Fiscal Decentralization and Local Tax Effort[#]

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ABSTRACT

In India an important policy initiative has been the devolution of financial responsibilities to village level local governments called the Panchayats. The Preamble to this initiative is two fold. First such devolution would not only lead to increased public expenditure but also such expenditures being targeted in a manner consistent with the preferences and needs of the local population. Second, the local tax base would widen, thereby reducing the magnitude of the equalization transfers. However, the incentive structures behind the granting of such additional financial powers have been inadequately articulated. The results have been in the form of reduction in taxes collected, as well as a perceived shrinking of the tax base. These outcomes are posited by us to be due to ignoring the impact of cost of collecting taxes, as well as perverse impacts of devolution of expenditure decisions on local wages and profits.

The extant literature has been so far unable to adequately explain the perverse outcomes of devolution especially where reactions to local tax efforts to transfers from the higher level governments are concerned. 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 that 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. Several policy conclusions are derived.

Key Words:
Devolution, Incentive Effects, Equalizing transfers, Panchayats and Local Government

JEL Codes: *H71, H77*

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I. Introduction

A long held view on the relationship between fiscal decentralization, a policy that has been carried out in India as part of an overall devolution process, and the ability of villages to raise local revenue for locally identified development efforts is that the former allows the latter to increase. This is alleged to have the dual advantage of reducing the fiscal burden on higher level governments and building capacity for taxation at lower level governments. In many developing nations including India, local economic development has been a by product of vertical competition between different layers of government. Under regimes of vertical competition, both federal and local governments use financial resources to achieve identical ends. Such vertical competition exists along with growing fiscal decentralisation.

More formally, the federal governments in developing economies act as an altruistic provider of revenues to villages to engender development. However, the level and structure of such transfers are not calibrated against any mutually agreed levels of development. Consequently, the continued provision of federal "revenues" to villages could crowd out (dampen) revenue raising efforts of villages and lead to less than optimal development increases of the tax base. But why should the tax base widen? As far as possible all goods must be taxed. If not then tax system will create distortions between taxed and not taxed gods. The idea behind the theory of taxation is that the tax base should widen and the tax rates ought to decline. If there are exogenous revenue requirements, and the tax base has shrunk, then either the tax rates have to rise or, external transfers should increase. It also ideal for local governments to be devolved with the powers to collect taxes on the relatively immobile tax bases for, the higher level governments are ideally suited for taxing the more mobile of the tax bases.

This paper is motivated by the possibility that altruistic transfers are quite likely to crowd out public transfers to households below the poverty line, i.e., in the presence of private transfers the effectiveness of government transfers will be reduced. Hansen (2000) examines methods of threshold estimation given that there might be multiple equilibria in any given sample that might otherwise go undetected. An identification of threshold is important if we have a prior that relationships change with the level of intervention. The structural relationship between the threshold variable (the net revenue) and the endogenous variable (in our case the local revenue) is non linear. The non linearity is caused by the impact of exogenous events such as

elections, droughts, floods, etc. In a subsequent paper Cox, Hansen and Jimenez (2004) use the methodology developed in Hansen (2000) to examine whether private transfers crowd out public transfers, conditioned on altruism. In fact, the authors purport to derive the threshold income at which this type of crowding out changes to crowding in. This relationship is between total income and net transfers with the order of this relationship proxied by a polynomial.

There is another strand of literature as in Buettner (2006), Snoddon (2003), Courchene (1994), and, Dahlby and Warren (2003) to which this paper is related to. This literature is concerned with the structure of fiscal equalization, its redistributive impact, as well as the relationship between the formative characteristics of the local tax base and equalization transfers.

The extant literature suggests that, within a federal structure, transfers to local governments in general will 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 the Indian scenario 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.

We develop a theoretical model to explain the incentive to collect taxes in the presence of enhanced grants from higher level governments at the level of villages. We then provide empirical support using micro data from Indian villages spanning three Panchayat periods (i.e. 15 years) for the hypothesis that grants that have the effect of raising the local wage rates will actually end up lowering tax collected. Empirical support for this paper comes from Indian data but the approach and the theoretical model have wider validity.

In the Indian scenario 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 the wage and those that do not. This has effects on the ability and the incentive to collect taxes. Expenditures that lead to a shrinking of the tax base will lower the ability to collect taxes. In

particular, employment generating expenditure will raise the rental rate of capital, thus creating a negative profit shock. Consequently, continued transfers of the fund from the higher level of government implies that agent responsible for collecting and paying taxes will now have a reduced incentive to do so.

Devolution of responsibility for expenditure assumes that the tax base will actually both rise and widen, i.e., any response would be such that an increase in devolution would increase and widen the tax base and there would be a reduced gap between taxes and expenditures. From this point of view the actual response of the tax base and the incentive to collect taxes seem to be perversely related. However, the critique of parametric invariance literature would argue that the tax response is conditional on the structure of devolution. Thus, in general there would be a tax reaction function based on the incentive structure for collecting taxes, especially in the aftermaths of enhanced fiscal transfers. In this paper we show theoretically that, in the presence of increased devolution, rational economic agents at the village level will collect less tax revenue and provide empirical evidence in support of this result using data from Indian villages. In this sense our paper is a substantial generalization of the extant literature.

To achieve these results we develop a model in which the representative household's consumption is a function of incomes arising out of supply of labor to private capital as well as supply of labor 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 the marginal product; and instead is an outcome of policy decided by an outside agent. The wage rate for public capital is set higher in comparison to the market wage rate. Households choose between supplying labor to private capital and public capital. The tax base of the village is however assumed to be the private capital. This has the implication that if households switch their labor supply away from private capital, the tax base will be reduced and consequently the tax collected will drop.

Underlying this model is a utility maximization problem of a representative consumer. This utility is maximized with respect to the tax collected. This reflects an important facet of the developing country experience where tax rates are fixed by a central authority and local governments are given the power to collect taxes.

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 reduction in profits through an adverse impact on the labor markets. The paper provides 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 is used as an important variable determining tax revenue. Being re elected will obviously affect the amount of taxes collected. However, the tax collected will influence the probability of re-election of a current Pradhan.[6]. The identity of the elected representative, as well as the change in the proportion of decisions taken at the local level are important explanatory variables connected to both quality and the structure of governance.

The plan of this paper is as follows. Section II describes the theoretical model. Section III discusses the data and the empirical methodology used. Section IV lays out and discusses the empirical results and Section V. concludes.

[4] The basic estimation procedure is briefly explained in the Data and Methodology section and elaborated upon in the Appendix.

[5] The methodology for doing this is explained briefly 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. We also tested separately for the impact of tax collected on the probability of being re-elected. This was done by panel Logit regression with a dummy of a Pradhan being re-elected as the dependent variable. This probability will partly depend on tax efforts in previous Panchayats. Therefore we include in the panel Logit regression the lag of tax collected alongside with other variables. The negative and statistically significant coefficient estimate of lag of tax (-0.642) implies that for an increase in tax, the probability of being re-re-elected is likely to decline. Detailed result will be furnished on request.

II. Model

Let there be three types of villages T, where T=1, 2, 3. Villages are categorized based on their respective village income premium. Village income premium is derived using the methods introduced by Krueger and Summers (1988) and represents the difference in income received by a household in village j to the average household across all villages in the sample. There are i=1,2,… n_T villages in each village type. The village type is crucially assumed to impact the tax base and consequently the tax collected.

Let k be the tax base, t the tax rate. Hence, the tax collected $x = kt$. We explicitly include a cost of raising taxes at the village level. Let ρ, the cost of raising taxes be written as $\rho(x)$. The net tax collected is therefore.

$$\kappa = x - \rho(x).x \qquad (1)$$

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., discretionary and block grants. The block grants are earmarked for specific programs of the higher level government and the funds are not fungible across expenditure items. The discretionary grants are grants similarly received from higher level governments and other outside agencies. Funds from these grants are fungible. The magnitude of the block grants available is a function of allocation by the various state governments. The budget with the state governments is in turn a function of the degree of compliance of individual state governments with the mandates of the central government. Block grants are typically fixed for a given Panchayat period (the period for which a term of the elected Panchayat lasts). Discretionary grants however are an add-on to the block grants and are usually the results of lobbying by the elected officials of the village. Discretionary grants can be applied to a variety of development efforts at the village level.

In this paper we suggest that the impacts of government transfers (outside transfers) depend on the objectives behind such transfers. A part of these transfers are designated for employment generation while the others are for providing services where the magnitude of local employment is negligible enough to be ignored. We accordingly define the employment generating transfers as g_1 and the other types of transfers as g_2. Both components are present in block and discretionary grants.

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

$$g_1 = g_1^0 - \lambda(x_{t-1}, x_t)x_t \quad (2)$$

$$\lambda \geq 0, \lambda_{x_t}, \lambda_{x_{t-1}} \geq 0 \quad (2a)$$

Where, λ is the rate at which the quantum of g_1 is adjusted to reflect changes in tax collected g_1^0 is the magnitude of g_1 received if the taxes collected by the Panchayat were zero. We can similarly write an equation for the behavior of g_2 as

$$g_2 = g_2^0 - \theta(x_t, x_{t-1})x_t \quad (3)$$

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

The total transfers to the Panchayat from outside is written as g where, g is

$$g = g_1 + g_2 \quad (4)$$

Let the per capita budget constraint of the government as well as that faced by the households be defined by z . That is,

$$z = (1 - \rho(x))x + g_2 \quad (5)$$

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_2 is the non employment generating transfers from outside the Panchayat.

Change in budget constrained due to the local tax effort is written as

$$z_x = \frac{d(x - \rho(x)x + g_2)}{dx} \quad (6)$$

$$= 1 - \rho_x x - \rho(x) + g_{2x} \quad (6a)$$

The change in government transfers due to local tax effort is given by g_x where $g_x = g_{1x} + g_{2x}$.

$$g_{2x} = \frac{\partial(g_2^0 - \theta x)}{\partial x} \quad (7)$$

$$= g_{2x}^0 - \theta_x x - \theta \quad (7a)$$

We can write the expression for g_{1x} 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. That is

$$c = f(k, g_1) - kf_k - g_1 f_{g1} \tag{8}$$

We assume that the production function f is of the Cobb-Douglass form and, is written as $f = Ak^{\delta_1} g_1^{\delta_2}$ 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, $g_1 f_{g1} = \delta_2 f$. 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,

$$c_x = (1 - \delta_1 - \delta_2)(f_k k_x + f_{g_1} g_{1x}) \tag{11a}$$

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

$$z_x = \frac{\partial}{\partial x}((1 - \rho(x))x + g_2) \tag{12}$$

$$= 1 - \rho_x x - \rho(x) + g_{2x} \tag{12a}$$

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

$$\alpha v'(z) = \frac{(\delta_1 + \delta_2 - 1)(f_k k_x + f_{g_1} g_{1x})}{1 - x\rho_x - \rho + g_{2x}} \tag{13}$$

Remark 1: Panchayats will increase the quantum of tax only if there is a corresponding increase in the net tax rate. That is tax can be increased only up to the point where $\kappa_x = 1 - \rho - x\rho_x \geq 0$ and, for this to materialize, both ρ and $x\rho_x$ must be small. The latter is possible only if the slope of ρ_x. Hence we expect the tax collected to decrease in order for the first order condition to hold.

Remark 2: In the first order condition for a maximum, the numerator is always positive (has to be). This is because of diminishing returns, and both f_k and f_{g1} being positive (f_{kk} and f_{g1g1} are negative) while k_x and, g_{1x} are negative. The denominator cannot be negative at equilibrium. This puts certain limits on government policy. This is particularly relevant with respect to the ability of the government to adjust g_2 in response to the observed buoyancy in local taxes. If we assume that g_2^0 is independent of changes in tax collected then, $\theta + x\theta_x \leq 1 - \rho - x\rho_x$. Thus g_2 cannot be lowered beyond a limit for the various tax efforts of the village.

Remark 3: Consider a policy change by the government whereby g_1 is altered while g_2 is unchanged. Suppose g_1 is changed to $\overline{g_1}$ such that $\overline{g_1} = g_1^0 - \overline{\lambda}(x)x$ where, $\overline{\lambda}(x) = r\lambda(x)$ and, r is a constant and less than 1. It is not difficult to see that $f_{\overline{g}_1}\overline{g}_{1x} > f_{g_1}g_{1x}$. Based on the behavior of the tax collected in relation to the tax base, we can certainly assume that tax base is unaffected by the tax collected (unlike in the extant literature where the base declines with an increase in tax). Given the first order condition for a maximum if the numerator of equation (13) increases, tax has to be reduced to ensure a maximum (similar conclusions can be made with respect to changes in g where g_1 is left unchanged.

Proposition 1: Tax collected by the village will decline if there is an increase in the employment generating transfers from outside the village (g_1) leading to a shift in labor from private capital (k) to be used in creating public goods. This shift in labor creates a reduction in the tax base which in turn will lead to reduction in taxes collected.

Proposition 2: The cost of collecting tax ρ mediates between g_1 and k by preventing the impact of an increase in g_1 on tax collected from being symmetric with a decrease in g_1 of a similar magnitude. We can assume that this holds for g_2 as well without loss of generality.

III. Data and Estimation Procedure

We use data from the ARIS/REDS survey of the NCAER. The survey is a nationally representative multi-purpose household and village surveys. The household survey collects detailed household information such as household demographics, welfare and agricultural production etc. As our focus on this paper 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 and subsequent rounds of data collection were held in 1970, 1971, 1982, 1999, and 2006. The current study 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 Panchayat for a range of variables germane to the analysis of the behavior of local taxes. We have yearly data on program spending derived from on block grants, untied 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 is as follows.[7]

- tax: The ratio of tax collected to total expenditure in per capita term
- Predicted rho ($\hat{\rho}$): Predicted cost of taxation
- g_1/ g_2: The ratio of g_1(per capita employment generating expenditure) to g_2 (per capita public goods generating expenditure)
- pubgd: The per household availability of public goods
- disblk: The ratio of untied revenue to tied revenue in per capita term

[7] 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.

- ipremia: Estimated village income premium
- panchayat1: dummy for current Panchayat
- decentralization: proportion of decision taken by the Pradhan and other elected village level officials
- mpradhan: dummy for male Pradhan
- scpradhan: dummy for SC Pradhan
- stpradhan: dummy for ST Pradhan
- obcpradhan: dummy for OBC Pradhan
- repradhan: dummy for re-elected Pradhan

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 makes explicit the impacts of the cost of tax collection as well as transfers, among other variables, on the amount of tax collected. This is given by:

$$\log(tax_{i,t}) = \beta_0 + \beta_1 \log(\hat{rho}_{i,t}) + \beta_2 \log(g_{1i,t} / g_{2i,t}) + \beta_3 \log(pubgd_{i,t}) + \beta_4 \log(ipremia_{i,t}) + \beta_5 Panchayat + u_{i,t} \quad (14)$$

The coefficients of interest are β_1 and β_2.

One of the contributions of this paper is that we estimate the impact of cost of taxation.[8] We model this 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.[9] 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.

[8] It should be made clear that the cost of taxation, as modeled here, accrues to the village administration and is, therefore, different from the marginal cost of raising taxes discussed earlier since these accrue to private players. g_1/g_2 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 g_2 can be inferred by estimating the village level wage and profit functions. Employment generating expenditures (i.e., g_1) will raise wages and will be a source of negative productivity shocks (that is profits will decline with and increase in g_1). Table 3 shows the results of such estimation.

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

In addition, local governance might influence local tax collection. Therefore, we also examine the effects of local governance on tax revenue by including dummy variables for decentralization, male headed Pradhan, the social group of the Pradhan and whether the Pradhan has been re-elected.

The three Stage Least Squares (3SLS) estimator is applied to circumvent potential reverse causality between villages' tax revenue and public transfers (i.e. employment generating or public goods generating expenditures). [10] In addition, we presume contemporaneous correlations among error terms in a system of equations as for example a macroeconomic shock (e.g. financial crisis etc.) would have effects on tax revenue, public transfers and provision of public goods. The ratio of employment generating expenditure to public goods generating expenditure is instrumented by its lagged value and lagged per household availability of public goods in a separate equation, while it is used as a right hand side variable in tax equation. Similarly, we instrument the availability of public goods by their lag in another separate equation. 3SLS is generally consistent and more efficient than 2SLS estimator (Green, 2003).[11]

The composition of the transfers from higher level government matters. Certain types of transfers will influence wages and others will affect the rental rate of capital (profits). In particular we note that the impact of employment generating expenditures have a positive impact on wages and act as 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_1/g_2 on tax collected should be negative.

[10] We also carried out a panel data estimation of the model. These results are available upon request. The estimated coefficient of the predicted *rho* (i.e. the cost of tax collection) is negative and statistically significant. Thus if the cost of taxation increases, villages tend to be hesitant in tax collection. The signs of coefficient estimates of other variables are also not different from our expectation (e.g. the higher the village income premium, the more collected tax etc.) although some are statistically insignificant. The estimates of public transfer on tax are statistically insignificant for both fixed and random effects (The sign is positive in fixed effects model and negative in random effect models). However, without controlling potential reverse causality of tax revenue on public transfer would lead to endogeneity bias. Hence, we prefer the 3SLS estimates reported in this paper.

[11] A limitation is that the results of 3SLS estimation are sensitive to a model specification. In addition to the estimation of the base tax equation, we can check the robustness by including the above mentioned variables as proxies for local governance.

[12] In table 3 we have shown the result of the village level profit and the wage equations conditioned on village level employment generating expenditures.

One of 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 rather than to provide public goods, these would reduce the amount of tax collected through a labor shift from private capita to public capital. This hypothesis can be tested by incorporating g_1/g_2 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. This is permitted by the equation we estimate.

IV. Results

Various summary measures on the key variables used in the analysis are reported in tables 1 and 2. We deflate nominal magnitudes using state CPI for agriculture and rural laborers (base year 1986). It is revealing to note that the covariance between local taxes and employment generating transfer is declining over time. This suggests that there could a crowding out of taxes by certain types of government transfers.

Tables 1 and 2 here

In Table 3 we show the impact of g_1 on village level agricultural profits and area weighted harvest wages

Table 3 here

The last column of Table 3 indicates that with a rise in g_1 the area weighted harvest wage rises. Further, this response is statistically significant. Concurrently, a rise in g_1 lowers the agricultural profit as indicated in the second column of Table 3. Thus, an increase in g_1 raises the wage and lowers the profit. We can infer from this that the marginal cost of raising taxes

[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.

will be positive. This is the reason for $\log(g_1/g_2)$ having a negative coefficient in the regressions reported in tables 4 and 5.

Tables 4 here

The first two columns of Table 4 (Case 1) show the results of 3 SLS estimations without a variable indicating the ratio of discretionary to block grant (untied vs. tied revenue) while third to fifth columns are given by including the variable into the tax equation.

Table 4 shows a significantly negative – economically and statistically – impact of cost of taxation on the tax collected: the elasticity of the ratio of tax to villages' total expenditure with respect to the cost is -26.796. We also observe a negative association between the ratio of employment generating expenditure to public goods generating expenditure (g_1/ g_2). The relevant coefficient is significant at 1 percent (column 1). This suggests that vertical transfers, in particular those that lead to higher g_1 relative to g_2 would reduce the tax base which, in turn, would result in the less share of tax to total expenditure.

Table 4 also shows the significant negative impact of public goods on the tax share: the elasticity of the tax ratio with respect to republic goods is -0.456 and statistically significant at 5 per cent level. On the other hand, as a proxy for inter village differentials, the positive sign of village income premium, suggests that the higher the income premium a village has, the higher ratio of tax to total expenditure. This is as we expect but it is statistically insignificant. The ratio of employment generating expenditures to public goods generating expenditure and, per capita availability of public goods in a village has significantly positive association with their lagged values respectively (column 2 and column 3).

Turning to columns 4 to 7 (Case 2- inclusion of discretionary to block revenues), the results are similar to the above. The positive and significant coefficient estimate of the ratio of discretionary revenue to block revenue suggests that the more untied revenue would lead to higher local tax effort: a one per cent increase in untied money relative to tied revenue would increase local tax collected (relative to total expenditure) by 0.476.

In table 5 we add a number of dummy variables into the base model to examine the influences of the local governance. The included dummy variables are whether decision making is decentralized, whether Pradhan is male or not, the cast of Pradhan (base is OC) and the re-elected Pradhan. Same as Table 4, the first three columns (Case 3) are given by omitting the variable for the ratio of discretionary to block grant while the last four columns contain the variable.

Table 5 here

As we see from Table 5, the results found from the base regression (Table 4) are robust and are not changed much by the inclusion of local governance indicators. For example, the impact of the cost of taxation is observed as becoming stronger: the estimated elasticity of cost of tax ratio with respect to the cost of raising public funds is -34.024 and significant at 5 per cent level. The rest of the variables show similar patterns to Table 4.

For local governance, decentralized decision making would have a negative influence on local tax effort although the estimated coefficient is only significant (at the 1 per cent level) in the regression with the ratio of discretionary grant (-2.437). Male headed Panchayat has a negative association with tax collected and statistically insignificant regardless of inclusion of the discretionary grant variable. Taking OC headed Panchayat as a base group, all caste dummy variables are insignificant except OBC Pradhan dummy (in regression without the grant variable – column 1) and SC Pradhan dummy (in regression with the grant variable – column 4) which are marginally significant at 1 per cent level. Dummy for re-elected head has negative signs and is significant in the regression with inclusion of the discretionary grant variable. Finally, the Sargan test statistics over identifying restriction for regression suggests that the system of equation in our study is just identified except Case 3.

Broadly speaking additional powers to make expenditure decisions are not being matched by increased tax efforts. Indeed increased fiscal devolution has led to reduced tax collection. This is consistent with the moral hazard problem as articulated in Jha et al. (1999b). Under the tenets of fiscal equalization principle it is expected that any of the budgetary gap at the level of the local governments would be filled by transfers from higher level governments.

However we find that in the Indian Panchayats all efforts are focused on fine tuning expenditures. Some specific empirical results obtained by our estimation are as follows:

Consistent with the model the result show that the cost of collecting taxes is an important determinant of the total taxes collected. As this cost goes up tax collection goes down. Past transfers have an impact on current g_1/g_2 and, through this, on tax collected. This is merely indicative of the negative trend in the magnitude of the tax base and may be attributed to government transfers altering the structure of the labor markets. Thus, even in cases where tax efforts are observed such efforts will shrink due to a reduction in the tax base.

We also find that the transfers from higher level governments will continue to increase. If the past transfers are large then the marginal effect of such transfers on current transfers will be significantly positive. This is the precondition for the reactionary response of the local tax efforts to transfers from higher level governments.

We however find that public good expenditures (i.e. the impact of increases in) decline over time. This suggests that such expenditures have not had any significant impact on growths in factor productivity and, therefore have not led to any meaningful increases in tax base.

Consistent with the literature on critique of parametric invariance we find that an increase in devolution actually brings about a perverse impact on local tax efforts. Increased devolution is measured by the increases in the number of decisions made at the local level (i.e. by the elected officials, the Gram Sabha, or both). This measure is consistent with the provisions of the Indian Constitution. Since in reality devolution is consistent with only the power to spend, the reactions to transfers from higher level governments are “reactionary” in nature.

We find evidence for the fact that the probability of re-election to the position of Pradhan is strongly influenced by the Pradhan having collected taxes in the previous Panchayat period (the impact is strongly and significantly negative). We therefore find that elected officials whose tenure extends beyond one Panchayat period progressively collect lesser taxes and even in some cases abstain from collecting taxes (shown by the coefficient on the dummy “position held before”).

In the empirical results the health of local economy does not seem to matter. In this paper we proxy the health of village economy by "village income premium". A village is supposed to have a positive income premium if the average income of that village is greater than the average incomes of all other villages in the economic space (within the sample). We find that the health of the local village economy does not significantly affect local tax effort.

The results also suggest that the declines in the incentives and ability to collect taxes along with the magnitudes have become structural (Panchayat period dummy is negative). This is irrespective of the type of the Panchayat, i.e., it does not matter whether the Panchayat is headed by a woman or a member belonging to religions and castes that are construed to be socially weak.

V. 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.

An important policy conclusion of this paper, then, 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. The

electoral system reinforces this effect: Pradhans continuing in office have an incentive to lower their tax effort.

Thus, 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.

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Table 1: Village Characteristics

Variables	*Panchayat Periods*		
Village Characteristics	**Current**	**Previous**	**Previous to previous**
Indicators of Remoteness (km.)			
Distance to Block head quarters	12.88	13.55	15.46
Distance to District head quarters	50.71	51.47	51.21
Distance to Taluk head quarters	15.71	16.45	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
Development Indicators			
Percentage of houses with electricity	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

Table 2: Structure and Behavior of Taxes and Expenditures

Variables	*Panchayat Periods*	*Mean**	*Std. Dev.*
Tax Collected	Current	749094	829408.5
	Previous	917358	2647280
	Previous to Previous	920908	2984130
Total Grant	Current	8215951	4967880.0
	Previous	7013983	1610000
	Previous to Previous	4757822	1080000
Discretionary grant	Current	978546	1061152.0
	Previous	878917	1908906
	Previous to Previous	577103	1126590
Block grant	Current	2961279	1844233.0
	Previous	2223643	6905147
	Previous to Previous	1542546	4702682
g1	Current	409163	804983.1
	Previous	383574	838628.3
	Previous to Previous	321198	725310.3
g2	Current	4889219	3723706
	Previous	3768744	8126133
	Previous to Previous	2381730	4913612
Exp. on Agricultural program	Current	626626	578432.4
	Previous	545467	1453271
	Previous to Previous	243797	676808.1
Exp. On Public welfare	Current	704431	1343857
	Previous	617814	1595558
	Previous to Previous	253296	726793.3
Cov (tax,g1)	Current	0.88	
	Previous	1.19	
	Previous to Previous	1.61	

*means are reported in rupees

Table 3: Impact of Labor Generating Expenditures on Profits and Wages

	Agricultural profit	*Area weighted harvest wage*
g1	-0.029*** (0.012)	0.020** (0.010)
g2	0.020 (0.014)	-0.012 (0.012)
Land Gini	0.929*** (0.162)	-
Consumption Gini	0.135 (0.174)	-0.312 (0.678)
Distance to town	0.002 (0.005)	-0.001 (0.004)
Distance to district headquarter	0.055 (0.073)	0.001 (0.001)
Distance to Pucca road	-0.011 (0.014)	-0.013 (0.012)
Distance to school	0.109 (0.072)	-0.023 (0.062)
Dummy for cooperative milk center	-0.011 (0.113)	0.021 (0.097)
Distance to wholesale market	0.006 (0.004)	-0.006** (0.003)
Number of Huts in the village	-0.038 (0.030)	-
Number of brick houses in the village	0.067* (0.04)	0.0002** (0.0001)
Average rain fall	0.081*** (0.031)	0.0001 (0.0001)
Time dummy	-0.443*** (0.125)	0.727*** (0.109)
Constant	10.301*** (0.500)	0.590*** (0.217)
Breusch and Pagan Lagrangian multiplier test[14]	1.22	1.87
Number of Observation	480	480

Note: All the variables are in logarithms.

[14] The Breusch-Pagan Lagrange multiplier test accepts pooled regression against random and fixed effects.

Table 4: The Base Equation

	without grant variable (Case 1)			with grant variable (Case 2)			
Dept. Variable	**log (tax)**	**log (g1/g2)**	**log (pubgd)**	**log (tax)**	**log (g1/g2)**	**log (pubgd)**	**log (grant)**
log (rho)	**-26.796**			**-19.953**			
	(3.04)* **			**(2.77)*** **			
log (g1/g2)	**-0.691**			**-0.39**			
	(2.53) **			**(1.93)***			
lagged (g1/g2)		**0.266**			**0.254**		
		(3.41)* **			**(3.19)*** **		
log (public goods)	**-0.456**			**-0.36**			
	(2.45) **			**(2.43)** **			
lagged public goods		-0.066	**0.937**		-0.126	**0.936**	-0.002
		(0.41)	**(35.92)*** **		(0.73)	**(33.14)*** **	(0.02)
log (ratio of discretionary to block grant				**0.476**			
				(3.38)* **			
lagged (ratio of discretionary to block grant							**0.47**
							(5.73)* **
log (village income premium)	0.114			0.096			
	(0.83)			(0.95)			
current Panchayat dummy	0.13			-0.12			
	(0.41)			(0.51)			
Constant	-22.566	0.256	-0.169	-16.684	-0.017	-0.176	-0.824
	(3.51)	(0.36)	(1.51)	(3.05)	(0.02)	(1.43)	(1.28)
Observations	96	96	96	91	91	91	91
Joint significant tests (Chi^2)	18.62***	11.63***	1290.34***	46.09***	10.31***	1098.24***	33.51***
Hansen-Sargan over identification test	$Chi^2(7)$=13.061, p value=0.0706			$Chi^2(13)$=18.554, p value=0.1376			

1 Absolute value of z statistics in parentheses
2 * significant at 10%; ** significant at 5%; *** significant at 1%

Table 5: Effect of Structure of Governance

	without grant variable (Case 3)			with grant variable (case 4)			
Dept. Variable	**log (tax)**	**log (g1/g2)**	**log (pubgd)**	**log (tax)**	**log (g1/g2)**	**log (pubgd)**	**log (grant)**
log (rho)	**-34.024**			**-26.746**			
	(2.37)**			**(3.05)*****			
log (g1/g2)	**-0.639**			**-0.354**			
	(2.71)***			**(2.44)****			
lagged (g1/g2)		**0.285**			**0.268**		
		(3.19)***			**(2.98)*****		
log (public goods)	**-0.566**			-0.23			
	(2.08)**			(1.32)			
lagged public goods		-0.312	**0.904**		-0.337	**0.902**	0.048
		(1.42)	**(26.03)*****		(1.49)	**(24.88)*****	(0.26)
log (ratio of discretionary to block grant				**0.703**			
				(4.62)***			
lagged (ratio of discretionary to block grant							**0.536**
							(5.47)***
log (village income premium)	0.126			**0.196**			
	(0.67)			**(1.77)***			
current Panchayat dummy	0.399			0.012			
	(1.01)			(0.05)			
Decentralisation dummy	-1.08			**-2.437**			
	(1.13)			**(4.00)*****			
male Pradhan	-0.153			-0.394			
	(0.35)			(1.40)			
SC Pradhan	-0.62			**-0.64**			
	(1.04)			**(1.80)***			
ST Pradhan	-0.274			0.501			
	(0.30)			(0.86)			
OBC Pradhan	**-0.928**			-0.099			
	(1.95)*			(0.31)			
Position held before	-0.334			**-0.592**			
	(0.55)			**(1.68)***			
Constant	-26.583	-0.777	-0.318	-17.819	-0.883	-0.329	-0.592
	(2.51)	(0.82)	(2.15)	(2.69)	(0.90)	(2.11)	(0.72)
Observations	72	72	72	69	69	69	69
Joint significant tests (Chi^2)	21.61**	10.81***	677.72***	79.06***	9.79***	618.77***	29.93***
Hansen-Sargan over identification test	$Chi^2(19)$=31.906, p value=0.0320			$Chi^2(31)$=42.355, p value=0.0840			

1 Absolute value of z statistics in parentheses
2 * significant at 10%; ** significant at 5%; *** significant at 1%

Appendix

Prediction of the cost of tax collection: The cost of tax is unobservable. Our *modus operandi* for estimating it is as follows. We generated 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 regression explained below.

The first regression (Pooled OLS): The generated random variables were regressed on a set of covariates representing village characteristics – log of amount tax collected (*taxcol*), 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 chose one random variable with the highest value. The estimated model is:

$\hat{\rho}$ = 0.378 + 0.008 log (*taxcol*) + 0.006 log(*pcvinc*) + 0.0004 *bus* – 0.002 *bank* – 0.0000 *pop*.

(N=656).

The value of log likelihood is 1.73 and all the coefficient estimates are insignificant. The second regression (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 *taxcol* 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 assuming that the (unobservable) cost of tax would be influenced most by the tax collected, we estimated the selected random variable from the first regression again by *taxcol* only, dropping other variables. This allowed us to draw more information rather than wasting many data observed in the *taxcol* by including other village characteristics which has only one or two observation. 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.[15] The estimated equation is:

$\hat{\rho}$ = 0.527 – 0.003 log (*taxcol*) (N=1448)

The Haussmann test supports random effect estimation. The negative sign of *taxcol* 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.

[15] Haussmann test supports panel IV random effect: $chi_2(1)=0.55$, Prob>$chi_{2=0.4563}$