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Does Public Service Delivery Influence Tax Evasion? Evidence from Municipality Tax in Bangladesh

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Abstract

This paper examines the role of access to public services on tax evasion. Establishing such link directly (for both the citizens and researchers at the micro level) is difficult because i. the tax collecting authority (Finance) and the service delivery authority (e.g., Utility Services) are often different and ii. There are numerous services, different, administratively, qualitatively and spatially, financed from the same revenue pool. The case of municipality taxation and municipality services could be an exception since the tax collecting authority and the service delivery authority are the same. With this belief, we investigate the role of service delivery in tax evasion using a citizens' survey conducted by BRAC Institute of Governance and Development (BIGD) in 2014. The survey collected information of citizens from 286 municipalities in Bangladesh (out of 321 municipalities and 11 large city corporations) who report their access to municipality services, details of their property holdings and municipality taxes they pay. We use details of holding properties and other citizen information to estimate a municipality tax liability of each citizen and then compare that with the actual tax payments to estimate the municipality tax evasion. The access to public services and tax evasion however are endogenously determined since greater tax evasion results into lower tax revenue, lower revenue expenditure and hence, poorer service delivery. Hence, we instrument for access to services with a regulatory intervention that has caused a rapid municipalization of urban settlements seventeen years ago, more than doubling the number of municipalities in subsequent five years. This has made significantly less funds available to each municipality, slowing down the infrastructural set-up and eventually poorer access to services even in 2014. We believe that this regulatory intervention is related to individual willingness to pay taxes only through access to services and tax rate, which we control for. We find that citizens with greater access of services evade less. Furthermore, in line with the literature, higher municipality tax rates are positively associated with greater tax evasion.

Key Notes

Tax Evasion and Avoidance, Public Goods, Subsidies, Revenue, State and Local Taxation

1. Introduction


Why do citizens evade tax? Allingham and Sandmo (1972) in their seminal work have highlighted the role of law enforcement on tax evasion but there has been limited empirical support (REF? Countries?). A large literature since has ensued focusing on the role of social, psychological, moral and cultural factors influencing willingness to evade tax. One strand of literature argues that citizens feel morally obliged to pay taxes if the government indeed provides the public good (See for example, Kolm (1973)). This is particularly intuitive when the developing countries are compared with the developed countries: whereas the quality of public services are lower in developing countries in comparison to the developed countries, the degree of tax evasion is also higher. Whether such quality-evasion nexus holds at more micro level (within a country) remains to be an open empirical question.

This paper looks at the role of the quality of municipal services delivery perceived by citizens on their tendency towards municipality tax evasion in Bangladesh. The municipal services received by an individual are water supply, solid waste management and street light. Within the purview of our study, the term “number of services” refers to the number of services an individual has access to out of the three aforementioned municipal services. We use a survey data conducted by BRAC Institute of Governance and Development (BIGD) in 2014 on more than six thousand households in 318 municipalities. The survey collected detailed data on the properties held, municipal taxes paid, municipal public services enjoyed etc. by the citizens. We use these responses to estimate each citizen’s tax liability and compare it with actual municipal tax payment to estimate their municipal tax evasion. We then investigate how this estimate of municipal tax evasion of each citizen varies with the access to municipal services by the citizens.

It is important to recognize that studying the relationship between access to services and tax evasion empirically at micro level is generally complicated. First, it is often difficult, both for the citizens and respondents as well as the researchers to directly relate the tax evasion to the public services provided to the citizens. This is partly because of the macro nature of the fiscal system. The confusion also results from the fact that the tax collecting authority (say, the Ministry of Finance) are often different from the service delivery agency (say, ministry of health, education etc.). Second, the exposures of different public services also varies across individuals. An individual experiences a whole host of services from different ministries across different locations at different points in time. This shapes the individual’s willingness to pay tax and hence, tax evasion. Disentangling the effect of access to services may therefore be problematic. Finally, the tax payment may also depend on the kind of tax in question (Income Tax, Corporate Tax, Import Duties etc.) which may differ according to the tax rate, enforcement mechanisms and other governance-related factors of the respective tax unit.

Municipality services and taxes in that respect solves many of such difficulties. First, it is much easier to establish a direct link between the services provided and the taxes paid in the municipality context since the service provider and the tax collector are the same authority. Hence, the citizens (and the researcher) are able to judge better the return of the taxes (in the form of access to services they receive) which in turn will shape their willingness to pay taxes. Second, the type of services provided by the municipalities are very similar which makes the comparison easier.

We investigate this relationship between evasion and access to public services in the context of a developing country, Bangladesh. The Article 60 of the Constitution of Bangladesh has granted



municipal governments the discretion to impose rates and taxes in their jurisdictions to raise and mobilize resources for financing their activities. This is primarily due to financing of the urban service delivery is mandated since the British rule. The primary source of this revenue is the holding Tax, the tax imposed on the value of the holding or property (Yunus and Rahman (2015)). Revenue is also generated from provision of other urban basic services that include water supply, street lights and conservancy and waste management. The fees and rates for these services are also determined based on the land holding. We call the sum of all these taxes, rates and fees as the municipality tax. Despite the clear mandate and legal provision, the actual collection of municipal taxes has been dismal. According to Yunus and Rahman (2015), the average revenue collection in Class A municipalities, the best type of municipalities, is only 42%. The municipalities therefore rely heavily on the funds provided from the central government through various channels including block grant, development funds and more importantly, fiscal supports. This pressure on the central fiscal system has made policy makers at local and national level interested on ways to strengthen municipality finance. To that end, understanding tax evasion and finding strategies to reduce it in an effort to raise municipal tax revenue is a major national policy question as well.

The public service provision and tax evasion however are endogenous. A greater degree of tax evasion will result into lower tax revenue which in turn will leave less funding for the municipality to spend on services, reducing access to public services. In order to take care of this endogeneity problem, we consider an instrumental variable approach by appealing to a regulatory intervention occurred seventeen years ago (in 1997). More specifically, the Municipality Ordinance 1997 has eased out paths of establishing new municipalities. This resulted into significant growth in number of municipalities: whereas in 1996, there has been 108 municipalities in Bangladesh, 120 additional municipalities have been established over the next five years. Given the fiscal reliance of the municipalities on the central government, the rapid municipalization is expected to create significant budgetary pressure on the central government. As central government's budgetary outlay has not matched the growth, each municipality experience less fiscal support resulting into slow progress in infrastructural set-up and institutional building. Hence, the municipalities established after the Ordinance experience poorer coverage of services than municipalities that are established before. We expect that such historical regulatory event would not affect citizens' willingness to pay for taxes in 2014. Since the tax collection system's reliance on infrastructure is far less, we further believe that such an instrument will not be related to the tax collection and enforcement efforts in 2014 and hence, will not affect tax payment incentives of the respondents. Nevertheless, we control for other enforcement related factors including the number of unfilled positions as a proportion of approved positions, tax rate, citizens' willingness to pay additional taxes in exchange of greater access to services, population size and area. Our use of utilizing recent historical interventions are similar to Andrabi, Das and Khwaja (2013).

We find one important result and a few consistent results. First, the citizens that has a greater access to public services evade less tax, in line with the theoretical predictions of Kolm (1973), Cowell and Gordon (1988), Falkinger (1991) and Bordignon (1993). Second, in line with the existing literature (See, for example, Fisman and Wei (2004) for a case on customs tax evasion), we find that evasion is positively associated with the tax rate the citizens face. Third, we find more educated citizens evade municipal taxes less, consistent with findings reported by Rodriguez-Justicia (2017).

Our findings contribute to the growing literature that attempts to understand the role of moral, psychological, social, cultural and other behavioral factors in shaping the tax evasion behavior. Torgler (2005) in countries in Latin America finds that size of the shadow economy, faith in government officials, pro-democratic attitude to tax system, trust in the fairness of the tax schedule

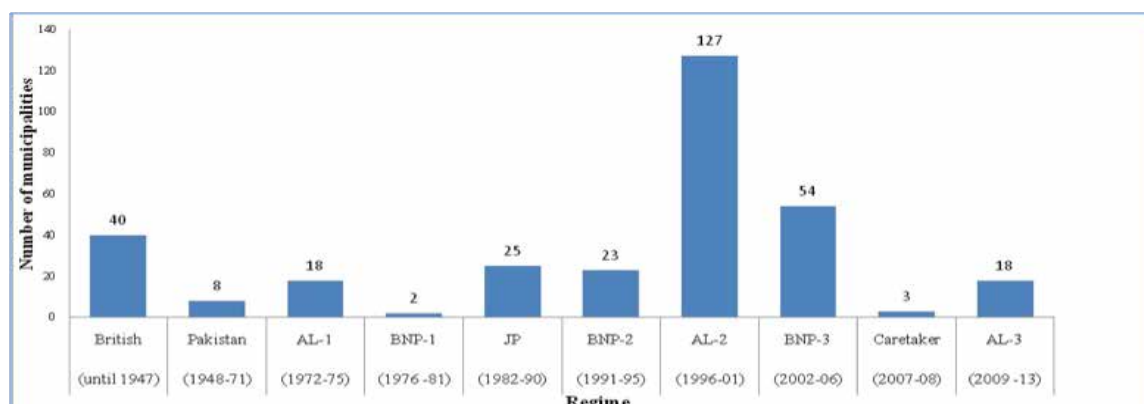
and belief of others obeying laws are positively associated with the individual tax morale. Guth, Levati and Sausgruber (2005) find that tax morale is lower when generated tax revenue is expended centrally, in which portion of tax collected from a region is allocated for offering public good in other regions, compared to revenue being disbursed locally. Richardson (2006) in his cross-country analysis tax morale and fairness of tax system is associated with lower incidence of tax evasion across countries. Lubian and Zarri (2011) shows that tax morale includes a happiness factor generating a higher hedonic payoff than cheating. Kountouris and Remoundou (2013) use immigrant data to show that culture has a strong influence on tax morale. Bucciol, Landini and Piovesan (2013) finds that demographic characteristics like age, gender and national origins are important determinants of fare evasion. Onu and Oats (2015) apply a discourse analytic framework on online transaction data to investigate the role of social influence in tax communication and compliance. Buonanno and Vanin (2017) shows that tax evasion is higher in communities with social closure in Italian municipalities. We contribute to this literature by investigating an additional factor, the role of public good provision, that influences tax morale and hence tax evasion: the role of public good provision. The paper is structured as follows. Section II provides the Institutional Background, Section III highlights the theoretical framework of this paper, Section IV discusses the data and the descriptive statistics, Section V highlights the econometric framework, Section VI presents the results of the first stage regression, Section VII exhibits the empirical findings of the OLS and IV results and Section VIII concludes.


2. Institutional Background

The history of municipality system in Bangladesh dates back to Mughal era with significant legal and tangible progress made during the subsequent British period (Islam (2015)). The British Government (1765 – 1947) has established a number of municipalities over time which continued during the Pakistani period (1947 – 1971) as well. After liberation, the first independent Awami League government (1972 – 1975) has continued establishing new municipalities. The growth of municipal establishments however has fallen during the first BNP era (1976 – 1981) despite the Municipal Act enactment of the Municipal Act 1977, but it peaked up a little during the Jatiyo Party Era (1982 – 1990). After the beginning of the new democratic era in 1991, there has been a greater emphasis on formation of a legal and institutional framework by the second BNP government (1991 – 1996).

The second Awami League government (1996 – 2001) has taken this step farther by passing the Municipality Ordinance 1997 and started a rapid municipalization process. As figure 1 exhibits, about 108 municipalities have been established between the British period and the Jatiyo Party regime. Between 1997 and 2001, additional 128 municipalities were established. This rapid municipalization continued during the early periods of the subsequent, third BNP regime (2002 – 2006) which slowed down significantly in recent years, possibly as pool of the urban settlements potential to be municipalities has been gradually exhausted.

Figure 1: Establishments of Municipalities over different regimes





Since the inception of local governments in the pre-colonial period, these government institutions have experienced significant changes regarding their responsibility and functions (Yunus and Rahman, 2015). However, one aspect of local governments has remained constant throughout this whole period: these governments have operated to advance the interests of the central government. As a matter of fact, following the liberation of Bangladesh in 1971, the local governments have still been serving the concerns of the incumbent party instead of ensuring the well-being of people in their respective jurisdictions. The local government bodies comprise multiple levels of sub-national governments. Municipal government, which operates in municipalities, is one of those sub-national governments.

The municipal governments undertake a series of tasks, which have been categorized into compulsory functions and optional functions, to ensure the welfare of residents of their respective jurisdictions. While the compulsory functions, which includes-water supply and solid waste management, are carried out to deliver the primary amenities to the residents, the optional functions are undertaken to provide supplementary amenities, such as maintenance of educational institutions and supervision of private structure, to the people. The municipal governments have to raise and mobilize the required financial resources to discharge their functions properly. To obtain the necessary financial resources, these governments resort to imposing taxes on the residents and receiving external grants from the central government.

The municipalities have officially been classified into classes three classes: A, B, and C. The volume of municipal government expenditure, the amount of revenue earnings and the size of the municipalities in terms of both population and area decrease in ascending order from Class A municipalities to Class C municipalities.

According to Yunus and Rahman (2015), the key source of revenue earnings for the majority of the municipal governments in Bangladesh is holding tax, which consists of property tax, water rate, conservancy rate and the street lighting rate, and is imposed on the basis of the value of the holding or property. In the Model Tax Schedule 2003, the central government has specified the rate structures of the four components of holding tax which the municipal governments are required to adopt. The municipal governments have followed progressivity in imposing holding tax across different classes of municipalities, where the rate of every component of holding tax is higher in class A municipalities compared to that of the remaining two classes of municipalities. With the exception of water rate, the municipal governments have been able to utilize the other three components of holding tax in generating financial resources, in which they have set the rates of those components near their respective upper limits. Although the assessment of annual value of properties for the purpose of determining Municipal tax liability has poorly been conducted across municipalities, majority of holding owners have regularly paid their holding taxes.

3. Theoretical Framework

The Set-up

We follow Cowell and Gordon (1988) and apply it to the case of municipality tax payment. The individual tax payer holds a property which generates an annual income (or utility) Y . The individual needs to pay a municipality tax, t , on Y . The individual needs to decide on the amount to be evaded, e , where $0 \leq e \leq Y$. The probability that the tax payer is audited is π and a surcharge rate of s is involved if the tax payer is caught evading on the evaded amount e . e then can be thought as a “risky asset” with return r with $r = -s$ with probability π and $r = 1$ with probability $1 - \pi$. The private consumption or disposable income therefore is

$$c = (1-t)Y + rte. \quad (1)$$

The utility function of the tax payer is given by $U(c, z)$ where z is the amount of public good provided by the government.

The municipality on the other hand provides the public good from the tax revenue generated from municipality tax. Suppose there are n such identical tax payers. The Municipality tax revenue generated therefore is given by:

$$R = \sum[Y - c] - n\theta(\pi) = ntY - \sum rte - n\theta(\pi). \quad (2)$$

Where $n\theta(\cdot)$ is the monetary cost of inspection. Cowell and Gordon (1988) assume that the public good services enjoyed by each tax payer, z , is proportional to R with $z = R/\phi(n)$ with limiting assumptions that $\lim_{n \rightarrow \infty} 1/\phi(n) = 0$ and $\lim_{n \rightarrow \infty} \frac{n}{\phi(n)} = 1/\bar{\phi}$. Since we are concerned about the quality of the public good which in turn builds up the perception about it, we assume that $z = \alpha R/\phi(n)$ where $\alpha \leq 1$ where it holds with equality in standard Cowell and Gordon (1988) case where quality is not important.

Equilibrium

An individual tax payer’s optimization problem therefore is given by

$$\max_e E[u(c,z)] \quad (3)$$

Subject to

$$z = \frac{\alpha [ntY - (n-1)\bar{r}te_{-i} - rte - n\theta(\pi)]}{\phi(n)} = \alpha \left[\frac{n(tY - \theta(\pi)) - (n-1)\bar{r}te_{-i}}{\phi(n)} - \frac{rte}{\phi(n)} \right] \quad (4)$$

And $c = (1-t)Y + rte$.

In equation 4, $E[r] = \bar{r} = 1 - \pi - \pi s$, the expected rate of return from evasion and e_{-i} are the optimal evasions chosen by others. The expectation operator in 3 is due to r of other tax payers.

The solution to the optimization problem 3 will generate the Best Response function of each tax payer. Assuming a symmetric equilibrium, we represent any other tax payer’s decision by \bar{e} and the

expected return of evasion $E[r]=\bar{r}=1-\pi-\pi_s$, the first order condition is given by:

$$E\left[\left\{U_c - \left(\frac{\alpha U_z}{\varphi(n)}\right)\right\}r\right] = 0. \quad (5)$$

An interior solution exists if $U_c > \alpha U_z / \varphi(n)$ and $E[r] > 0$. For large economies, Equation 4 reduces to $E[U_c r] = 0$.

Comparative Statics

We are interested in the effect of a change in the quality of the service, α , on evasion. Implicitly differentiating the FOC in (5), we get:

$$\frac{\partial e}{\partial \alpha} = - \frac{E\left[\left\{U_{cz} \frac{R}{\varphi(n)} - \frac{\alpha}{\varphi(n)} \frac{\alpha R U_{zz}}{\varphi(n)} - \frac{U_z}{\varphi(n)}\right\}r\right]}{D}$$

$$\text{Where } D = E\left[\left\{U_{cc} - 2U_{cz} \frac{\alpha}{\varphi(n)} + U_{zz} \left(\frac{\alpha}{\varphi(n)}\right)^2\right\}r^2\right].$$

The strict concavity of utility function as assumed by Cowell and Gordon (1988) implies $D < 0$. Assuming $U_{cz} > 0$, $U_{zz} < 0$ and $U_z > 0$, the numerator is however difficult to sign. This is due to two opposing effect. First, the increase in efficiency in supplying public good would increase the return from paying tax which will reduce tax evasion. This is captured by $-\frac{E\left[\frac{U_z}{\varphi(n)}r\right]}{D} < 0$. On the other hand, the increased efficiency will also leave an individual with greater utility reducing the need to forgo private consumption and pay tax and eventually, increase evasion. This is given by

$-\frac{E\left[\left\{U_{cz} \frac{R}{\varphi(n)} - \frac{\alpha}{\varphi(n)} \frac{\alpha R U_{zz}}{\varphi(n)}\right\}r\right]}{D} > 0$. In other words, a high rate of return from tax payment resulting from high marginal utility, U_z , would ensure a reduction in evasion as a response to increase in quality of public service at low level of z .

4. The Econometric Framework

We estimate the municipality tax evasion in three steps. First, a taxable assessed value of the land property held by the citizen is estimated, second, the tax liability is calculated based on the assessed value and the municipality tax rate and finally, the tax evasion is computed by the difference between the tax liability and tax payment.

Following the rule stipulated in the Municipality Act, an assessment to evaluate each respondent's annual holding of the property is carried out. Based on this property value and other information, a taxable value of the property is estimated. The whole assessment procedure is conducted by these few steps:

- (i) Income derived from renting a holding or property for an entire year is calibrated.
- (ii) Then, two month's rental income is subtracted from that annual rental income for maintenance of that holding.
- (iii) Besides, any formal or institutional mortgage interest cost, which is borne by the owner of the holding, is also deducted.

(iv) If the owner of the holding resides in that holding, an additional quarter value of the ten-month's rent is also subtracted.

(v) Following the deductions of the steps ii - iv, the remaining value of the holding is then determined as "the annual value of the holding".

The second part of estimating the tax liability is the composite municipal tax. The Model Tax Schedule (2003) also stipulates that the municipal governments can impose maximum 7 percent of the annual assessed value of the holding as property tax, payment of which is compulsory for every owner of holding. Moreover, the municipal government has the authority to levy maximum 10 percent of annual estimated value of the holding as water rate for supplying piped water service in the municipality. On the other hand, an optimal rate of 7 percent of the annual value of the holding can be charged as conservancy rate for delivering waste management service to the jurisdiction. In addition, the municipal government can impose maximum 3 percent of annual assessed value of the holding as street lighting rate for providing street lighting service to the residents of the municipality. According to the Model Tax Schedule (2003), the municipality tax or the holding tax rate is the summation of property rate, water rate, conservancy rate and street lighting rate of a property (Yunus and Rahman, 2015). Based on the aforementioned band of constituents, the municipal government has the discretion to impose from 0 (zero) to 27 (twenty seven) percent of the annual assessed value of the holding as the holding tax rate. Holding tax rate for a municipality hence is determined by

$$\text{Holding Tax Rate} = \text{Property Rate} + \text{Water Rate} + \text{Conservancy Rate} + \text{Street Lighting Rate}$$

Given the tax rate, the Municipal tax liability is estimated by

$$\text{Municipal tax liability} = (\text{Municipal Tax Rate}) * (\text{Assessed Annual Value of the Holding})$$

In estimating Municipal tax liability, this study takes into account the possibility that residents of an area may not receive certain municipal services, such as- piped water supply or waste management, due to residency outside of the coverage of those services. In such cases, rates of those services (for example, water rate for provision of water supply) are excluded is calculating the municipal tax rate and hence, the Municipal tax liability.

Finally, we follow Fisman and Wei (2004) in estimating the municipal tax evasion. We estimate the tax evasion as the log difference between the municipal tax liability and actual municipal tax paid, i.e.,

$$\text{Holding Tax Evasion} = \text{Log} (\text{Municipal tax liability}) - \text{Log} (\text{Actual Holding Tax Paid}).$$

The theoretical framework section clearly suggests that the municipal tax evasion and municipal service delivery are endogenous. Whereas poorer service delivery lowers willingness to pay taxes and encourages tax evasion, greater tax evasion leaves the municipality with fewer tax revenue to spend on public service delivery resulting into poorer service delivery. In order to identify the effect of municipal service delivery, we instrument the number of services delivered by the municipality with the year the municipality has been established. More specifically, the rapid municipalization occurred since 1997 has resulted into significant growth in number of municipalities: the number of municipalities in particular more than doubled in only five years after 1997. Hence, the amount

central government funding to the municipalities, either through various projects or through fiscal transfers to support day to day operations, are significantly diminished. As a result, these newly established municipalities could not build the infrastructures (for example, construction of pipe network and water reservoir for water supply, a drainage system, waste disposal points etc.) required to provide municipal services. The slow progress has affected the public service delivery in these municipalities. Since new infrastructure development projects may be undertaken since then, we additionally control infrastructural project fixed effects experienced by the municipalities experienced since 1997.

We believe that the municipal tax evasion in municipalities established after 1997 are less likely to be systematically different from those established before 1997. To begin with, the tax administration is relatively less reliant on infrastructure and a decade (from the survey) should be long enough to fully institute a tax administration system at the municipality level. Nevertheless, it is still possible that there may be more unfilled positions in the new municipalities than older ones. We therefore control for the unfilled positions as a percentage of approved positions for tax officials along with other factors including the class of the municipality, the composite tax rate, the municipality population and area as well as projects (regarding municipality tax administration) fixed effects. We expect that the municipalities before and after 1997 otherwise have similar tax administration system. Hence, our instrumental variable is

$$\text{New Municipalities after 1997} = \begin{cases} 1 & \text{if the municipality is established after 1997} \\ 0 & \text{if the municipality is established before 1997} \end{cases}$$

Given that, the first stage of our IV strategy is done by the estimation:

$$\ln(X_{1i+1}) = \alpha_0 + \alpha_1 Z_i + \alpha_2 X_{2i} + \alpha_3 X_{3i} + \alpha_4 X_{4i} + \vartheta_i$$

Where X_{1i} is the number of services provided by the municipality to individual i , Z_i is the instrumental variable, which is a dummy variable representing whether the individual i resides in the municipality established after 1997 or not, X_{2i} is a vector of municipality level control variables consisting of area, population, class, ratio of unfilled to approved number of tax officials and project fixed effects, X_{3i} is a vector consisting of socio-economic-demographic characteristics of individual i that includes level of education, age, income, gender and X_{4i} constitutes division-fixed effects and finally, ϑ_i is the error term clustered at the municipality level.

The second stage hence is given by

$$\ln L_i - \ln P_i = \beta_0 + \beta_1 X_{1i} + \beta_2 X_{2i} + \beta_3 X_{3i} + \beta_4 X_{4i} + \epsilon_i$$

Where L_i is the estimated tax liability of individual i and P_i is the municipality tax paid by the individual, X_{ji} are the variables and vectors defined as above and ϵ_i is the unexplained error term clustered at the municipality level.

5. Data and Descriptive Statistics

We examine holding tax evasion across municipalities in Bangladesh by using BIGD municipality survey conducted in 2014. The survey has been conducted on a representative sample of 6,370 households living in all the 318 municipalities in Bangladesh. The survey collected information on the municipality taxes paid by the respondents and the municipality services enjoyed by the respondent. The respondents also report the ownership status of their residence and the size of the residence (both in terms of square footage and number of floors) along with their socio-economic background including income, age, gender and education.

The citizen's survey is complemented by two additional datasets. First, The BIGD has also collected a few information from the municipalities. These information include staffing information, rates and fees of holding tax and other services, the year of establishment, the geographical area of the municipality, the size of the population living in the municipality, class of the municipality as well as other geographic information. We in addition have conducted an event analysis to ascertain the political affiliation of the mayor of the municipality at the time of survey as well as whether there is a minister, state-minister or a deputy minister from the municipality.

The original sample size of this survey is 6,370 urban households. However, about 626 households report that they do not own a holding in the municipality. Furthermore, about 115 respondents have high enough mortgages which exempts them from paying municipality taxes. Finally, we also do not have data on population size on three municipalities. Given all this, we finally have 5,490 observations to work with.

Table 1: Descriptive Statistics

Variable	Unit	Mean	Standard Error	Observations
Municipality-specific characteristics				
Log difference between holding tax liability and holding tax payment		2.85	0.027	5629
Coverage of municipal services		1.00	0.005	318
Log difference between approved tax staff and filled tax staff		0.840	0.033	313
Holding tax rate	Thousand	0.106	0.002	318
Population	Square	62.226	5.052	315
Area	Kilometer	15.999	0.561	317
Socio-economic characteristics of the individual				
Age	Year	51.049	0.159	6370
Total Household Income	Thousand Taka	390.205	10.761	6370
Years of education	Years	7.857	0.058	6370
Whether the individual is male or not		0.947	0.003	6370
Whether the individual is married or not		0.937	0.003	6370
Whether the individual is Muslim or not		0.888	0.004	6370
Willingness to pay additional holding tax		2.378	0.016	6370

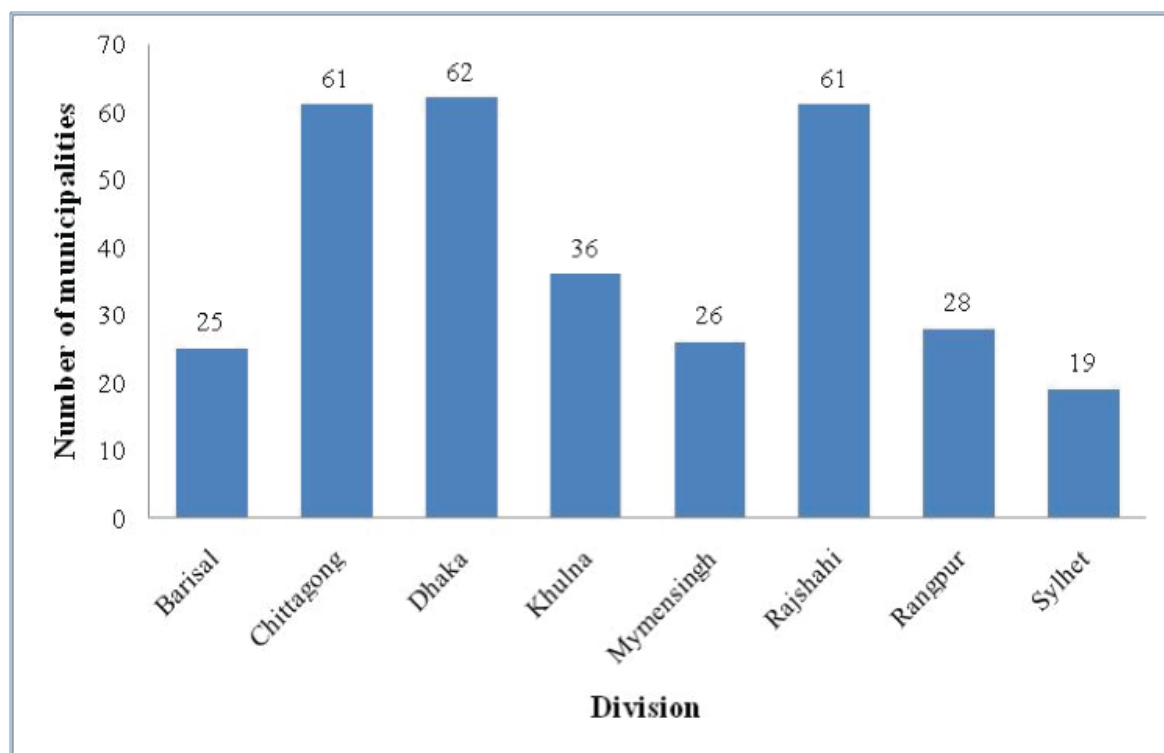
Table 1 presents the descriptive statistics of the major variables used. An average municipality in Bangladesh is 15.999 square kilometers in size where 62.2 thousand citizens inhabit. The mean number of services provided by an average municipality is 0.99, which is very low given they are mandated to provide three main urban services (water supply, waste management and conservancies and street light). The mean municipality tax rate is 10.6% of the assessed taxable property held by a citizen. The proportion of unfilled positions of tax staffs is 54% suggesting that staffing in the municipalities is an issue. These municipalities are spread across the country, even though some divisions host many more municipalities than others. Figure 2 presents distribution of municipalities across divisions. Figure 3 presents distribution of municipalities by class. Clearly, there is a large number of municipalities that are in class C and most of these class C municipalities are established after the 1997 ordinance. In an attempt to enable these municipalities in providing greater services and collect taxes more efficiently, the Government of Bangladesh has initiated a number of projects over the years. These projects are designed to develop the infrastructure required to provide services and also to build capacities of the staffs to administer municipalities, provide services and collect tax. Table 1 indicates that the average number of projects that a municipality experienced over these years 2.264.

Table 1 also represents tax evasion by each respondents and other individual-specific characteristics. Clearly, tax evasion is a problem: the mean log differences between the tax liability and tax payment is 2.858 suggesting a 65% tax evasion. The respondents have mean age of 51 years with annual income of 390 thousand taka per year and roughly 7.87 years of schooling. About 94.7% of the respondents are male, 93.6% are married and 88.8% are Muslim.

Figure 2: Class Distribution of Municipalities



Figure 3: Distribution of Municipalities across divisions



6. Municipal Services and the Instrumental Variable: The first stage regression

This section focuses on the first stage of our instrumental variable regression where our dependent variable is the number of services experienced by each individual. We will first discuss the results regarding the instrumental variable, and then we take up role of other variables that are statistically significant.

The Instrumental Variable

The results are presented in table 2. In the first column, we consider the dummy variable for the municipalities established after 1997 after controlling for relevant municipality-level factors. This vector of controls includes the percentage of approved tax official positions that are unfilled, the log of composite holding tax, dummy variables representing class of the municipality, log value of the population living in the municipality and log value of the geographical area of the municipality. We find that the municipalities established after 1997 can provide a significantly fewer number of public services in comparison to municipalities that are established before. The corresponding F statistic is 17.612 which is higher than the Stock and Yogo (2005) cut-off for the weak instrument. In the specification in column 2, we additionally control for divisional fixed effects. The instrumental variable remains to be statistically significant with the F-statistic 19.214. In the specification in column 3, we add a few more control variables including individual specific factors (income, age, education, gender, religion and willingness to pay extra tax in return for additional services) and project fixed effects. The level of services between the old and new municipalities are still statistically significant and the corresponding F-statistic is 19.149. We therefore conclude that the instrument is not weak.

Table 2: First Stage Regression Results: Dependent Variable: ln(Number of services + 1)

	(1)	(2)	(3)
Coverage of municipal services	OLS	OLS	OLS
Dummy variable on municipalities being established since 1997	-0.136*** (0.0322)	-0.138*** (0.0315)	-0.136*** (0.0310)
Ratio of approved tax staff versus unfilled tax staff	-0.0107 (0.0261)	-0.00952 (0.0253)	-0.0107 (0.0252)
Log (holding tax)	0.780*** (0.0616)	0.784*** (0.0610)	0.778*** (0.0616)
Dummy variable on Class A municipalities	0.0459 (0.0453)	0.0399 (0.0468)	0.0372 (0.0462)
Dummy variable on Class B municipalities	0.00814 (0.0350)	0.0131 (0.0359)	0.0158 (0.0357)
Log (population of municipality)	0.0260 (0.0194)	0.0379* (0.0209)	0.0397** (0.0202)
Log (area of municipality)	-0.0436* (0.0251)	-0.0551** (0.0254)	-0.0547** (0.0250)
Log (age)			0.0107 (0.0184)
Log (total household income)			0.00391 (0.00363)
Level of education			0.00602* (0.00338)
Willingness to pay additional holding tax			-0.0130* (0.00784)
Dummy variable on gender			-0.0170 (0.0266)
Dummy variable on marital status			-0.0406** (0.0174)
Dummy variable on religion			-0.0648*** (0.0191)
Constant	-1.210*** (0.172)	-1.291*** (0.176)	-1.244*** (0.198)
Observations	5,490	5,490	5,490
R-squared	0.709	0.715	0.719
F-statistic	17.612***	19.214***	19.149***
Shea's Partial R-squared	0.029	0.031	0.0301

In the above table, ***, ** & * indicate level of significance at 1 percent, 5 percent and 10 percent level respectively. In the estimation of column 1, only municipality-specific factors have been incorporated. Moreover, in column 2, division-fixed effects have been included alongside municipality-specific factors. Column 3 encompasses municipality-specific factors, individual-specific factors and division-fixed effects. Project-fixed effects, which indicates whether a specific municipality-centered project, such as – First Urban Governance and Infrastructure Improvement Project (UGIIP-I), in a specific municipality, have also been included in all estimations.

Other Control Factors

A few control variables also turned out to be strongly associated with the services provided by the municipalities. In analyzing these factors, we focus only on the third specification for being the most robust. Among the municipality-specific factors, higher municipality tax rate is positively associated with greater number of services. This is expected as the composite rate is simply the sum of all the rates and hence, an increase in services also results into addition of the rate of that service to the composite rate. In addition, the geographically larger municipalities provide fewer services since a larger geographical area, controlling for population and other municipality factors, means more areas to provide the services and hence, harder to cover.

A few individual specific factors turns out to associate closely with number of services. First, education is positively associated and the coefficient is statistically significant at 10% level. This indicates that more educated citizens seem to reside in areas where there are greater number of services. Individuals who are willing to pay additional taxes in return for additional service also experience fewer services with the coefficient statistically significant at 10% level, indicating that there is a demand for municipality services. The number of services provided also seem to be negatively associated with citizens being married and the coefficient is statistically significant at 5% level. This suggests that married citizens tend to avoid neighborhoods that has greater number of services, possibly to avoid higher cost of living. Finally, greater number of services is negatively associated with a citizen being Muslim and the coefficient is statistically significant at 1% level.

7. Tax Evasion and Public Services: The Second Stage Results

We now turn to our main research question of analyzing the effect of the number of services provided on tax evasion, as captured in the second stage regression of our IV strategy. Table 3 presents the results of this second stage along with estimates from ordinary least squares (OLS) for the purpose of comparison with the second stage. We follow the same organization of table 2 to allow correspondence of each stage and also the OLS estimates. Accordingly, the first three columns are OLS and the second three columns are second stage of our IV estimation.

Effect of Public Services

The first row of table 3 presents coefficients of the log of number of public services. Column 1 shows our OLS estimate that the number of public services are positively associated with tax evasion and the coefficient is statistically significant at 1% level. The results of the corresponding IV specification is presented in column 4. We find that the coefficient has increased close to six folds and it is statistically significant at 1% level. The robust Durbin-Wu-Hausman statistic is 6.027 which is statistically significant at 1% level.

We control for divisional fixed effect first. In column 2, we present the OLS results of the second specification with the divisional fixed effects. The coefficient remain to be negative with a little drop in magnitude and is still statistically significant at 1% level. The results of the IV estimation is presented in column 5. Similar to the OLS, the coefficient is negative and falls a bit in magnitude and is still statistically significant at 1% level. The robust Durbin-Wu-Hausman statistic is 6.361 which is statistically significant at 1% level.

Table 3: Second Stage Results: Dependent variable: ln (Tax liability) – ln (Tax payment)

	(1)	(2)	(3)	(4)	(5)	(6)
Holding tax evasion	OLS	OLS	OLS	IV	IV	IV
Log (coverage of municipal services)	-0.551*** (0.198)	-0.547*** (0.185)	-0.537*** (0.175)	-3.292*** (1.266)	-3.163*** (1.159)	-3.204*** (1.143)
Ratio of approved tax staff versus unfilled tax staff	0.507*** (0.162)	0.595*** (0.152)	0.586*** (0.150)	0.442*** (0.168)	0.537*** (0.150)	0.524*** (0.148)
Log (holding tax)	0.937*** (0.199)	0.977*** (0.190)	1.053*** (0.180)	3.160*** (1.043)	3.104*** (0.971)	3.201*** (0.954)
Dummy variable on Class A municipalities	-0.536** (0.265)	-0.310 (0.270)	-0.336 (0.260)	-0.280 (0.325)	-0.0913 (0.307)	-0.122 (0.295)
Dummy variable on Class B municipalities	-0.392** (0.197)	-0.284 (0.190)	-0.258 (0.189)	-0.356* (0.213)	-0.238 (0.206)	-0.203 (0.207)
Log (population of municipality)	-0.0198 (0.144)	-0.146 (0.152)	-0.107 (0.147)	0.0457 (0.153)	-0.0457 (0.164)	3.80e-05 (0.159)
Log (area of municipality)	0.177 (0.153)	0.153 (0.149)	0.144 (0.143)	0.101 (0.173)	0.0504 (0.172)	0.0397 (0.166)
Log (age)			-0.428*** (0.128)			-0.389*** (0.136)
Log (total household income)			-0.0543** (0.0268)			-0.0414 (0.0299)
Level of education			-0.0998*** (0.0162)			-0.0822*** (0.0191)
Willingness to pay additional holding tax			-0.124*** (0.0413)			-0.163*** (0.0468)
Dummy variable on gender			-0.0245 (0.134)			-0.0696 (0.136)
Dummy variable on marital status			0.0290 (0.120)			-0.0830 (0.140)
Dummy variable on religion			0.138 (0.0945)			-0.0305 (0.138)
Constant	2.189*** (0.772)	2.122*** (0.807)	4.653*** (0.917)	-1.705 (1.874)	-1.763 (1.849)	0.765 (1.882)
Observations	5,490	5,490	5,490	5,490	5,490	5,490
R-squared	0.149	0.178	0.197		0.038	0.053
Endogeneity				6.027***	6.361***	6.951***

In the above table, ***, ** & * indicate level of significance at 1 percent, 5 percent and 10 percent level respectively. In the estimation of column 1 and column 4, only municipality-specific factors have been incorporated. Moreover, in column 2 and column 5, division-fixed effects have been included alongside municipality-specific factors. Both column 3 and column 6 encompass municipality-specific factors, individual-specific factors and division-fixed effects. Project-fixed effects, which indicates whether a specific municipality-centered project, such as – First Urban Governance and Infrastructure Improvement Project (UGIIP-I), in a specific municipality, have also been included in all estimations.

Finally, we add individual specific factors and the project fixed effects which are the same set of control variables as in that of specification 3 in table 2. Column 3 presents the OLS results. The magnitude has again fallen a little, but it is still negative and statistically significant at 1% level. In comparison, as column 6 indicates the IV results, the coefficient has gone up a little in magnitude, remains to be negative and statistically significant at 1% level. The robust Durbin-Wu-Hausman statistic is 6.951 which is statistically significant at 1% level.

Effect of Tax Rate

We turn now to the effect of tax rate. The literature both provide theoretical and empirical support that tax rate increases tax evasion (See, for example, Fisman and Wei (2004)). We only present the results of the IV estimation since IV provides bias-corrected estimates. Accordingly, we start with column 4. We find that a one percent increase in tax is associated with 3.1% increase in evasion and the coefficient is statistically significant at 1% level. Column 5 presents results of additionally control for division fixed effects. We find that coefficient falls a little, but it is still positive and statistically significant at 1% level. Finally, in column 6, after controlling for individual specific variables and project effects, the coefficient increases a bit and is still statistically significant at 1% level. This is consistent with the theoretical prediction and the empirical literature.

Effect of unfilled tax position

The gap between the unfilled and approved tax positions is an indicator of the degree of tax collection efforts and enforcement in the municipality. For that matter, we expect that the coefficient of the log differences between the unfilled and approved tax positions should be positive. We again only follow the IV estimates. Column 4 indicates that the coefficient is positive and statistically significant at 1% level. After controlling for division fixed effects, the coefficient increases more (as column 5 suggests) and remains statistically significant at 1% level. Finally, with individual-specific variables and project fixed effect, the coefficient falls slightly, remains positive and statistically significant at 1% level.

The role of Individual-specific factors

We also find a few individual specific factors to be statistically significant. The IV results are presented in column 6. First, we find that age is negatively associated with the tax evasion and the coefficient is statistically significant at 1% level. Second, consistent findings of Rodriguez-Justicia (2017), higher levels of education is negatively associated with the tax evasion. Finally, we find that citizens who are willing to pay more taxes in exchange of more services seem less likely to evade taxes and the coefficient is statistically significant at 1% level. The relationship however is not identified.

7. Conclusion

In this paper, we have examined the effect of access to municipal services on incidence of tax evasion in municipalities in Bangladesh. Since the public service provision is endogenously determined with tax evasion, we instrument for public services with a regulatory intervention that took place seventeen years ago. A rapid municipalization has taken place since the regulation which constraints transfers from the center and results into slow infrastructural development and fewer service delivery. Applying this identification strategy, we find that a greater access to public services results into lower tax evasion.

We also report a number of additional findings. First, in line with literature, tax evasion is positively associated with municipal tax rate as greater tax rate increases the tax burden and raises incentive to evade. Second, we find that number of unfilled tax positions as percentage of approved number of positions, controlling for size of citizenry and geographical area, are positively associated tax evasion. This is in line with the enforcement argument: a greater number of tax staffs would ensure greater degree of tax assessments and enforcements and hence, lower tax evasion. Third, we find a similar results as Rodriguez-Justicia (2017) that level of education is negatively associated with tax evasion. Fourth, tax evasion is negatively associated with individuals' willingness to pay more taxes in return for services. Finally, age of the citizen is negatively associated with tax evasion.

Our major finding has important implications for understanding citizen's incentives to evade taxes. The quality of public services seem to influence the tax morale such that citizens facing greater (poorer) access to public services may consider the service as a high (low) return from their tax payments and hence are willing to pay more (less) taxes. This also sheds light on potential discrepancies in tax evasion around the world. We observe such high rate of compliance despite low enforcement efforts and high tax morale in developed countries is possibly because quality of publicly services are high. On the other hand, the low rate of compliance and low tax morale in developing countries is possibly due to poor quality service delivery in those countries. Future research may look into cross-country differences in evasion and services delivery and connect the two.

Our findings has important policy implications for strengthening governance of the public sector institutions in developing countries. One reason why developing countries fail to provide access to high quality public services is that they often fail to translate the tax revenues into public services due corruption and various other misgovernances. Stronger institutions therefore would transform the revenues to services more efficiently which would provide greater access to public services to the citizens, improve their tax morale, lower evasion and raise tax revenue.

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