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International Center for Public Policy
Andrew Young School of Policy Studies
Georgia State University
Atlanta, Georgia 30303
United States of America

Phone: (404) 651-1144
Fax: (404) 651-4449
Email: hseraphin@gsu.edu
Internet: http://aysps.gsu.edu/isp/index.html

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Corruption and the Size of Local Governments: Are They Related?

Michael A. Nelson
Department of Economics
University of Akron
Akron, OH 44325
U.S.A.
E-mail: nelson2@uakron.edu

Abstract

Using a large cross-country data set of developing and developed countries it is found that less fragmented municipal government structures are associated with more honest (less corrupt) behavior by government officials. The evidence is strongest for high-income countries. Corruption is measured various ways, including perceived corruption by citizens and experienced corruption by business managers. Fragmentation is defined as the average "size" of a municipality, measured alternatively in terms of geographic area or population served. A similar conclusion is drawn for other "bottom-tier" governmental units, at the same level as municipalities or one tier below, although the results are less strong statistically. Overall, these findings suggest that some caution should be exercised before adopting more fragmented local government structures as a strategy to promote good governance.

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Michael A. Nelson
Department of Economics
University of Akron
Akron, OH 44325
U.S.A.
E-mail: nelson2@uakron.edu

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Corruption of government officials has attracted the interest of economists for more than three decades.[1] Two major strands have evolved from the literature over that time period, one dealing with how corruption influences economic performance and the other focusing on indentifying what factors and institutional arrangements deter corrupt behavior. Our understanding of both has been aided by the recent introduction of measures of perceived or experienced corruption for individual countries. The availability of these data has led a substantial body of empirical work addressing various issues in both strands of the literature.

Separately, there has been a movement globally towards more decentralized government structures with the promise that this will lead to improved accountability on the part of public officials and greater efficiency in the delivery of government services (World Bank, 1999, Chapter 5; Arzaghi and Henderson, 2005). These decentralization initiatives have taken several forms including the devolution of spending and tax authority to subnational governments (fiscal decentralization), and, in some cases, an increase in the number of subnational units of government with the goal of promoting competition among these suppliers of government services.

Together, these two developments have given rise to several empirical investigations into the nexus between decentralization and the level of corrupt activity by government officials. Do decentralized government structures deter or promote honest behavior on the part of government

[1] For an early seminal work on the topic from the perspective of an economist, see Rose-Ackerman (1978).

officials? The methodological issues confronted by the researcher in addressing this issue are substantial as the dimensions to measuring decentralization are several and complex (Prud'homme, 1995; Triesman, 2002). Most of the literature to date has focused on fiscal decentralization and the preponderance of that evidence generally points to more fiscally decentralized structures being less corrupt, but these conclusions are not always robust to model specification.

The focus of this paper is on a less-studied dimension to decentralization – the "size" of municipalities and other "bottom tier" (defined below) units of local government. Do smaller, more fragmented, local jurisdictions – measured either in terms of population served or geographic area – enhance or deter corrupt behavior by public officials? The World Bank (1999, p. 115) notes that "subnational governments are proliferating," especially in a number of developing countries. While there may be good reasons for this to happen, as noted above, a counter trend has begun to emerge more recently. In both the US (Holzer, 2009) and elsewhere (Gómez-Reino and Martinez-Vazquez, 2011) some budget-strapped governments have moved away from greater fragmentation looking for opportunities for collaboration and efficiency from sharing of service delivery.

A comprehensive assessment of the merits of the arguments for or against greater decentralization as a strategy to promote good governance is not the goal of this paper. Instead, the focus here is restricted to the corruption dimension to good governance – will fragmented local government structures promote or inhibit corrupt behavior by public officials at the subnational level?

Using a large cross-country data set the findings reported below reveal that less fragmented municipal government structures are associated with more honest (less corrupt) behavior by government officials. Corruption is measured various ways, including perceived corruption by citizens and experienced corruption by business managers. Fragmentation is defined in this analysis as the average "size" of a municipality, measured alternatively in terms of geographic area or population served. A similar conclusion is drawn for other "bottom-tier" governmental units, at the same level as municipalities or one tier below, although the results are less strong

statistically. These units have various names (e.g., "villages", "parishes", "communes," "cantons") and their significance as a component of local government structure varies substantially from one country to the next. Overall, these findings suggest that some caution should be exercised before adopting more fragmented local government structures as a strategy to promote good governance.

The remainder of this paper is organized as follows: In the next section the arguments made in favor of the position that more decentralized government structures are corruption deterring are summarized and compared with counter arguments that reach the opposite conclusion. Available empirical evidence to date on the matter is also summarized. After that, several approaches to measuring local government fragmentation are presented followed by a section summarizing available international data sets (both macro level and micro level) on corrupt behavior by public officials. A base econometric model is presented and estimated followed by a discussion of the results. Several robustness checks to model specification are then performed and discussed. Concluding remarks follow.

Decentralization and Corruption of Public Officials

Can we expect a more decentralized government structure to promote honest behavior by government officials and thereby constrain bribe-taking in the conduct of their official duties? In recent years a substantial literature has emerged that either directly or indirectly addresses the issue and, viewed holistically, it does not unambiguously point one way or another in terms of answering this question. In this section some of the major arguments of both sides of this issue are summarized. Since it is the primary focus in the empirical analysis below, special attention will be given to the role that local government structure (greater fragmentation) – smaller and therefore more local government units serving a given population or land area - has to play in corruption deterrence.[2]

Smaller local jurisdictions as a corruption deterrent. A more fragmented local government structure forces these jurisdictions to operate in a more competitive environment and this

[2] Broader issues surrounding local government structures, including Tiebout (1956) sorting, spillover externalities, scale and administrative economies in production, and intergovernmental grants are beyond the scope of this paper. See Oates (1999) for a broader appraisal on these issues.

institutional arrangement will contribute to better governance outcomes. This strand of the literature has its foundation in the work of Tiebout (1956), followed by Brennan and Buchanan (1980), Epple and Zelenitz (1981), and Hoyt (1991), among others, who have argued the more decentralized government structures constrain rent-seeking behavior of bureaucrats. Airkan (2004) extended these ideas into a formal model of corrupt bureaucratic behavior. In her model governments maximize a weighted sum of corrupt earnings and citizen utility. As the number of local jurisdictions increase the competition for mobile capital increases and this lowers the optimal amount of corrupt payments that officials can extract under the assumption that public and private goods are complementary. Similar arguments were made earlier by Rose-Ackerman (1978).

Beyond this, smaller local government units promotes accountability (Klitgaard, 1988; Tanzi, 1994; Murphy et al., 1995; and Shah, 2006). Citizens are closer to government officials and this lowers their cost of monitoring bureaucratic behavior. "Over regulation" for the purpose of solicitation and collection of bribes can be more easily detected and thwarted in such circumstances. Moreover, in assessing bureaucratic performance it will be easier for citizens to use "yardstick" measures of expected outcomes based on their observation of the performance in competing jurisdictions nearby (Breton, 1996). Finally, Fan, et al. (2009) note that it may be easier for citizens in smaller jurisdictions to co-ordinate a voting strategy to remove corrupt officials from office.

Smaller local jurisdictions promote corrupt behavior. Despite the intuitive appeal of the above arguments, there are also compelling arguments that reach the opposite conclusion. While smaller-sized local jurisdictions can lead to a more competitive "market" for services supplied by local governments, it also has to potential to lead to more regulatory "toolboths" that citizens and firms must face when they do business in multiple jurisdictions. Shleifer and Vishny (1993) formalized these ideas in their model that compares the optimal bribe in a single jurisdiction with the situation where the bribe giver has to deal with several governmental units (officials) – either vertically (different tiers of governmental levels) or horizontally (multiple jurisdictions at the same level, the focus in this paper) - acting independently of one another. They conclude that

aggregate bribe-maximizing payment will be directly related to the number of jurisdictions that the bribe-giver must deal with.

As to the idea that local officials are more accountable to citizens when the unit size is smaller because the "distance" between the official and citizen is reduced, others have argued that this reduced distance can actually promote corrupt behavior (Tanzi, 1994; Prud'homme, 1995; Bardhan and Mookherjee, 2000; Lambsdorff and Teksoz, 2004). Closer personal relationships between officials and citizens could foster trust between the two parties, a key ingredient in reaching agreement on a corrupt deal.

It has also been argued that the media will tend to focus its oversight efforts more on larger jurisdictions and high-profile corruption cases. Petty corruption in smaller communities may not receive media attention and this reduced scrutiny lowers the probability of corrupt officials getting caught, thereby encouraging such behavior.[3] Finally, Tanizi (1996) points out that the opportunity cost of engaging in corrupt activity and getting caught is likely to be lower in smaller jurisdictions as they tend to get paid less relative to their counterparts in larger jurisdictions. This would also serve to promote dishonest behavior in smaller jurisdictions.

In conclusion, based on the arguments presented above one cannot draw a unambiguous conclusion as to what role – if any – that local government size plays in influencing corrupt activity by government officials. It is also worth pointing out that the ideas presented above are not mutually exclusive; each may be in play a role, in varying degrees, at the same time. Bringing empirical evidence to bear on this matter holds the potential to improve our understanding of this important issue and sort out the relative merits of the arguments presented above. Attention next is turned to a summary of the empirical evidence to date on this issue.

Previous empirical work. Much of the extant empirical work on the decentralization-corruption nexus has focused on fiscal decentralization rather than local government fragmentation. Fiscal decentralization refers to the devolution of spending and tax authority to lower tiers of

[3] Having said this, there is some evidence that the growth of the use of the internet may serve as a substitute for the established media in the scrutiny of dishonest behavior by government officials. (See Goel, et al., 2012).

government and is typically measured by the expenditure, tax, or employment share of governmental jurisdictions below the central level relative to all levels of government.[4] A summary of this literature can be found in Table 1. Generally, empirical support is marshaled for the proposition that more fiscally decentralized governments are associated with less perceived or experienced corruption, although the conclusion is not always robust to model specification (e.g., Fan, et al, 2009). Somewhat surprisingly, the preponderance of the empirical literature has concluded that federal government structures are associated with higher levels of corruption.

Empirical studies that have addressed the link between government fragmentation and corruption are more limited and are summarized in Table 2. Several measures of fragmentation have been analyzed, including the number of separate tiers of subcentral governments (e.g., central, state, local) and various perspectives on the size of bottom-tier (local) units of government size.

Treisman (2002) and Fan, et al. (2009) conclude that more tiers of government are corruption enhancing, especially in developing countries. The evidence on bottom-tier size is more mixed. Arikan (2004) reports that larger "municipal" type local governments (defined in terms of population served) promotes dishonest behavior, but the conclusion is not robust across all model specifications and it is based on a relatively small sample size. In contrast, Fan, et al. (2009) concludes that larger units of local government (defined in terms of land area) are associated with lower experienced corruption, especially in the case of developing countries, although the findings are again not robust to all model specifications. Finally, using a data set on conviction rates for corruption in the US states, Goel and Nelson (2011) report that larger general-purpose units of local general-purpose governments (counties, municipalities), defined in terms of population served, deter corruption while the size of single-purpose units of local government ("special districts") have little influence on the honesty of government officials.

Given the conflicting nature of the above results regarding the local government fragmentation – corruption nexus the goal of this paper is to bring additional empirical evidence to bear on this important issue. Using a large cross-country data set, the strategy will be to approach the issue systematically, taking into account different (1) definitions as to what constitutes a local

[4] See Prud'homme (1995) and Bardhan and Mookherjee (2005) for a critique of these measures of decentralization.

government, (2) different ways to "normalize" the data in making cross-country comparisons, (3) different measures of corruption, and (4) different model specifications (i.e., control variables). Of primary interest is to learn what conclusions can be drawn that are generalizable across the various ways to set up the econometric analysis.

Fragmentation of Local Government Structure

Table 3 provides some descriptive statistics on the variation in local government size internationally. Two alternative definitions of what constitutes a unit of local government are considered. The first ("Bottom Tier") is the number of "lowest tier" governmental units as estimated in the mid-nineties by Treisman (2008). To qualify, the unit must have a public budget, administer multiple public services, and have limited geographical boundaries. The unit may or may not have policymaking autonomy and local electoral accountability. Thus he includes here public bodies that in some cases may be "administrative agents of higher levels of government" (Treisman, 2010). In his classification scheme higher-tier governments are geographically subdivided by lower-tier jurisdictions.

The second local government measure used in the analysis below is "municipalities or equivalent" and is based on World Bank (2000) estimates for 1999. These may or may not be the "lowest tier' of government according to the Treisman classification scheme.[5] In some countries there are other units of local governments that share the same tier as municipalities. For example, in Tunisia "rural council areas" are considered distinct from municipalities but both are classified in the bottom tier of that country's government structure. In the US, "special districts" are also included in the same tier as municipalities.

While there is a high degree of correlation between the two measures (0.90, see Appendix, Table A1, panel A), there are important differences and this will prove important in the analysis presented below. Generally, since it restricted to only municipal governments the World Bank estimates are lower than the Treisman counterparts which are defined to encompass all forms of

[5] The World Bank definition of a municipality and how/if a distinction is made between this form of government and other units of local of local governments (e.g., towns, villages, communes) is unclear. It may be that the World Bank estimates are based on by the individual country definitions as to what constitutes a municipality.

"bottom tier" units (see Table 3 "Actual Number" means).[6] Overall, there are 94 countries with comparable estimates for both local government measures. Of these, in 29 countries the "bottom tier" estimate of number of jurisdictions exceeds the "municipal" estimate by more than 400. In some cases the differences are especially noteworthy. For example, the World Bank estimates that there are 149 municipalities in Thailand, while Treisman determines that there is yet another tier of government below the municipal level with 64,531"bottom tier" units (i.e., "villages" with directly elected "headmen"). A level of government below the municipal level – with a large number of governmental units - is also identified by Treisman for several other countries, including Bangladesh ("villages"), Uganda ("villages"), Philippines ("barangays"), Ethiopia ("kebeles"), Ghana ("unit committees"), United Kingdom ("parishes and communes"), and Madagascar ("cantons"). All of these bottom-tier units have locally-elected leadership.

To account for differences in country size the actual units of local government in each country are adjusted for differences in population and land area, respectively, and descriptive statistics are reported in Table 3 for both the Treisman and World Bank measures. Using the former measure the unweighted average population per unit of local government was 39,000 while the average land area stood at 2,000 square kilometers. According to the former measure the most decentralized country in the data set is Laos with an average population of 5,000, and least decentralized is Malawi with an average population served of 11.8 million per local government unit. An even greater range existed when the data are adjusted by geographic land area. Similar results are obtained when the data are restricted to municipalities (last two columns of Table 3), although the range is smaller.

Table A1 in the appendix (Panel A) shows the correlation between the two local government measures when they are adjusted by population or land area. Whether adjusted by geographic area or population, the correlation between the two measures of local government is relatively high; for example, the correlation between *Bottom Tier – average area* and *Municipal Gov't – average area*) is 0.86. In contrast, it does matter whether the data are adjusted by population or

[6] There are a few exceptions to this. For example, the World Bank classifies "special districts" in the United States as municipalities while Treisman does not.

land area. For example, the correlation between the area and population measure of government size is only 0.28 for municipalities.

Beyond the measures of local government fragmentation discussed above, two additional measured are also considered in the analysis below. One attempts to get more precisely at the average population actually served by municipal governments. This is accomplished by the calculating the average *urban* population served by municipal governments in each country (*Municipal Gov'ts – average municipal pop.).* A second, described in more detail below, represents an estimate of the number of bottom-tier units of government that are classified as something other than municipal forms of government.

It is clear when examining the fragmentation measures for the individual countries that there are several "outlier" countries that deviate substantially from the sample mean. Consider, Malawi for example, in Table 3 with a mean population of nearly 12 million per unit of local government (bottom tier) compared to the sample mean of 39,000. Even dropping Malawi from the data set there are still a number of other outliers as shown in the scatter plot diagram in Appendix A2 where bottom-tier government size (population served) is plotted against the World Bank corruption measure described below (e.g. Botswana (BWA), Hong Kong (HNK), Uruguay (URG)). Given these outliers it is unlikely to expect a linear relationship between any of the fragmentation measures and corruption. To address this each of the fragmentation variables considered in this analysis is transformed into natural logarithms prior to inclusion in the econometric models presented below.

Corruption Measures

Several alternative measures of cross-national corruption are used in this analysis, including both macro- and micro-level indicators. The Transparency International (TI) Corruption Index (http://www.transparency.org) is an index of *perceived* corruption within the public sector of each country that is based on multiple polls of citizens, the experiences of country analysts, and risk assessments of individuals doing business in that country. The World Bank (WB) Index of corruption (www.worldbank.org/wbi/governance) is similarly constructed, albeit with a different algorithm to aggregate the available data. In addition, fewer individual country corruption

ratings/polls are required by the World Bank to construct their index, as a result this index is available for a greater number of countries than the TI index. Both the TI and WB indices are subjective evaluations of the significance and cost of corruption in a given country and are constructed such that higher index values imply less corrupt governance. These corruption measures have been used most frequently in the extant empirical literature on corruption determinants and are highly correlated (see Table A1 in the Appendix, Panel B).

The World Business Environment Survey (WBES) is an *experience-based* index of corruption (http://go.worldbank.org/RV060VBJU0) based on a survey of over 10,000 firms in 80 countries conducted by the World Bank between 1999 and 2000. Among other things, the survey asked local firm managers and owners to assess if it is "common for firms in our line of business to have to pay some irregular 'additional payments' to get things done." Possible responses range from 1 = "never" to 6 = "always" and the index is formed by taking a country-wide average of all respondents. As shown in Table A1, Panel B, in the Appendix the WBES experience-based index (rescaled so that higher index numbers imply lower payments) is somewhat less correlated with the TI and WB perceptions- based index (0.79 in each case).

The individual responses from the WBES survey are also available for a micro-level analysis of corruption determinants. In addition, the survey asks a second question pertaining to *bribery amount* and this permits an analysis of this second dimension to corruption activity. Specifically, managers were asked: "On average, what percent of total annual sales do firms like yours pay in unofficial payments/gifts to public officials?" Seven possible options were given to respondents, ranging from (1) 0% to (7) over 25%. Managers in 60 countries offered responses to this question.[7]

Econometric Setup, Data, and Base Model Results

Using a large cross-country data set the following "base" model is used as a starting point to investigate the relationship between local government fragmentation and corruption:

[7] For further details see, Fan, et al. (2009) who use both bribe frequency and bribe amount in their analysis of corruption.

$$Corruption_i = \beta_0 + \beta_1 \text{Log}(Local\ Fragmentation)_i + \beta_2 Log(GDPpc)_i + \boldsymbol{\beta_3}\ (\boldsymbol{Control\ Factors})_i + e_i \quad (1)$$

where *Corruption* is one of the alternative measures of corruption for the i^{th} country in the data set, *Local Fragmentation* is one of the measures of local government fragmentation described in a preceding section, *GDPpc* is per capita GDP, measured in purchasing power parity, and ***Control Factors*** is a set of control factors that have been identified in the literature as corruption determinants. Following Fan, et al. (2009) the control variables used in the base model include the significance of imports (*Imports*) and fuel exports (*Fuel Exports*) in each country, the percentage of the population that is protestant (*Protestant*), and dummy variables indicating whether or not that country (i) has been characterized as continually "democratic" over the last half the twentieth century (*Democratic*), and (ii) was a former colony of the British (*British colony*).

Complete variable definitions, data sources, and descriptive statistics can be found in Table 4. All corruption measures date to the year 2000 and the per capita GDP data are lagged to the year 1995 to reduce potential two-way causality between the dependent variable and this regressor. OLS results using the Transparency International corruption perception index are summarized in Table 5. Five models are presented, differing only by the specific measure of local government fragmentation incorporated into the empirical setup.

All five models explain over 80% of the variation in the data and have statistically-significant F-values. Prior to discussing the results for the key fragmentation variables a few brief comments regarding the estimates for the control variables are in order. Across all models three of the control variables are consistently statistically significant: stage of development (*GDPpc*), significance of fuel exports (*Fuel Exports*), and the percentage of protestant population (*Protestant*). More prosperous countries are associated with lower corruption (recall higher values of the dependent variable imply lower perceived corruption), a finding that is consistent with much of the extant literature on this topic (see Gundlach and Paldam, 2009; Serra, 2006). Similarly, countries that are relatively more protestant are perceived to be less corrupt, also consistent with earlier studies (e.g., La Porta et al., 1999; Paldam, 2001 and 2002; Treisman,

2000). Fuel and mineral exporting nations, in contrast, are perceived to be more corrupt, corroborating Ades and Di Tella (1999). Finally, there is only weak evidence that former British colonies are less corrupt and no evidence the economic activity surrounding imports (*Imports*) has any affect on perceived corruption.[8]

Turning next to the local government fragmentation variables, there is evidence that less fragmentation (larger government size) contributes to better outcomes when a *bottom-tier* definition of local government is used. Whether measured in terms of area (Model 1) or population (Model 3) the estimated coefficient on the fragmentation variable is positive and statistically significant at better than the 95 per cent level. In terms of practical significance the effects of the parameter estimates might appear to be relatively modest. For example, the Model 1 estimate indicates that doubling (100%) the average geographic area of local government will improve a country's perception index by 0.16 on a ten point scale. Doubling the population size of local governments (Model 3) will improve the perception index by a similar amount (0.22). However, viewed from the perspective of the sample range in decentralization, a somewhat different story emerges. For example, taking the average land area of Bangladesh's 64,460 bottom-tier units of local government, and reducing that figure to the sample mean would result in a 1.1 point (almost half of a standard deviation) improvement in its corruption index. A similar result obtains if the analysis is undertaken using average population served rather than average land area.

The remaining models presented in Table 5 offers additional insight into this by distinguishing between *municipal* and other (*non-municipal*) forms of local governments. Included in the latter are units of government at the same level (tier) or below municipal governments.[9] The findings

[8] Similar results are obtained for these control factors when the local government fragmentation variables are excluded from the model.

[9] Estimates of the number of *non-municipal governmental units* are based on the author's analysis of the World Bank (2000) and Treisman (2008) data on local government structure for each county. Despite the fact that both sets of estimates are for approximately the same time period, there are in some cases significant differences between the estimates for some of the countries and also some differences in country coverage. These differences are reconciled using other sources, generally references on local government structure specific to an individual country, and the author's judgment. In some cases estimates of the number of non-municipal governments could not be estimated and these countries are dropped from further analysis using these fragmentation measures. Also, for about two-thirds of the countries in the data set there are no additional units of local government at or below the

of this analysis are consistent with the conclusions drawn above for all bottom-tier governments. Specifically, the results for Model 2 show that larger municipal governments (average area) is associated with less perceived corruption at better than the 90 per cent level of significance.[10] This conclusion holds when the municipality size is measured in terms of country population (Model 4) or metropolitan population (Model 5). Similarly, the estimated parameters of non-municipal government fragmentation variables are also positive, providing some evidence that fewer of these units would also promote less corrupt government. The evidence here is less statistically strong, however, perhaps due to the fact that (1) this measure includes a wide variety of local government units, and (2) some judgment was used in making the estimates of the number of units of these units of local governments (see note 9).

Other Macro Corruption Measures

In this section a check is made to see if the conclusions drawn above are robust for the other measures of corruption considered in this analysis, as well as the somewhat different set of countries associated with each corruption index. Any differences in results between higher-income and lower-income countries – viewed as distinct groups – are also explored. The same model set up (equation (1)) is used again. However, to conserve space, only the results for the key fragmentation variables are reported below although a few brief comments will be made regarding the other variables in the model set up.

On the left-hand-side of Table 6 the estimates for the fragmentation variables are reported for the World Bank (WB) and World Business Environmental Survey (WBES) measures of corruption. All corruption measures are scaled differently (see Table 4) so the parameter estimates all not directly comparable other than the sign (higher index values imply less corruption in all cases). The findings generally confirm the previous conclusion that local greater government fragmentation does not serve as a deterrent to corruption in the public sector, either perceived

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municipal level. In these cases the number of *non-municipal governmental units* is coded as one (1) rather than zero to permit logarithmic transformation of this fragmentation measure so that these countries could be included in the analysis presented in Table 5.

[10] Ideally, it would have been preferred to have used the average geographic size of each city for this fragmentation measure but such data were not available.

(WB measure) or experienced (WBES measure). The evidence is strongest for the bottom-tier measure of local government fragmentation (lines 1 and 3 in Table 6).

For the WB corruption index the findings for the remaining variables in the model (not reported) track quite closely to earlier results (see Table 5). This is not surprising given the high correlation between the TI and WB indices, although the use of the latter brings about 20 additional countries into the data set. For the WBES measure, both the fuel exports and protestant population variables lose statistical significance in most cases.[11]

In the right-hand side of Table 6 possible differences in the role that local government fragmentation plays in corruption between higher- and lower-income countries is explored. The findings for the latter group of countries could be of special policy interest if it is concluded that fragmented local government structures in low-income countries have the potential to serve as a substitute check against corruption in lieu of stronger legal and political institutions. To assess this all countries in the data set are classified as either upper income or lower income based on World Bank classifications for the year 2000.[12] The World Bank corruption index is used to maximize the number of countries in the data set.

Surprisingly, more fragmented local government structures appear to have more of an effect on high-income countries than those at lower stages of development. Only one of the fragmentation variables (see line 5) are statistically significant at conventional levels for the latter group. For higher-income economies, fewer bottom-tier local government units serving a given geographic area or population is associated with perceptions of less corrupt governance. Once again, the evidence is strongest for the bottom-tier definition of local government that is not restricted to municipalities.

[11] Similarly, the results for the *non-municipal local government* fragmentation measure (not reported) are quite consistent with the conclusions drawn earlier for these units of local government. Results for the full model are available upon request.

[12] Specifically, all countries classified by the World Bank (1999) in the year 2000 as either "High Income" or "Upper Middle Income" are grouped in the present analysis as "Upper Income", all other categories are included in the "Lower Income" group.

Micro Corruption Measures

In this section the recent micro data analysis of Fan, et al. (2009) is extended through the use of the five measures of local government fragmentation discussed above. Fan, et al. did incorporate one of these measures in their analysis - "bottom-tier governments (average area)." They did not consider municipal and other forms of local government separately, nor did they explore other ways to normalize the data beyond geographic area. Also, their fragmentation variable entered their model without logarithmic transformation unlike what is done in the present analysis. While their evidence using their fragmentation variable was mixed, the authors nevertheless concluded that "…smaller local units were associated with more frequent and costly corruption…" and hence reducing their size may be a "bad idea." (p. 33)

The micro-level corruption data used here are the individual firm manager responses to a1999-2000 World Business Environment Survey regarding bribe *frequency* and *amount*. Respondents to the former question were given the following options: 1 = never, 2 = seldom, 3 = sometimes, 4 = frequently, 5 = usually, and 6 = always.[13] One important advantage of using this micro-level data set is that it mitigates the issue of two-way causality that can be more inherent in an analysis of macro-level variables. Another advantage is the response does not necessarily represent a broad country-wide assessment of the honesty of government officials but instead focused in on experiences of individuals doing business at the local level, an issue that is more directly relevant here.

The econometric setup used here mirrors Fan et al. (2009), with the same control variables used above and additional controls for the firm characteristics and industry dummy variables relevant to the specific survey respondent. Firm characteristics include three dummy variables (=1, 0 otherwise) if the firm (1) has state ownership (total or in part), (2) has foreign ownership (total or in part), and (3) exports some of its products. Finally, firm size, measured by natural log of sales, completes the empirical setup.

For ease of comparison with the results above the dependent variable is rescaled from -6 to -1 so that higher values imply less corruption. Given the nature of the dependent variable the model is

[13] For further details on both bribery measures see http://go.worldbank.org/RV060VBJU0.

estimated as an ordered probit and the results are presented in Table 7. Overall, the findings for the key variables of interest are generally consistent with the earlier results that used macro-based corruption measures. In particular, managers operating in countries with less fragmented lower-tier local governments report that they faced the need to make fewer irregular payments to government officials to "get things done" (Model 1 and 3). A similar conclusion can be drawn when the analysis is restricted to municipalities, but only when the data are adjusted for geographic area (Model 2). Larger municipal governments (based on population) have no statistically-significant effect on experienced corruption by survey respondents (Model 4 and 5). Generally, the evidence for non-municipal local governments (Model 2, 4, and 5) supports the position that less corrupt outcomes result with fewer units of these forms of government.

The marginal effect of a change in the average size of a local government unit is not inconsequential. For example, using Model 1 results from Table 7 a one standard deviation increase in the geographic size of bottom-tier local governments will increase by over eight percent the probability that the respondent will select the option that irregular payments are never expected.[14]

As to the other results presented in the table, managers in state-owned enterprises tended to make fewer irregular payments. A similar finding was observed for foreign owned firms although the evidence is not as statistically as strong. In contrast to the findings presented in Table 5 there is no evidence that firms located in fuel-exporting nations face more corrupt public officials.

Further insight can be gained by analyzing how managers responded to the query regarding the *amount* of the irregular payments for "firms like yours", measured in terms of percentage of total annual sales. Respondents were given the following options: 1 = 0%, 2 = 0 to 1%, 3= 1 to 1.99%, 4 = 2 to 9.99%, 5 = 10 to 12%, 6 = 13 to 25%, and 7 = over 25%. Ordered probit estimates of the same model used above with *amount* as the dependent variable (rescaled from -7 to -1 to ease comparisons with earlier results) are presented in Table 8. To conserve space, only

[14] Calculation assumes the firm manager is not employed by a state- or foreign-owned firm with sample median values used for the other regressors in the model. Estimation is based on STATA 11 software using the *prchange* command. Complete results are available upon request.

the local government fragmentation results are presented, complete results for the full are available upon request.[15]

The results are generally consistent with those presented earlier in that larger bottom-tier units of local government are associated with both lower "irregular" payment frequency and lower amount (Model 1 and 3). This conclusion holds for non-municipal local governments as well; however, there is little evidence that the size of municipal local governments affects the size of bribe payments (Model 2, 4, and 5). Regarding bottom-tier governments more generally, and using Model 1 results from Table 8, a one standard deviation increase in the geographic size of local governments (broadly defined) will increase by thirteen percent the probability that the manager will respond that irregular payments are zero.[16]

Further Robustness Tests

Prior to concluding several additional robustness tests are carried out. First, corruption experiences related to several specific government services are analyzed using other data available from the WBES. Second, the role of electoral accountability is addressed. Are the conclusions drawn above influenced by how "bottom tier" authorities are selected to govern (i.e., locally elected or appointed by a higher tier authority)? Finally, other decentralization measures used in the extant literature not related to local government fragmentation (i.e., number of tiers of government, fiscal decentralization, and public-sector employment decentralization), are also incorporated into the models presented earlier. Each of these is discussed in turn below.

An Analysis of Selected Government Services. A possible critique of the above analysis is that the corruption measures are "macro" in nature, representing an overall assessment of corrupt behavior in a county. This assessment may be unduly influenced by the actions of central government authorities (e.g., corruption by customs officials or surrounding arms contracts, health care fraud, judicial misconduct) that tend to be more high profile and subject to greater

[15] The results for the other variables in the model were qualitatively similar to what are reported in Table 7 with the exception that firm size (sales) is inversely related to bribery amount.
[16] Calculation based on same assumptions as above. See note 14 for details.

media scrutiny.[17] To the extent that this holds, local government structure would appear to be less relevant in explaining these forms of corrupt behavior.

Citizen perceptions or experiences in dealing with local government officials would clearly be preferred in the present context. Yet such measures, particularly ones that are comparable cross-country, are difficult to come by. It is possible, however, to make use of the responses to the following WBES survey questions on the corruption experiences in several specific areas where business managers interact with government officials:

Do firms like yours typically need to make extra, unofficial payments to public officials…

- *to get connected with the telephone?*
- *to get licenses and permits?*
- *to deal with taxes and tax collections?*
- *to gain government contracts?*
- *when dealing with customs/imports?*

For each question respondents could select the following options: 1 = always, 2 = mostly, 3 = frequently, 4 = sometimes, 5 = seldom, and 6 = never. While these activities cannot always be cleanly mapped to one specific level of government, some are more within the purview of central or higher-tier government authorities (e.g., customs/imports) than others. Licenses and permits, along with taxes and tax collection, for example, would seem to be pertinent to government officials at all levels.

Individual survey responses for each of the five service areas listed above were applied to the same model set up used in Model 1 and Model 2 in Table 7. Table 9 presents a summary of the results for the key local government fragmentation variables (based on average geographic size) for each service area. For comparison purposes, the Table 7 parameter estimates for the fragmentation variables pertaining to the respondents overall evaluation of corruption are reproduced in the top row of the Table 9.

[17] Special thanks to Nicholas Charron for making this observation and to suggesting possible strategies to address this, including the analysis presented below.

Perhaps somewhat surprisingly, the results using the *bottom-tier* fragmentation measure (Model 1) reveal that fewer units of these units of government are associated with better outcomes in all five service areas, including those like customs and imports that would appear to be out of the direct area of responsibility for local government officials. Further insight can be gained, however, by examining the results of Model 2 where municipal governments and other bottom-tier units of local governments are considered separately (displayed on the right side of Table 9). Here the parameter estimate on the *Non-municipal local government* fragmentation variable is not statistically significant for three service areas, telephone connections, government contacts and customs/imports. These findings are consistent with the view that these units of local government would have little decision making authority in any of these three areas. In contrast, even at this low level these governmental units may well have some authority to grant licenses and permits and to collect taxes. The findings for *Municipal governments* are again consistent with the conclusions drawn in earlier sections of the paper regarding the link between fragmentation and corruption. Officials associated with the units of government are likely to have decision making authority in most of the service areas considered above.

Electoral Accountability. Next, the role of electoral accountability is addressed. One might expect better governance outcomes when local authorities are accountable to citizens via regularly scheduled elections.[18] To address this each country in the data set is coded as follows: = 1 if the executive at the bottom tier government (or municipality) is directly elected or chosen by a directly elected assembly OR if that unit of government has both a locally-selected executive and a centrally appointed official, = 0 if the executive is centrally appointed.[19] Based on these classifications the goal was to re-estimate some of the models presented above for both groups of countries. Unfortunately, there were too few observations with non-missing observations for the latter group of countries (centrally appointed executive) to estimate the basic

[18] A simple t-test provides evidence in support of this hypothesis. For example, dividing the sample into two groups of countries, one where local government executives have at least some local electoral accountability and the other where the executives are appointed by higher levels of government, the sample mean for the 2000 Transparency International corruption perception index is 4.93 for the former and 3.76 for the latter. This difference in group means is statistically significant at approximately the ten percent level ($t = 1.63$, $df = 88$). The sample size of the latter group (no electoral accountability), however is small, only 13 countries in the entire data set.

[19] The electoral accountability classifications for bottom-tier governments are based on Treisman (2008). Classifications of municipal governments are based on Triesman (2008) and the author's own analysis using a variety of sources.

models presented in Table 5. For example, Models 1 and 3 were estimated with 70 observations in the data set, all but nine are coded as one using the criteria above. Similarly, of the 67 observations used to estimate Models, 4 and 5 in Table 5, 62 of the countries are coded as one.

All of models in Table 5 were re-estimated using only the countries where the executive was subject to some electoral accountability. The results (not reported) are quite similar to what was reported in Table 5, although with the exception of Model 1 the parameter estimates of the key local government fragmentation variables were slightly higher. Their statistical significance is also somewhat stronger as well. For example, the estimated parameter estimate of the *Non-municipal local governments – average population* variable (Model 4) increases from 0.05 in Table 5 to 0.07 and becomes statistically significant at the ten percent level.[20] Overall, these results indicate that the conclusions drawn in the paper hold for countries with local government executive accountability. Data limitations prevent an analysis to see if similar conclusions can be drawn in countries where the local government executives are appointed by authorities in higher tiers of government.

Including Other Decentralization Measures in the Model. As a final robustness test other decentralization measures were added to the base model along with the local government size measures. Three variables are considered, including (1) the number of tiers of government, (2) subnational government share of total government expenditures at all levels, and (3) the subnational government share of total employment. These three variables are added, in turn, to equation (1) and the results are presented as Model 1 (number of tiers), Model 2 (expenditure share), and Model 3 (employment share) in Table 10. To conserve space, only the results using the Transparency International (TI) corruption index are reported in the table, and only the estimates for the key decentralization variables in each model (complete results are available upon request).

The results fail to uncover support that any of these three additional decentralization variables influence perceived corruption. The number of governmental tiers, expenditure share, and

[20] Similarly, the conclusions regarding the other variables in each model are also robust to this restriction placed on the data set. Full results are available upon request.

employment share never meet typical standards for statistical significance for any of the local government size variables they are paired with. Local government size measured by either the average population served or average geographic area of *bottom-tier government* units is still positively associated with more honest government officials, although the evidence is relatively weak in Model 2 where these size measures are paired with the spending share of subnational governments. The parameter estimates for the *Municipal government* fragmentation variable are consistently positive but are not longer statistically significant at conventional levels.

Conclusions

Greater decentralization of decision making within the public sector has been advocated by the World Bank and other international institutions as a strategy to improve governance outcomes, especially for developing countries. While decentralization can take many forms, one approach has been to make subnational government structures more competitive through the creation of additional units of government at that level. More recently, faced with problems in balancing budgets, a counter movement has emerged in some countries, notably the United States, that has advocated reversing the trend towards greater fragmentation of government structure at that local level. Proponents of this movement have advocated increased sharing of the responsibility of service delivery among units of local governments, if not their outright consolidation into larger jurisdictions.

While much of this debate has centered on what institutional arrangements can deliver government services in the most cost-effective manner, there are other important considerations that are pertinent in determining what constitutes good public policy in this area. The present study has contributed to that debate by bringing empirical evidence to bear on how local government fragmentation affects the (perceived or real) level of corruption by public officials.

Using a large international data set of more than 70 developed and developing countries and several measures of corruption this study had reached several conclusions regarding the nexus between local government size and corruption:

- There is considerable evidence that a more fragmented structure of municipal governments is associated with more corrupt behavior by public officials.
- There is some evidence of a possible nexus between the size of other units of local governments at the 'bottom tier" (e.g., "villages", "parishes", "communes," "cantons") and corruption (real or perceived), but this evidence is less compelling, at least gauged by conventional standards of statistical significance.
- The evidence less local government fragmentation deters corruption is strongest for high-income countries.

These results suggest that, on balance, any Tiebout-like corruption-deterring effects stemming from a more competitive structure of municipal governments is more than offset by corruption-promoting effects associated with smaller municipalities. The statistically weaker finding for the non-municipal, bottom tier governments may be because they have less decision making authority on activities normally associated with corruption and bribery (Table 9) or simply due to the heterogeneous nature of this group of local governments.

Of course, despite the conclusions drawn above it cannot be said that a less fragmented municipal government structure promotes better governance outcomes more generally. An assessment of that would require further analysis of how fragmentation affects other factors that play into determining outcomes at the local level, including the cost effectiveness of service delivery (economies of scale, administrative cost duplication), the extent of Tiebout-like citizen sorting to accommodate preference variations in government services, and benefit spillovers of government services beyond political boundaries. These considerations are beyond the scope of this paper.

In closing, some important caveats to these conclusions should be noted and they point the way to future research on this topic. First, the present analysis is based on measures of local government fragmentation that are calculated by taking country-wide population (or land area) and dividing by the number of units of local government. The distribution of these units by size within an individual country is not addressed. For example, no distinction was made in the analysis above between a country with one or two very large urban governments, together with

many small units, versus another country with less variation in local government size, but with the same country-wide average as the first country.

Second, further robustness checks of the "fragility" of the results to model specification would be useful. Earlier applied econometric literature has demonstrated that this can be an important consideration, including in the analysis of corruption determinants (Serra, 2006). "Robust" results to changing model specification would lend greater confidence in the conclusions drawn in this paper.

Finally, given the inconclusive results the connection between non-municipal units of local government and corruption behavior deserves more attention. Given that these units of government of local government are likely to vary considerably from one country to the next in terms, of mission, responsibilities, and degree of independence with higher-tier jurisdictions, case studies of countries with a large number of these units of local government may yield important insights into this important question.

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Table 1 Fiscal Decentralization and Corruption				
Author	**Corruption Data Set**	**Fiscal Decentralization Measure**	**Conclusions (Influence of level of corruption)**	**Controls**
Huther and Shaw (1998)	TI	Subnational share of public expenditures	Negative & significant in most models	Correlation analysis
De Mello and Barenstein (2001)	ICRG	Subnational share of public expenditures	Negative & significant in most models	Country income and population
Fisman and Gatti (2002a)	ICRG	Subnational share of public expenditures	Negative & significant in most models	Various country characteristics
Fisman and Gatti (2002b)	US State-level conviction rates	Federal grants to states as share of total state-local expenditures	Positive & significant	Various state characteristics
Arikan (2004)	TI	Subnational share of public expenditures and subnational share of employment	Negative & significant in most models	Gov't wages, import share, ethnolinguistic fractionalization, press freedom, school enrollment, land area, other decentralization measures (only 30 – 40 countries in data set)
Enikolopov and Zhuravskaya (2007)	TI & WB	Subnational share of public expenditures	Not robust to all model specifications	Various country control variables
Fan, et. al (2009)	WBES (Bribe frequency or amount)	Subnational government revenue share of GDP	Negative & significant in most models	Other decentralization measures, various country and respondent characteristics
Fan, et. al (2009)	WBES (Bribe frequency or amount)	Subnational share of total government employment	Positive & significant in most models	Other decentralization measures, various country and respondent characteristics

Table 1
Fiscal Decentralization and Corruption

Author	Corruption Data Set	Fiscal Decentralization Measure	Conclusions (Influence of level of corruption)	Controls
Goel and Nelson (2011)	US State-level conviction rates	Substate expenditure share	Negative & significant	State income and population, enforcement variables, government size, and other decentralization measures.
Goldsmith (1999)	TI	Federalist system	Positive and mostly significant	Income, economic and political freedom
Treisman (2000)	TI	Federalist system	Positive and significant	A variety of institutional variables, legal, economics, regional, latitude
Gerring and Thacker (2004)	WB	Federalist system	Positive and significant	Various country control variables
Kunicová and Rose-Ackerman (2005)	WB	Federalist system	Positive and significant	Income, political freedom, electoral rules
Treisman (2007)	TI, WB	Federal structure, subnational share of public expenditure	Not robust to model specification	Various county control variables, other decentralization measures including number of governmental tiers and local government size
Fan, et. al (2009)	WBES (Bribe frequency or amount)	Federal structure, elections at bottom & second-lowest tiers	No significant impact	Other decentralization measures, various country and respondent characteristics

Notes:
Corruption measures - Transparency International (TI), World Bank (WB), World Business Environment Survey (WBES), International Country Risk Guide (ICRG).

Table 2
Local Government Fragmentation and Corruption

Author	Corruption Data Set	Fragmentation Measure	Conclusions (Influence on level of corruption)	Controls
Treisman (2002)	CPI	Bottom unit size (land area)	Inconclusive results	Various country control factors
Persson, Tebellini and Trebbi (2003)	Graft, CPI, ICRG	District Magnitude	Smaller voting districts lead to more corruption for Graft and CPI measures	Voting rules, democracy, education, democracy, regional variables
Arikan (2004)	CPI	Number of "municipal-type" jurisdictions & all subnational jurisdictions normalized by population	Negative and significant in some models with limited control variables	Gov't wages, import share, ethnolinguistic fractionalization, press freedom, school enrollment, land area, other decentralization measures (only 30 – 40 countries in data set)
Fan, et. al (2009) & Treisman (2002)	WBES (Bribe frequency or amount)	# of government tiers	More tiers has a positive & significant influence on the level of corruption in most models; strongest evidence when sample restricted to developing countries	Other decentralization measures, various country and respondent characteristics
Fan, et. al (2009)	WBES (Bribe frequency or amount)	Bottom unit size (land area)	Larger units does not have a significant impact in most models; negative (corruption reducing and significant in selected models, strongest evidence when sample restricted to developed countries	Other decentralization measures, local decision making authority, various country and respondent characteristics
Goel and Nelson (2011)	US State-level conviction rates	General-purpose and special-district governments in a state normalized by population	General-purpose governments: positive & significant Special-district governments: inconclusive	State income and population, enforcement variables, government size, and other decentralization measures

Notes:
See Table 1.

Table 3
Characterizing Local Government Structure Globally

	Local Governments – Bottom Tier (n = 125 countries)			Local Governments – Municipal or equivalent (n = 122 countries)		
	Actual Number	Population Served[1]	Land Area[2]	Actual Number	Population Served[1]	Land Area[2]
Most Decentralized	237,333 (India)	0.005 (Laos)	0.002 (Bangladesh)	237,687 (India)	0.02 (France)	0.01 (India)
Mean	7,507	0.39	2.00	3,629	1.85	2.86
Least Decentralized	6 (Guyana)	11.8 (Malawi)	81.0 (Botswana)	6 (Guyana)	15.21 (Mozambique)	65.34 (Mozambique)

Notes:

1. Population (100,000) divided by the actual number of local governments.
2. Land area 1,000 sq km) divided by the actual number of local governments divided.

Source: Author's calculations. See text for details.

Table 4
Variable Definitions, Summary Statistics and Data Sources

Variable	Definition [mean; standard deviation][1]	Source
Corruption – Transparency International	Transparency International (TI) Corruption Perceptions Index score, 1= most corrupt to 10 = least corrupt, 2000 [4.76; 2.40]	Transparency International[2]
Corruption – World Bank	Control of Corruption Index (WB), World Bank, (range: -2.5-+2.5; higher value, less corrupt), 2000, [-0.07; 1.00]	World Bank[3]
Corruption – World Business Environment Survey (Bribe Frequency)	Control of Corruption Index (WBES), World Business Environment Survey, frequency of irregular payments (range 1 = "never" to 6 = "always"), 2000, [4.14; 0.86] (macro data set) [2.91; 1.68] (micro data set)	World Business Environment Survey[4]
Corruption – World Business Environment Survey (Bribe Amount)	Control of Corruption Index (WBES), World Business Environment Survey, amount of irregular payments , percent of sales (range 1 = 0% to 7 = "over 25%) , 2000, [2.43; 1.54] (micro data set)	World Business Environment Survey[4]
Bottom-tier gov'ts – average area	Average land area per unit of local government (1,000 sq. km), mid-1990s. [2.00; 8.02]	Treisman (2008)[5], World Development Indicators[6]
Municipal gov'ts – average area	Average land area per municipal government, 1999 [2.86; 7.67]	World Bank (1999)[7] World Development Indicators[6]
Other local gov'ts – average area	Average land area per non-municipal local government at the same level (tier) or below municipal governments, 1999 [0.19; 0.28]	World Bank (1999)[7] Treisman (2008)[5] World Development Indicators[6]
Bottom-tier gov'ts – average pop.	Average population (100,000) per unit of local government, mid-1990s. [0.40; 1.15]	Treisman (2008)[5], World Development Indicators[6]
Municipal gov'ts – average pop.	Average population (100,000) per municipal government, 1999 [0.83; 1.83]	World Bank (1999)[7] World Development Indicators[6]
Municipal gov'ts – average municipal pop.	Average municipal population (100,000) per municipal government, 1999 [0.72; 1.22]	World Bank (2000) World Development Indicators[6]

Table 4
Variable Definitions, Summary Statistics and Data Sources

Variable	Definition [mean; standard deviation][1]	Source
Other local gov'ts – average population	Average population (100,000) per non-municipal local government at the same level (tier) or below municipal governments, 1999 [0.07; 0.06]	World Bank (1999)[7] Treisman (2008)[5] World Development Indicators[6]
Tiers	Number of tiers of governments (including the central government), 1999 [3.71; 0.91]	Treisman (2008)[5]
Subnational spending share	Subnational percentage of total government expenditures, average for 1995-2000 [24.8; 14.2]	IMF and Treisman (2008)[5]
Subnational government employment	Non-central government employment, (civilian government administration % labor force), 1997 [2.4; 2.8]	Schiavo-Campo et al. (2007) Treisman (2008)[5]
Per capita GDP *(GDPpc)*	Per capita GDP (PPP), 1995 [$7,386; $7,617]	World Development Indicators[6]
Democratic	Classified as democratic for all years between 1950 and 2000 [0.15; 0.36]	Treisman (2008)[5] Przeworski, et al. (2001)
Fuel Exports	Percentage of mineral fuels in manufacturing exports, 2000 [16.9; 27.5]	World Development Indicators[6]
Imports	Imports of goods and services as percent of GDP [47.2; 23.8]	World Development Indicators[6]
Protestant	Protestants and a percent of the population [13.2; 21.3]	Treisman (2008)[5] La Porta et al. (1999)
British colony	Former British colony [0.32; 0.47]	Treisman (2008)[5]

Notes:

1. Descriptive statistics are not reported in logarithm form. Other non-municipal local government descriptive statistics are calculated for only countries with a positive number of these jurisdictions.
2. http://www.transparency.org
3. www.worldbank.org/wbi/governance
4. http://www.gcgf.org/ifcext/economics.nsf/Content/IC-WBES
5. www.sscnet.ucla.edu/polisci/faculty/treisman/Pages/publishedpapers.html and http://www.sscnet.ucla.edu/polisci/faculty/treisman
6. World Bank, *World Development Indicators On-line*, http://data.worldbank.org/
7. World Bank (1999), Table A.1.

Table 5
Corruption and Local Government Fragmentation
(Dependent Variable*: Corruption Perceptions – 2000 (Transparency International*)

	Model 1	Model 2	Model 3	Model 4	Model 5
Bottom-tier gov'ts – average area	0.16** (2.4)				
Municipal gov'ts – average area		0.14* (2.0)			
Non-municipal local gov'ts – average area		0.05 (1.4)			
Bottom-tier gov'ts – average pop.			0.22** (2.6)		
Municipal gov'ts – average pop.				0.19* (1.8)	
Municipal gov'ts – average municipal pop.					0.18* (1.7)
Non-municipal local gov'ts – average pop.				0.05 (1.5)	0.05 (1.4)
Log Per capita GDP	1.43** (8.7)	1.40** (8.9)	1.46** (9.2)	1.46** (9.3)	1.41** (9.2)
Democratic	0.53 (1.3)	0.47 (1.1)	0.40 (1.0)	0.35 (0.9)	0.36 (0.9)
Fuel Exports	-0.02** (3.9)	-0.02** (3.4)	-0.02** (4.2)	-0.02** (3.4)	-0.02** (3.4)
Imports	0.01 (1.1)	0.01 (1.1)	0.00 (0.8)	0.00 (0.7)	0.00 (0.7)
Protestant percentage of population	0.03** (5.9)	0.03** (6.1)	0.03** (7.7)	0.04** (8.2)	0.04** (8.1)
Former British colony	0.50 (1.7)	0.43 (1.4)	0.53* (1.7)	0.51* (1.7)	0.55* (1.8)
R^2	0.84	0.84	0.85	0.83	0.83
F-statistic	76.1**	71.7**	96.9**	95.1**	89.0**
N	70	67	70	67	67

Notes:
See Table 4 for variable definitions. All local government measures and per capita GDP are transformed into natural logarithms prior to estimation. Countries with no non-municipal local governments at or below the municipal level were arbitrarily assigned one unit of government to permit logarithmic transformation. Intercept estimate not reported to conserve space. The numbers in parentheses are t-statistics in absolute value based on robust standard errors. * denotes statistical significance at the 10% level and ** denotes statistical significance at the 5% level or better.

Table 6
Local Government Fragmentation – Alternative Perspectives
(Dependent Variable*: Corruption measure for year 2000*)

Fragmentation Measure [Line #]	**World Bank (WB)**	**World Business Environmental Survey (WBES)**		**Higher-income Countries (WB)**	**Lower-income Countries (WB)**
Bottom-tier gov'ts – average area **[1]**	0.04* (1.8)	0.18** (5.0)		0.09** (2.6)	0.03 (1.1)
Municipal gov'ts – average area **[2]**	0.01 (0.5)	0.14** (2.8)		0.07** (2.1)	0.02 (0.5)
Bottom-tier gov'ts – average pop. **[3]**	0.06* (1.7)	0.21** (4.5)		0.09* (1.8)	0.05 (1.5)
Municipal gov'ts – average pop. **[4]**	0.03 (0.6)	0.13 (1.4)		0.08 (1.5)	0.06 (1.4)
Municipal gov'ts – average municipal pop. **[5]**	0.02 (0.5)	0.15** (2.1)		0.08 (1.4)	0.06* (1.72)
Summary Statistics by Line #					
Line # **R^2, N**					
1	0.83, 98	0.66, 63		0.86, 48	0.50, 50
2	0.82, 90	0.62, 56		0.86, 44	0.45, 46
3	0.83, 98	0.63, 63		0.84, 48	0.51, 50
4	0.82, 90	0.54, 56		0.85, 44	0.47, 46
5	0.82, 90	0.56, 56		0.85, 44	0.47, 46

Notes:
For WB and WBES corruption measures the estimates are based on equation (1). Full estimation results are available upon request. Lines 2, 4, and 5 also include a non-municipal "other local government" variable in the model, also not reported. In each case the dependent variable is scaled so that higher values imply less corruption. See Table 4 for variable definitions, including further details on how each corruption variable is scaled. The numbers in parentheses are t-statistics in absolute value based on robust standard errors. * denotes statistical significance at the 10% level and ** denotes statistical significance at the 5% level or better.

Table 7
Corruption and Local Government Fragmentation
(Dependent Variable*: WBES Survey – 1999-2000 on bribe frequency: individual responses*)

	Model 1	Model 2	Model 3	Model 4	Model 5
Bottom-tier gov'ts – average area	0.13** (3.7)				
Municipal gov'ts – average area		0.07** (2.1)			
Non-municipal local gov'ts – average area		0.04** (2.4)			
Bottom-tier gov'ts – average pop.			0.14** (2.8)		
Municipal gov'ts – average pop.				-0.03 (0.4)	
Municipal gov'ts – average municipal pop.					0.04 (0.9)
Non-municipal local gov'ts – average pop.				0.02 (1.3)	0.03* (1.7)
Log Per capita GDP	0.30** (4.9)	0.30** (4.8)	0.33** (5.2)	0.33** (4.7)	0.33** (5.0)
Democratic	0.13 (0.7)	-0.03 (0.2)	0.03 (0.2)	-0.19 (0.9)	-0.14 (0.7)
Fuel Exports	-0.00 (1.5)	-0.00 (1.2)	-0.00 (0.7)	0.00 (0.4)	-0.00 (0.2)
Imports	0.00* (1.9)	0.00 (0.40)	0.00 (1.1)	0.00 (0.1)	-0.00 (0.1)
Protestant percentage of population	0.60 (1.4)	0.81 (1.4)	0.90** (2.1)	0.92 (1.4)	1.02 (1.6)
Former British colony	-0.11 (0.8)	-0.14 (1.1)	-0.13 (0.9)	-0.01 (0.1)	-0.05 (0.3)
Firm Characteristics of Respondents					
State Ownership	0.56** (8.3)	0.59** (8.8)	0.54** (8.0)	0.57** (8.3)	0.58** (8.3)
Foreign ownership	0.07 (1.4)	0.08* (1.9)	0.07 (1.4)	0.08* (1.9)	0.08** (2.0)
Firm is an exporter	-0.05 (1.2)	-0.02 (0.6)	-0.06 (1.3)	-0.02 (0.8)	-0.02 (0.7)
Log firm sales	-0.00 (0.2)	-0.00 (0.2)	-0.00 (0.2)	0.01 (0.8)	0.00 (0.1)
Wald chi-square (15)	230.7**	225.8**	212.5**	164.3**	181.8**
N	6,494	5,785	6,494	5,785	5,785

Notes: Ordered probit estimation with robust standard errors clustered by country. See Table 4 for variable definitions. All local government measures, per capita GDP and firm sales are transformed into natural logarithms prior to estimation. Countries with no non-municipal local governments at or below the municipal level were arbitrarily assigned one unit of government to permit logarithmic transformation. Industry dummy variables not reported. The numbers in parentheses are z-statistics in absolute value based on robust standard errors. * denotes statistical significance at the 10% level and ** denotes statistical significance at least at the 5% level.

Table 8
Corruption and Local Government Fragmentation
(Dependent Variable*: WBES Survey – 1999-2000 on bribe amount: individual responses*)

	Model 1	Model 2	Model 3	Model 4	Model 5
Bottom-tier gov'ts – average area	0.18** (2.9)				
Municipal gov'ts – average area		0.01 (0.2)			
Non-municipal local gov'ts – average area		0.06** (2.5)			
Bottom-tier gov'ts – average pop.			0.22** (2.8)		
Municipal gov'ts – average pop.				-0.09 (0.9)	
Municipal gov'ts – average municipal pop.					-0.02 (0.2)
Non-municipal local gov'ts – average pop.				0.04* (1.8)	0.05** (2.1)
Wald chi-square (15)	217.6**	241.1**	189.4**	235.3**	226.8**
N	4,066	3,493	4,066	3,493	3,493

Notes:
Ordered probit estimation with robust standard errors clustered by country. See Table 4 for variable definitions. Models are the same as reported in Table 7, full model results are not reported but are available upon request. The numbers in parentheses are z-statistics in absolute value based on robust standard errors. * denotes statistical significance at the 10% level and ** denotes statistical significance at the 5% level or better.

Table 9
Corruption and Local Government Fragmentation: Individual Services
(Dependent Variable*: WBES Survey – 1999-2000 on bribe frequency: Individual responses for selected services*)

Service	Model 1		Model 2	
	Bottom-tier gov'ts* – *average area		***Municipal gov'ts* – *average area***	***Non-municipal local gov'ts* – *average area***
Overall evaluation	0.13** (3.7)		0.07** (2.1)	0.04** (2.4)
Telephone connection	0.09** (3.3)		0.11** (3.2)	0.02 (1.3)
Get licenses and permits	0.13** (4.5)		0.14** (3.5)	0.03* (1.8)
Dealing with taxes and tax collection	0.13** (3.6)		0.15** (3.6)	0.04** (2.0)
Gain government contracts	0.12** (4.0)		0.16** (3.9)	0.02 (1.2)
Dealing with customs/imports	0.10** (3.3)		0.15** (3.4)	0.01 (0.9)
N range for individual services	3,277 - 3,770		3,203 – 3,658	

Notes:
Estimates based on Model 1 and Model 2 in Table 7 with individual services as the dependent variable. Overall evaluation results reproduced Table 7. Full model results not reported but are available upon request. All other notes from Table 7 apply here.

Table 10
Corruption, Local Government Fragmentation, and Other Decentralization Measures
(Dependent Variable*: Corruption Perceptions – 2000 (Transparency International*)

	Model 1 (Number of Tiers of Gov't)			**Model 2** (Subnational Share of total expenditures)			**Model 3** (Subnational Share of total employment)		
	Local Gov't Size	# tiers	R^2, N	Local Gov't Size	Expenditure share	R^2, N	Local Gov't Size	Employment share	R^2, N
Bottom-tier gov'ts – average area	0.19** (2.4)	0.16 (0.9)	0.85, 70	0.14 (1.3)	-0.00 (0.2)	0.85, 50	0.19** (2.4)	0.02 (0.4)	0.86, 55
Municipal gov'ts – average area	0.13 (1.6)	0.10 (0.6)	0.83, 66	0.14 (1.4)	-0.00 (0.3)	0.84, 48	0.13 (1.6)	0.02 (0.3)	0.85, 52
Bottom-tier gov'ts – average pop.	0.29** (2.8)	0.22 (1.2)	0.85, 70	0.12 (0.8)	0.00 (0.0)	0.85, 50	0.20* (1.8)	0.02 (0.4)	0.85, 55
Municipal gov'ts – average pop.	0.17 (1.4)	0.06 (0.4)	0.83, 66	0.16 (0.9)	-0.00 (0.1)	0.84, 48	0.10 (0.7)	0.02 (0.4)	0.84, 52
Municipal gov'ts – average municipal pop.	0.16 (1.4)	0.09 (0.5)	0.83, 66	0.16 (0.9)	-0.00 (0.2)	0.84, 48	0.11 (0.9)	0.02 (0.4)	0.84, 52

Notes:
Estimates for all three models based on equation (1).Non-municipal local governments included in model but included in table above to conserve space. Full estimation results are available upon request. See Table 4 for variable definitions. The numbers in parentheses are t-statistics in absolute value based on robust standard errors. * denotes statistical significance at the 10% level and ** denotes statistical significance at the 5% level or better.

Appendix Table A1
Correlation Matrices of Key Variables

Panel A: Local Government Structure

	Local Gov't's (Bottom Tier)	Local Gov't's (municipal or equiv.)	Bottom Tier – average area	Bottom Tier – average population	Municipal gov't's – average area	Municipal Gov't's – average pop	Non-municipal Gov't's – average area	Non-municipal Gov't's – average pop.
Local Gov't's (Bottom Tier)	1.00							
Local Gov't's (municipal or equiv.)	0.90	1.00						
Bottom Tier – average area	-0.07	-0.04	1.00					
Bottom Tier – average population	-0.09	-0.05	0.32	1.00				
Municipal Gov't's – average area	-0.08	-0.07	0.88	0.36	1.00			
Municipal Gov't's – average pop.	0.00	-0.07	0.15	0.86	0.28	1.00		
Non-municipal Gov't's – average area	-0.13	0.14	0.21	0.17	0.15	-0.13	1.00	
Non-municipal Gov't's – average pop.	-0.06	0.21	0.09	0.17	-0.02	-0.13	0.94	1.00

Panel B: Corruption Measures (2000)

	Transparency International	World Bank	World Business Environment Survey
Transparency International	1.00		
World Bank	0.97	1.00	
World Business Environment Survey	0.79	0.79	1.00

Appendix A2
Scatter Plot of World Bank (WB) Corruption Measure versus Average Local Government Population (000)[1]

Notes:

1. Malawi excluded.