues et al. (2009) use a ten year panel data on 110 district governments' public finances and other district level data in Ghana to examine the impact of the flow and size of externally generated revenues (from central government and other sources) on local governments' own-generated revenue. They find that larger past external transfers are significantly and negatively associated with local governments' level of own generated revenue and local governments experience slower subsequent growth in internally generated revenues. They infer that the nature of the flow of local governments' external sources of revenue discourage rather than encourage their internal revenue generation.

Similarly the benefits of increased own tax generation on quality of governance and provision of public goods have been articulated by, among others, Gamkhar and Shah (2007) who have reviewed the literature on the "flypaper effect" to show that increased local taxes could lead to efficient local spending, and Oates (2006), Blochlinger and Petzold (2009), Jin and Zhou (2001), Rodden and Webbels (2009), Eyraud and Lusinyan (2011), and Rodden (2002). These collectively point out that a reduced magnitude of local revenue generation could variously impact local economic growth.

Our paper provides subtle departures from the extant literature on fiscal equalization and impact of vertical fiscal imbalances. First, we show non equalizing fiscal transfers are a problem only if such transfers are likely to affect the labor marker leading to a shrinking of the base from which taxes are to be raised then such transfers are not optimal for welfare of the local governments. In particular, labor augmenting non-equalizing transfers are likely to reduce the incentive to collect taxes as well as their magnitudes. Most importantly, we isolate variables related to local governance that could help offset some of the pathologies associated with non equalizing labor augmenting transfers. Secondly, if local tax efforts are not crowded

will more revenue be collected and will such collection lead to an improvement in governance and enhanced provision of public goods?

III. The Model

In our model each *Panchayat* has the capacity to raise taxes and spend these revenues as well as those that come in as grants from higher level governments. Let k be the tax base of the *Panchayat, t* the tax rate. Hence, the tax collected $x = kt$. Let ρ, the cost of raising taxes be $\rho(x)$ whence the net tax collected is:

$$\kappa = x - \rho(x).x \tag{1}$$

Where, $0 \le \rho \le 1$. The marginal cost of collecting tax is positive i.e. $\rho^{'}(x) > 0$.

Local governments receive grants in two forms viz., program and block grants. Program grants are earmarked for specific programs of the higher level government and funds are not fungible across expenditure items. Program grants are determined by allocation by the state government and the number of flagship programs of the central governments mandated to be implemented by *Panchayats*. Program grants are typically fixed for a given *Panchayat* period (the period for which a term of the elected Panchayat lasts). Discretionary (Block) grants are received from higher level governments and other outside agencies but are fungible and can be applied to a variety of development efforts at the village level and are often the result of lobbying by village officials.

In this paper we suggest that the impacts of government transfers depend on the objectives behind such transfers, i.e. on whether these transfers are employment generating. We accordingly define the employment generating transfers as g_a and the other types of transfers as g_b.

We will follow the fiscal equalization principle and write the behavior of g_1 as

$$g_a = g_a^0 - \lambda(x_{t-1}, x_t)x_t \tag{2}$$

$$\lambda \ge 0, \lambda_{x_t}, \lambda_{x_{t-1}} \ge 0 \tag{2a}$$

Where, λ is the rate at which the quantum of g_a is adjusted to reflect changes in tax collected g_a^0 is the magnitude of g_a received if the *Panchayat* collected zero taxes. We can similarly write an equation for the behavior of g_b as

$$g_b = g_b^0 - \theta(x_t, x_{t-1})x_t \tag{3}$$

$$\theta \geq 0; \theta_{x_t}, \theta_{x_{t-1}} \geq 0 \tag{3a}$$

Total transfers to the *Panchayat* from outside is written as g where, g is

$$g = g_a + g_b \tag{4}$$

Let the per capita budget constraint of the village government as well as that faced by the households be defined by z, i.e.,

$$z = (1 - \rho(x))x + g_b \tag{5}$$

Where, z is the revenue for public spending, $(1 - \rho(x))x$ is the net tax (net of cost of raising an additional unit of tax) and, g_b is the non employment generating transfers from outside the *Panchayat*.

Change in budget constrained due to the local tax effort is:

$$z_x = \frac{d(x - \rho(x)x + g_b)}{dx} \tag{6}$$

$$= 1 - \rho_x x - \rho(x) + g_{bx} \tag{6a}$$

The change in government transfers due to local tax effort is given by g_x where $g_x = g_{ax} + g_{bx}$.

$$g_{bx} = \frac{\partial(g_b^0 - \theta x)}{\partial x} \tag{7}$$

$$= g_{bx}^0 - \theta_x x - \theta \tag{7a}$$

We can write the expression for g_{bx} in a similar manner.

Let the consumption c of a representative household be determined by income from labor supply to private capital and wages received from labor supply to government programs. Hence,

$$c = f(k, g_a) - kf_k - g_a f_{g_a} \tag{8}$$

We assume that the production function f is of the Cobb-Douglass form and, is written as $f = Ak^{\delta_1} g_a^{\delta_2}$ where $\delta_1 + \delta_2 < 1$ and, $\delta_1, \delta_2 > 0$. It is then easy to see that $kf_k = \delta_1 f$ and, $g_a f_{g_a} = \delta_2 f$. Hence, $c = (1 - \delta_1 - \delta_2) f$

A representative household's utility u can then be written as

$$u = c + \alpha v(Z) \tag{9}$$

where, $\alpha v(Z)$ is the utility from public goods. Maximization of utility with respect to the tax x gives the first order condition

$$u_x = c_x + \alpha v'(Z) Z_x = 0 \tag{10}$$

Equivalently, $\alpha v'(Z) = \dfrac{-c_x}{Z_x}$

We can write change in household consumption with respect to tax as

$$c_x = (1 - \delta_1 - \delta_2) \frac{df}{dx} \tag{11}$$

That is,

$$c_x = (1 - \delta_1 - \delta_2)(f_k k_x + f_{g_a} g_{ax}) \tag{11a}$$

We can similarly write the impact of tax on the budget constraint as

$$z_x = \frac{\partial}{\partial x}((1 - \rho(x))x + g_b) \tag{12}$$

$$= 1 - \rho_x x - \rho(x) + g_{bx} \tag{12a}$$

Hence, the first order condition for utility maximization is as follows

$$\alpha v'(z) = \frac{(\delta_1 + \delta_2 - 1)(f_k k_x + f_{g_a} g_{ax})}{1 - x\rho_x - \rho + g_{bx}} \tag{13}$$

The village *Panchayat* is assumed to use its tax policy to satisfy this optimality condition.

Remark: In the right hand side (rhs) of the first order condition for a maximum the denominator, being (from 12a) the response of public goods supply to tax collected, is positive. In the numerator, by assumption of diminishing returns, $1 > \delta_1 + \delta_2$. Further, whereas f_k and f_{g_a} are positive, k_x and g_{ax} are negative. Hence, the numerator is also positive. The left hand side is scaled up marginal utility of the public good, which is positive.

(13) states that the marginal utility of the public good should be equal to the impact of the higher tax needed to finance the public good (the numerator of the rhs of (13)) normalized by the impact of the additional tax on public goods supply (the denominator of the rhs of (13)), in effect this means that the marginal utility of the public good should equal, at the margin, the private output foregone to produce the public good. The following proposition follows.

Proposition

From (13) we must extract an estimable equation which can be tested against the available data. To do this we exploit the monotonic relation between tax collected and public goods supply. When public goods supply rises, (z goes up) tax collected must rise to finance the increased public goods supply. The first term in the numerator on the rhs of (13) is negative, assuming diminishing returns. f_{g_a} is positive whence, assuming g_{ax} is negative, $\alpha v'(z)$ will rise when g_a goes up. This is possible only when z goes down, i.e., tax revenue falls. Further, from (13) and under our assumptions when ρ rises $\alpha v'(z)$ will rise, i.e., z and tax revenue will fall.

The marginal utility of the public good is not observable and hence not testable. However the relation between tax collected g_a and ρ, as underpinned by (13), can be tested. Hence, this paper tests the relation between them with (13) being the implied theoretical rationale. In line with the literature and the discussion above we augment the estimated equation with some control variables relating to governance structures.

IV. Data and Estimation Procedure

We use data from the ARIS/REDS survey, a nationally representative multi-purpose household and village survey of the NCAER. As our focus is on village level economic behavior we use data from the village survey. This survey contains information on economic/political structure and the level of development at village level (e.g. irrigation facilities, land use system, infrastructure etc.) The survey was first conducted in 1969 with subsequent rounds of data collection in 1971, 1982, 1999, and 2006. This paper draws upon village survey in 2006 of which data was collected from 242 villages of 17 states. These data have detailed information at the village level over three *Panchayats* for a range of variables germane to the analysis of the behavior of local taxes. We have yearly data on program spending, block grants, taxes collected by source, and a number of village level characteristics.

The list of variables in per capita terms for the empirical estimation of the model includes the following:[8] (i) The ratio of real value of tax collected in per capita term (tax_{it}), (ii) Predicted rho ($\hat{\rho}$): Predicted cost of taxation, (iii) The ratio of g_a (per capita employment generating expenditure) to the block grant, and a number of control variables including i) dummies for political reservation for female Pradhan, (ii) dummy variables of current and previous *Panchayat*, taking previous to previous *Panchayat* as the base (iii) regime change: change in gender of Pradhan through electoral competition (iv) number of Gram Sabha meetings held, (v) dummy for Pradhan dynasty (re-elected Pradhan or, member of the family of the earlier Pradhan being elected). The data are summarized in tables 1, 2 and 2a.

Tables1, 2, 2a here

Table 1 shows that the proportion of the cultivated area irrigated and the area irrigated by government canals has stagnated over the past two *Panchayat* periods (encompassing the period 1998 to 2008). Agricultural wage rates have, as expected, gone up. The land inequality in villages continues to be high. The slow growth in the per capita taxes collected is noticeable. The magnitude of its increase between the current and the previous Panchayat period is 4.45% while during the same period the ratio of employment generating transfers to block grants have increased by 8.7%. Table 2 presents statistics on the proportion of local revenue to total transfers received, the proportion of program expenditures to total expenditures by the *Panchayat* and the share of block grants in the total transfers received by the *Panchayat*. Even though the share of local revenues in the total transfers has gone up in the various states, it is still quite low with the exception of Maharashtra and Punjab. Further, *Panchayats* in various states are primarily spending monies transferred to them for specific welfare schemes designed by the central government, indicating that the magnitude of block grants-which are fungible and can be controlled by the *Panchayats*-are relatively small. Does that then mean that program expenditures could crowd out both block grants as well retarding the collection of local taxes? We cannot infer this causation from this table for we do not know whether the disincentive to collect taxes is structural.

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[8] In calculating per capita values, we use population sizes in 1999 for the previous Panchayat period. Interpreting the result thus requires some caution since population may have changed during Panchayat periods. By using the 1999 population figure we are able to use the data on tax and transfers for the previous Panchayat periods. The motivation for this comes from the possibility that assuming constant population will enable us to use more data than just drawing upon 1999 and 2006 data only.

In table 2a we examine whether political reservations can create incentives to collect taxes. If tax collection is a function of quality of governance then given the evidence on the relationship between quality of service delivery and political agency of women, we could conjecture that in *Panchayats* reserved for women revenue generation on an average must be higher. The evidence presented in table 2a supports this conjecture. We find for example that in villages currently reserved and ever reserved (i.e., reserved at least once) both the growth in local tax revenue and the share in total transfers received are higher. In reality it is quite possible that the impact of the cost of taxes (owing to lower profit margins caused by higher wage rates), and the share of employment generating expenditures that shrink the tax base could offset any incentives caused by political agency and the attendant improvement in the quality of governance.

Hence, the objectives of the econometric analysis are to test (i) the impact of cost of taxation on tax collection and (ii) the influences of public transfers, especially employment generating transfers, on village tax effort, after controlling for other exogenous variables. We re-characterize the first order condition (13) in an estimable form which explicitly relates tax collected to, among others, the cost of tax collection and the structure of grants, g_a and the block grant. This is necessary in view of the fact that v' is unobservable. To link the first order condition in (13) with the estimated equation we invoke the fact that the higher the tax collected the greater would be public goods supply and hence the lower, *ceteris paribus*, will be the marginal utility of public goods $\alpha v'$. If our theoretical model is correct the higher the cost of tax collection, *ceteris paribus*, the lower should be tax collected and the higher the v'. Further, the higher the ratio of employment generating grants to other grants, viz., $(g_{a,i,t}/blk_{i,t})$ the lower should be the tax collected and the higher the v' assuming that g_{ax} and g_{bx} are both positive. Our base specification for tax collected by village i in time period t is:

$$\log(tax_{i,t}) = \beta_0 + \beta_1 \log(\rho_{i,t}) + \beta_2 \log(g_{a,i,t}/blk_{i,t}) + \beta_3 Dpan + u_{i,t} \qquad (14)$$

The coefficients of interest are β_1 and β_2.

In actual estimation a number of control variables are added to (14).

As indicated above since the marginal utility of the public goods is not observed we use (13) to establish the relation between tax collected and g_a and ρ to establish an estimable equation that is observationally equivalent. We normalize g_a by block grants. We estimate the impact of cost of taxation on tax revenue[9] as follows. As this cost is unobservable, we generate 1000 random variables whose observations are drawn from a uniform (0, 1) distribution, regress them on a set of covariates, and choose the one with the highest log-likelihood value.[10] Then, we predict the cost of taxation (ρ) by regressing the random variable on the tax collected. The detailed procedure is given in the Appendix. If this cost is correctly estimated the coefficient on cost of tax collection in the estimated form for (14) should have a negative sign and be significant.

Local governance might influence local tax collection. Therefore, we examine the effects of local governance on tax revenue by including dummy variables for whether a current Pradhan is female, interaction of female Pradhan dummy with Panchayat dummies, whether regime change happened, whether the Pradhan has been re-elected.

In equation (14), we treat the ratio of employment generating expenditure to block grants as endogenous because an adverse co-variate or macroeconomic shock (e.g. financial crisis etc.), for example, would reduce tax revenue and public transfers. Hence, panel Instrumental variable (IV) estimator is applied to address possible endogeneity. The ratio of employment generating expenditure to the block grant is instrumented by its lag and the lagged per household availability of public goods.[11]

The composition of the transfers from higher level government matters. Certain types of transfers influence wages and others affect the rental rate of capital (profits). In particular we note that the impact of employment generating expenditures increase wages and act as

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[9] It should be made clear that the incidence of the cost of taxation, as modeled here, is on the village administration and is, therefore, different from the standard literature on marginal cost of raising taxes since the incidence of the latter is on private players and, g_a/blk indirectly incorporates the marginal cost of taxation. In fact the marginal cost of raising local taxes is shown to be reacting to g_1. The fact that there is a marginal cost and it will be a function of both g_1 and blk can be inferred by estimating the village level wage and profit functions. Employment generating expenditures (i.e., g_a) will raise wages and will be a source of negative productivity shocks (that is profits will decline with an increase in g_1). These results are not germane for the current analysis and are, therefore, not included here but are available from the corresponding author upon request.

[10] Such a procedure was used in the case of analyzing bid-ask spreads in rice markets in India by Jha et al. (1999a).

[11] A caveat of serial correlation of error term might arise from the use of its lagged value. We carried Arellano-bond test for zero autocorrelation for each equation and found that serial correlation is not present in our model. Another possible endogeneity may exist if local revenue collection responded with a lag to local transfers. To avoid this, we also run separate regressions by including lagged value of transfer variable (instead of current value of transfer) into the local tax revenue equation. The results are consistent with our findings from the first stage regression in Table 3, and are robust regardless of inclusion/exclusion of non-core variables (e.g. proxies for local governance). The results of Arellano-bond tests and the regressions will be available upon request.

adverse shocks on profits.[12] If an increase in g_1 raises the marginal cost of collecting taxes then the impact of a rise in $(g_{a,i,t} / blk_{i,t})$ on tax collected should be negative.

One of the contributions of our estimated empirical equation is that it enables us to test the incentive effect of fiscal equalization differentiating characteristics of grants villages receive. This is different from the earlier studies where a uniform grant is considered (e.g. Dahlby, 2002; Buettner, 2006). Under the fiscal equalization system the provision of public transfers induced by the change of marginal contribution rate is considered to have an incentive effect on local tax effort.[13] However, as our theoretical model suggests, if public transfers are given to generate employment, these would reduce the amount of tax collected through a labor shift away from private capital (leading to reductions in capital accumulation and profits). This hypothesis can be tested by incorporating the ratio of employment generating grants to block grants $(\frac{g_a}{blk})$ into the empirical estimation: Provided the disincentive effect of outside transfer exists, an increase in this ratio would have a negative impact on local tax effort.

V. Results

Since the ratio of employment generating grants to other grants and taxes (block grants) could be mutually endogenous, (14) is estimated using appropriate instrument and the results are reported in tables 3 and 3a. Broadly speaking additional powers to make expenditure decisions are not being matched by increased tax efforts. This is consistent with the moral hazard problem articulated in Jha et al. (1999b). Under the tenets of fiscal equalization principle it is expected that any budgetary gap at the level of the local governments would be filled by transfers from higher level governments. However, we find that in Indian *Panchayats* all efforts are focused on fine tuning expenditures.

Consistent with the model the results show that a rise in the cost of collecting taxes reduces tax collection. Past transfers have an impact on current $\frac{g_a}{blk}$ and, through this, on tax collected. This is consistent with our theoretical model which suggests that a rise in $\frac{g_a}{blk}$ lowers the tax base by raising wages. Thus, even in cases where tax efforts are observed such efforts will shrink due to a reduction in the tax base.

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[12] As indicated earlier employment generating expenditures impact profits and wage rates. .
[13] We note the important contribution of Buettner (2006) which finds a support for the incentive effect of fiscal equalization, drawing upon a panel data obtained from municipalities in a German state. However, Buettner does not consider fiscal transfers that increase wages.

Tables 3 and 3a here

The first stage results show that the ratio of employment generating expenditures to the block grant responds negatively to its lagged value. The cost of raising taxes has a positive effect on the magnitude of employment generating grants received by the village. The stock of public goods does not seem to have any impact on g_a/blk. We conduct three Panel Instrumental Variable Regressions. The first is the base regression incorporating the effects on tax collected of g_a/blk and the cost of taxation alone. In the second and third regressions more and more governance variables are included. In the first stage of the regression, for all three specifications we include the basic variables, i.e, lag log g_a/blk, lag log public goods and log cost of taxation. For each of the three specifications the predicted values of log g_a/blk are used in the regression. The two stages of the regression are estimated jointly in a Panel IV framework. Diagnostics for both stages of each regression are satisfactory.

The first second stage regression is a base equation with cost of taxation and instrumented g_a/blk and dummies for current and previous period Panchayats using the previous to previous Panchayat as base. The results show a negative and statistically significant impact of cost of taxation on the tax collected: the coefficient of the tax with respect to the cost is -61.445. We also observe a negative (and statistically significant) association between the tax collected and the ratio of employment generating expenditure to the block grant i.e. g_a/blk. This suggests that vertical transfers, in particular those that lead to higher g_1 relative to other types of the transfers would reduce the tax base which, in turn, would result in the less tax collection.

It is pertinent to ask whether this relationship is robust to the inclusion of variables related to governance or is the disincentive to collect taxes structural. We estimate two extensions of the base model by introducing a number of variables related to governance and devolution. In order to enhance participation govern and improve the quality of service delivery, India is actively pursuing a program of reserving the post of Pradhan (head) in some Panchayats for

women. To see whether this makes a difference to tax collection we include dummies for villages that are currently reserved and those that were previously reserved (since reservations are a random process these dummies will not proxy time trend). Women could also become the Pradhan through the electoral process (i.e. through electoral competition). A dummy for change in gender of Pradhan is included. We also wish to examine whether dynasty (same Pradhan being re elected) could have perverse impact on tax effort. Collecting taxes in one period could seriously jeopardize the chance of re election. We include a dummy for dynasty to indicate either the same person or a member of the family of the previous Pradhan being re elected.

As in the case with the first stage result, we find that the inclusion of the variables associated with governance does not alter the impact of cost of raising taxes and g_a/blk on taxes collected. The second and third columns in Table 3a indicate that the declines in the incentives and ability to collect taxes along with the magnitudes have become structural. No matter what governance variables we add the impacts of both log g_a/blk and cost of taxation on tax collected are significant and negative. Indeed the coefficients do not vary much across equations. The elasticity of tax collected with respect to g_a/blk, while significant, is low. Further, only employment-generating grants have such effects. Further, the current and previous Panchayat period dummies are insignificant in all equations. Hence, the ability of any given Panchayat to have any incentive to raise local revenues will be nonexistent if we do not control for specific characteristics related to quality of service delivery.

We do this by relating our paper to the literature political agency for women where it has been shown that a greater congruence exists between expenditures and preferences. This would then imply that such Panchayats are more likely to be able to generate own revenues. Our results lead to two conclusions. a) *Panchayats* currently headed by women tend to be able to raise more revenues. The coefficient on this variable is 0.056 (0.075) and strongly significant in each of versions 2 and 3, respectively, of the estimated equation if the *Panchayats* are currently reserved. b) There are no legacy effects of past reservations. What we find is that *Panchayats* that are not currently reserved but have been reserved in past are not able to significantly raise local revenues through taxation, i.e., once reservations have lapsed the *Panchayats* are not able to generate the same magnitude of revenues as they did

during the period of reservations. This results is in contrast to those obtained while evaluating willingness to contribute, quality of service delivery and, problem solving where evidence (Deininger et al 2012 a, b) suggest that even after the lapse of reservation the improved standards of these elements achieved during the reservations period are maintained.

Women' political agency does not necessarily lead to increases in local revenues through taxes. A regime change from male to female Pradhan through electoral competition actually produces the opposite result. The coefficient on this variable is -0.122 and strongly significant. A more active Panchayat leads to better tax collection as indicated by the positive coefficient on the number of Gram Sabha meetings held. So people's participation matters, although this effect is only weakly significant. Some amount of tax effort inertia is indicated by the fact that with a re-elected Pradhan tax collection actually falls significantly. Thus, individually the effects of some of the variables associated with governance have signs along the expected lines. Overall, however, the impact of employment generating grants and cost of taxation are the dominant influences on tax collected. The share of employment generating grants in total grants needs to reduce. Further and, in particular, the cost of collecting taxes is a dominant influence on tax collected. To the extent that governance influences the cost of collecting taxes a central policy implication of this paper is that such costs need to be reduced.

Impact of Increased Taxes on Availability of Public Goods

From a development perspective the importance of increased tax collection is underscored if this leads to enhanced provision of public goods. If spending outpaces revenues, soft budget constraints, expenditure profligacy by local governments and other inefficiencies associated with such imbalances that include inefficient governance and low levels of provision of public goods and services follow. Thus, Karpowicz (2012) suggests that such imbalances come into greater scrutiny during times of economic downturns and there is a significant possibility of recentralization of revenue and expenditure decisions.

Efficient allocation of public goods has been attempted through other legislations such as political reservations for women. There is much empirical evidence to suggest that political reservations and other such legislative measures have influenced the quality of governance. The evidence on the ability of local governments to improve the efficiency of provision of

public goods is however mixed. While Chattopadhyay and Duflo (2003) and later Beaman et al. (2011) suggest that improved provision resulting from political reservations is limited to certain public goods (example water and education), Deininger et al (2012 a, b) using much more representative data find that even though the broad indicators of the quality of governance improve, there is no conclusive proof of the supply of public goods increasing under a regime of decentralization or through political reservations.

Why is the public goods provision poorer relative to other measures of governance in spite of political reservations and other measures to build capacities of the *Panchayats*? One possibility is a complete lack of or deficient revenue decentralization that has occurred. We have noted in Table 2a that the proportion of local revenues across all types of *Panchayats* is still very low whereas benefits of fiscal decentralization are well documented. Gamkhar and Shah (2007) have reviewed the literature on the "flypaper effect" to show that increased local taxes could lead to efficient local spending. Oates (2006), Blochlinger and Petzold (2009), Jin and Zhou (2001), Rodden and Webbels (2009), Eyraud and Lusinyan (2011), and Rodden (2002) show that transfer dependency could have adverse impacts on higher level governments as well as generating significant distortions to allocations of expenditures leading to inefficient governance and, poor quality of delivery of public goods and services. More specifically, the benefits include increased control of the types of local expenditure, ability to provide insurance to households against potential village level or household level shocks (such as during as drought), increased incentive to improve the quality of public goods such as schooling, and, insure against under spending on certain public goods by higher level government.

In India while the power to spend has been devolved to *Panchayats*, the ability to raise revenues has not been devolved (even though this is enshrined within the provisions of the 73rd amendment). This leads to attrition in the efficiency of the political institutions and elected officials (such as the Pradhan and ward members).

Therefore it is reasonable to conjecture that the efficiency of elected officials will improve with increased revenues generated as taxes. This is consistent with our claim that a *Panchayat* will be a more responsible administrative body if at least part of its budget is financed by its own activities, i.e., taxation.

We use a two stage instrumental variable regression to test our conjecture and show that increased tax efforts would lead to an increase in per household availability of public goods. We are also able to show that the efficiency of elected leaders as well as the quality of governance improves under this regime. The estimation equations are as follows.

$$PG_{vt} = \alpha_k X_{kvt} + \delta_m V_{mvt} + \varepsilon_{vt} \text{ (Where, i=1, 2, 3…)} \tag{15}$$

$$X_{vit} = \beta_l Z_{lvt} + \upsilon_{vt} \tag{16}$$

In (15) the subscript v is the vth villages, t is the time period, and PG is the availability of per household public goods in a village. X_v is the ratio of tax total village income. V_{mvt} is a vector of village characteristics which includes, current women Pradhan*Ratio of tax to income, previous women Pradhan*Ratio of tax to income, block grant, block grant*Ratio of tax to income, distance to district head quarters, currently reserved for women Pradhan, currently reserved for women Pradhan*No. of GS meeting held, previously reserved for woman Pradhan, Previously reserved for woman Pradhan*No. of GS meeting held

Since the tax to village income (VI) as well as the number of gram Sabha meetings held could be endogenous these are instrumented and estimated via (16). The vector Z of instruments includes currently reserved village, current reserved village interacted with number of candidates contested in local elections, previously reserved village, previously reserved village interacted with number of candidates contested in local elections, distance to school, distance to pucca road, average rainfall, social conflicts, area under rabi season, existence of political dynasties (Pradhans that got re elected or came for the same families).[14] These instruments are chosen to reflect the stated hypotheses. We assume that (i) $E(Z'X) \neq 0$ (i.e., all instruments are relevant to the vector X_{kvt} and, Z_{lvt} affects X_{kvt}) and, (ii) $E(Z'\varepsilon) = 0$ (i.e., the instruments used are valid and uncorrelated with ε). We compute the partial R^2 of relevance of the instruments (also called the test for excluded instruments). If the value of R^2 is high and standard error is low then the instruments are sufficiently relevant to explain the endogenous regressor. It transpires that the instruments lack the sufficient relevance to explain the endogenous repressor. If the null hypothesis is rejected, then there are no

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[14] Both casual empiricism and empirical estimates suggest that the probability of being re elected significantly is reduced if the Pradhan in the previous period collected taxes. However the presence of and the impact of political dynasties are both important to estimate tax effort as well as the efficiency of provision of public goods. We therefore allow the dynasty effects to enter through the predicted magnitudes of gram Sabha meetings held during a Panchayat period.

redundant instruments that have been included. We have also used the Anderson canonical correlation likelihood ratio test under the null hypothesis that equations are under identified (we expect the null to be rejected in our specification).[15] If our specification is identified then we wish to test whether the identification is strong or weak using the Cragg–Donald's F-statistic under the null of weak identification.[16] The Sargan test[17] has been used for over identification. The Wu–Haussmann F test estimates the test of endogeneity and performs under the null that the regressors are exogenous. Similarly, the Durbin–Wu–Haussmann chi test balances the consistency of instrumental variables estimation against efficiency of the least squares estimation. It tests under the null that instrumental variables estimation and least squares estimation are both consistent. The results are reported in table 4.

Table 4 here

These results are indicative of several concerns important for policy. i) Local tax efforts have improved but women's ability to collect taxes has increased more rapidly relative to that of men. This increase is significant. While this coefficient was -0.186 and strongly significant in the previous *Panchayat* it goes up to 0.089 and significant in the current *Panchayat.* The sign and direction of this effect are consistent with those in Table 3a where the response of tax collected to reservations for women is reported. However, the effect of a women pradhan in the previous *Panchayat* has the opposite effect indicating that the presence of woman Pradhan in the current *Panchayat* is more important. This result is an additional support for political agency of women in Panchayats. ii) We then investigate whether increasing the tax to VI ratio matters for local economic development. The lower panel of Table 4 shows that the impact is significant and increases per capita public goods (coefficient is 5.031 and strongly significant), after controlling for a large number of factors germane to governance and the quality of governance.[18] iii) One interesting result is that political agency matters for tax effort but not for the provision of public goods, a result consistent with Deininger et al (2012b). Hence, with increases in local revenues, the efficiency of the elected representatives

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[15] The under-identification test is a Maximum Likelihood test of whether the equation is identified, i.e., if the excluded instruments are 'relevant', i.e., correlated with the endogenous regressors. The test of the rank of the matrix under the null hypothesis is that the equation is under identified. A rejection of the null indicates that the matrix is full column rank, i.e., the model is identified.

[16] Cragg–Donald's F-statistic tests whether the equation is weakly identified, i.e. if the F-statistic is greater than 10 then the instruments are not weak.

[17] The Sargan is a test of over-identifying restrictions. The joint null hypothesis is that the instruments are valid instruments, i.e. uncorrelated with the error term.

[18] We have earlier talked about vertical fiscal imbalance. These regressions were estimated using tax to total transfers ratio and the results hold. However the tax to VI ratio is a better measure for discussing impact of taxes on development. VI (the denominator of this expression) is less prone to biases compared to total transfers since these could be biased due to factors attributable to administrative factors, center state relations etc.

in general and of the women representatives in particular improves over time. Hence if taxes increase over time then, the efficiency of governance will also improve over the same period. Inefficiencies that exist on the part of the elected representatives in the provision of public goods will be reduced or eliminated with increased availability of locally generated resources. For example, even though the women elected representatives are less efficient compared to their male counterparts (coefficient is -1.6 and significant during the current Panchayat period), in the presence of increased local taxes, this coefficient is 8.7 and significant. iv) The results also reinforce the earlier arguments that untied transfers to the villages (block grants) by themselves will not help in increasing the supply of public goods. Such transfers reduce supply of public goods (coefficient is -0.059 and significant). We show that if Panchayats are held responsible for generating own revenues and if such revenues go up then the efficiency of block grants go up (coefficient is 0.077 and significant). Untied transfers could reduce the supply of public goods because such transfers are natural avenues for corruption, and, investments in unproductive activities (Bahl and Wallace, 2005, Karpowicz, 2012). It is often suggested that block grants are conditioned on the local governments raising taxes (we are not talking about equalizing grants in this context). To test whether presence of local taxes in the total revenues available to the village we regressed total bribes paid in the village on the ration of taxes to total revenue, political reservations, village level inequality, and n number of candidates for elections. The following results were obtained.[19]

$$Ln \ (bribe) = 5.21^{*} - 12.76^{***} \ (tax/total \ transfer) - 0.40 \ Reserved + 0.25^{**} \ no. \ of \ candidates + 8.56^{**} \ land \ Gini$$
$$(2.83) \quad (3.20) \qquad\qquad\qquad (0.49) \qquad\qquad (0.11) \qquad\qquad\qquad (3.92)$$

We find that increased proportion of local taxes/total transfers available at the village level reduces bribes (coefficient is -12.76 and significant) v) Hypothesis (iii) and (iv) are thus rejected. There are significant links between increased local taxes and availability of public goods. Elected officials are held accountable for monies available and raised. These results tie in with the remark of Mr. Jadhav cited at the beginning of our paper wherein taxes are seen as sign of efficiency of local governments. The efficiency of the local bureaucracy (the elected officials like the ward members and the Pradhan) significantly improves hence rejecting hypothesis 4.

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[19] The regression was estimated as a two stage instrumental variables regressions since the ratio tax to total transfers could be endogenous. We instrumented this with political reservations, average rainfall, village population, and, distance to district head quarters. The various test statistics are reported here. Number of observations= 482, F-stat=4.7[***] (0.0018), Wu-Hausman F test (Endogeneity test): 4.34[**], Durbin-Wu-Hausman chi-sq test endogeneity test): 9.47[***], Sargan statistic (over identification test): 59.24[***].

VI. Conclusions

In India an important policy initiative (in the form of additional powers to spend) has been the devolution of financial responsibilities to village *Panchayats* in the hope that such devolution would not only lead to more public expenditure more targeted to the preferences and needs of the local population, but also widen the local tax base, thereby reducing the need for equalization transfers. However, the incentive structure behind the grant of such additional financial powers has been inadequately articulated. In particular this policy initiative has ignored (i) the cost of tax collection at the local level, and (ii) the impact of fiscal devolution on the local wage rate and, assuming private capital to constitute the tax base, on tax collection. Previous work on the incentive effects of such transfers (e.g. Buettner 2006) has also ignored these effects.

This paper has attempted to fill this gap. It models and measures the cost of taxation and uses this and the ratio of transfers that augment the local wage rate to those that do not, after controlling for a number of other village level characteristics, to explain tax collected at the local level within a framework which allows for mutual endogeneity of tax collected and transfers. We find that both the cost of tax collection and the ratio of transfers that augment the local wage rate to those that do not have a significant negative effect on tax collection, thus validating the conclusions of the theoretical model developed in this paper. The significance of a number of governance variables (e.g. political reservations for women) is also investigated. An important policy conclusion of this paper, hence, is that transfers of additional powers to spend to local authorities, in our case villages, without making them accountable for tax collection will set up perverse incentives which will lead to lower tax collection.

Enhanced tax collection at *Panchayat* level is important not only for its own sake but also because of the essential role of such tax collection in assuring enhanced supply of local public goods., an expressed objective of the *Panchayati Raj* Constitution Amendment).

An increase in devolution of financial powers to local levels must be accompanied by accountability in tax collection of the Panchayat. Also Pradhans need to be given incentives to ensure that increasing tax effort becomes essential for their re-election. Alternatively, they could be penalized for lowering tax effort. The cost of collecting taxes needs to be brought

down through governance reforms. Commensurate with this governance reforms must take place to enhance the response of public goods to tax collected.

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Table 1: Village Characteristics

Variables (averages)	*Panchayat Periods*		
Village Characteristics	**Current**	**Previous**	**Previous to Previous**
Indicators of Remoteness (km.)			
Distance to Block head quarters			15.46
Distance to District head quarters			51.21
Distance to Taluk head quarters			17.08
Indicators of Infrastructure (km.)			
Distance to Bus stand	3.83	5.94	5.765
Distance to Pucca road	2.395	3.39	4.975
Distance to Post Office	2.37	3.91	2.73
Distance to Railway	25.14	27.01	28.44
Welfare indicators (Average numbers per village)			
Brick houses	254.04	223	173.8
Huts	53.71	55.71	63.41
Mud houses	127.71	132.09	128.56
Multi storey houses	59.84	37.17	23.49
Public Goods (Average numbers per village)			
Public tap	10.79	8.96	8.44
Drinking wells	9.2	8.33	7.98
Street lights	11.11	9.10	7.61
Public toilets	4.04	3.71	3.73
Other village characteristics			
Percentage of houses with electricity connection(*No.'s*)	25.42	17.00	13.12
Proportion of cultivated area irrigated	0.79	0.76	0.61
Proportion of Area irrigated by govt. Canal	0.29	0.27	0.39
Village harvest wage	68.59	38.05	10.28
Land Gini	0.55	0.56	0.369
Consumption Gini	0.23	0.19	0.22
Value of tax collected in per capita (Rs.)	35.90	34.37	34.42
g1/block grant	0.965	0.887	0.746
Regime change (from female Pradhan to male Pradhan)	0.179	0.239	
Regime change (from male Pradhan to female Pradhan)	0.313	0.159	
Number of Gram Sabha meetings held	4.48	2.38	

Table 2: Fiscal Decentralization by states

State	% of local revenue to transfers from outside	% of government (program) expenditure as a part of total transfer	% of block grant to local revenue	% of local revenue to transfers from outside	% of government (program) expenditure as a part of total transfer	% of block grant to local revenue
	Current Panchayat			Previous Panchayat		
ANDHRA PRADESH	20.51	36.60	62.45	14.50	46.09	55.12
BIHAR	12.51	18.03	45.83	8.94	24.13	34.95
CHHATTISGARH	22.43	36.47	92.10	6.92	38.47	77.59
GUJARAT	15.88	52.12	87.21	13.15	66.40	9.13
HARYANA	34.35	77.22	61.66	31.72	59.97	65.53
HIMACHAL PRADESH	10.77	17.53	91.78	5.70	17.79	76.77
KARNATAKA	15.94	33.92	94.96	6.05	29.18	93.60
KERALA	17.98	17.39	54.16	21.19	15.99	66.98
MADHYA PRADESH	11.09	41.13	93.06	5.28	52.02	92.78
MAHARASHTRA	41.37	43.54	62.56	28.79	47.47	72.13
ORISSA	10.93	79.67	75.41	6.89	74.21	78.04
PUNJAB	60.93	53.76	25.47	45.57	43.60	23.48
RAJASTHAN	9.11	22.85	90.38	5.01	20.67	88.39
TAMIL NADU	23.99	27.40	80.96	22.93	25.52	75.94
UTTAR PRADESH	12.45	67.68	73.12	10.99	66.06	67.27
WEST BENGAL	11.40	40.65	42.03	3.34	22.23	44.35
Total	20.73	41.62	70.82	14.81	40.61	63.88

Table 2a: Fiscal Decentralization by reserved villages

State	% of local revenue to transfers from outside	% of government (program) expenditure as a part of total transfer	% of block grant to local revenue	% of local revenue to transfers from outside	% of government (program) expenditure as a part of total transfer	% of block grant to local revenue
Reserved	19.77	44.98	72.86	13.47	48.46	19.77
No reserved	20.62	38.31	68.69	16.46	41.87	20.62
At least once reserved	20.21	48.95	71.56	14.04	46.85	20.21

Table 3: Panel IV regression: Tax equation (First Stage)

	$\log(\frac{g_a}{blk})$ base	$\log(\frac{g_a}{blk})$ governance (A)	$\log(\frac{g_a}{blk})$ governance (B)
Lag log ($\frac{g_a}{blk}$)	-0.288***	-0.283***	-0.290***
	(0.0945)	(0.0942)	(0.0937)
Lag log (public goods)	-0.0183	0.0182	-0.0173
	(0.275)	(0.276)	(0.272)
log (cost of taxation)	10.97**	10.90**	11.71**
	(5.118)	(5.100)	(5.698)
Constant	6.504	6.615*	6.932
	(3.940)	(3.933)	(4.328)
F-test	3.11***	2.74***	2.74***
Prob >F	0.0103	0.0102	0.004

Table 3a: Panel IV regression: Tax equation (Second Stage)

	log (tax) base	log (tax) governance (A)	log (tax) governance (B)
log (g_a/block grant) (instrumented)	-0.033**	-0.0322*	-0.0370**
	(2.00)	(0.0166)	(0.0164)
log (cost of taxation)	-61.445***	-61.46***	-61.14***
	(195.90)	(0.312)	(0.356)
Current Panchayat	-0.014	-0.0113	-0.0102
	(0.76)	(0.0189)	(0.0221)
Previous Panchayat	-0.005	0.00151	0.0146
	(0.30)	(0.0163)	(0.0193)
Currently Reserved (women)		0.0565***	0.0757***
		(0.0211)	(0.0253)
Previously reserved (women)		0.0141	-0.00389
		(0.0156)	(0.0168)
Regime change (Pradhan from male to female)			-0.122**
			(0.0527)
Number of Gram Sabha meetings held			0.00210*
			(0.00110)
Dynasty (re elected Pradhan)			-0.0599**
			(0.0260)
Constant	-40.134***	-40.08***	-39.93***
	(190.49)	(0.215)	(0.239)
Village Fixed effects	yes	yes	yes
Observations	248	248	248
Joint significance	986785***	978317.29***	997033.82***
Hausman Test for FE vs. RE	22.67***	24.24***	18.04**

1 Absolute value of z statistics in parentheses
2 * significant at 10%; ** significant at 5%; *** significant at 1%
3 Arellano-Bond tests for zero autocorrelation confirms that serial correlation is not present in our model (at 5%)
4 Hansen-Sargan statistics of over identification tests indicates that the instruments are valid (i.e. uncorrected with the error term and correctly excluded from the estimated equations).

Table 4: Local Taxes and Public Goods

Variables	Coef	Std. Err.	t	P>t
	1st stage			
Dependent variable	**Ratio of tax to income**			
Current women Pradhan	0.089*	0.047	1.9	0.058
Previous women Pradhan	-0.186***	0.069	-2.7	0.007
Distance to district	-0.0004	0.0005	-0.77	0.444
Average rainfall	0.0001***	0.00002	4.84	0
Village population	0.023	0.037	0.62	0.539
Constant	-0.139	0.290	-0.48	0.633
	2nd stage			
	Availability of public goods			
Ratio of tax to income	5.031***	1.922	2.62	0.009
Current women Pradhan*Ratio of tax to income	8.722**	3.623	2.41	0.016
Previous women Pradhan*Ratio of tax to income	7.658**	3.151	2.43	0.015
Block grant	-0.059***	0.018	-3.27	0.001
Block grant*Ratio of tax to income	0.077***	0.027	2.88	0.004
Distance to district	-0.002	0.005	-0.43	0.665
Current women Pradhan	-1.611***	0.484	-3.33	0.001
Current women Pradhan*No. of GS meeting held	0.236***	0.049	4.84	0
Previous women Pradhan	-0.062	0.861	-0.07	0.943
Previous women Pradhan*No. of GS meeting held	0.118**	0.058	2.02	0.044
Constant	1.696	1.528	1.11	0.267
Village fixed effect	Yes			
Hausman chi2 test (Fixed vs random effect)	83.04***			
Test of excluded instruments	9.21***			
Anderson canon. corr. LR stat (Under identification test)	60.69***			
Crag-Donald F-stat (Weak identification test)	10.86*			
Sargan statistic (Over identification test)	54.37***			
Wu-Hausman F test (Test of endogeneity)	3.23*			
Durbin-Wu-Hausman chi-sq test (Test of endogeneity)	6.78***			
Number of observations	465			

Appendix

Prediction of the cost of tax collection: The cost of tax is unobservable. Our *modus operandi* for estimating it is as follows. We generate 1,000 random variables, i.e., 1,000 column vectors (as possible candidates of the cost of tax, ρ) whose observations were drawn from a uniform (0, 1) distribution. We then selected one which has the highest log likelihood in the first regression explained below.

The first regression (Pooled OLS): The generated random variables were regressed on a set of covariates representing village characteristics, viz., log of amount tax collected (*tax*), log of per capita village income (*pcvinc*), distance to the nearest bus stand (*bus*) and to the nearest bank (*bank*) and population in village (*pop*). Comparing the values of log likelihood obtained by pooled OLS over 1,000 generated random variables, we choose the regression with the largest log likelihood ratio which then gives us one (a column vector) among the 1000 random variables. The estimated model is:

  $\hat{\rho} = 0.871$ -0.026*** log (*tax*) -0.037 log(*pcvinc*) -0.002 *bus* – 0.001 *bank* – 0.0000 *pop*. (N=362).

The value of log likelihood is -36.725 and the coefficient of log(*tax*) is significant at 1 percent. All other variables are insignificant.

The second regression involves panel IV regression. It would be ideal to estimate the random variables by many potentially relevant regressors with many observations. However, while we had more than ten observations (on average) in the *tax* for each village, the availability of other data was limited (e.g. one observation in the *bus* and the *bank* or two observations in *pcvinc* for each village). Given this data constraint and the finding above that the (unobservable) cost of tax would be influenced most by the tax collected, we use the column vector selected from the

1st stage regression as the dependent variable in a model with tax only as the independent variable, i.e., by dropping all the other variables. This allowed us to draw more information rather than wasting many data observed in the *tax* by including other village characteristics which has only one or two observation and which were, in any case, not significant in the first stage. However, the estimate can be biased by endogeneity between the cost of tax and the tax collected. This means that the impact of the cost of taxation on the tax collected needs to be controlled for. We therefore applied panel IV regression method where *taxcol* was instrumented by its lag.[20] The estimated equation is:

$$\hat{\rho} = 0.521 - 0.008 \log (tax) \ (N=1185)$$

The Hausman test supports random effect estimation. The negative sign of *tax* might represent the economies of scale but is statistically insignificant. We use the predicted value ($\hat{\rho}$) from the Panel IV estimation for our base model investigating the impact of government transfer on the local taxation. If the cost of taxation was properly estimated, we expect the coefficient estimate to have a negative sign.

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[20] Hausman test supports panel IV random effect: $chi_2(1)=1.17$, $Prob>chi_2=0.28$