

THE POLITICAL ECONOMY OF URBAN PRIMACY: A RECONSIDERATION

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Sidney Carl Turner  
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Committee:

\_\_\_\_\_ Kingsley Haynes, Chair

\_\_\_\_\_ Stephen Fuller

\_\_\_\_\_ John Nye

\_\_\_\_\_ Roger Congleton, External Reader

\_\_\_\_\_ James P. Pfiffner, Program Director

\_\_\_\_\_ Mark J. Rozell, Dean

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George Mason University  
Fairfax, VA

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A dissertation submitted in partial fulfillment of the requirements for the degree of  
Doctor of Philosophy at George Mason University

by

Sidney Carl Turner  
Master of Public Policy  
The College of William and Mary, 2007  
Bachelor of Arts  
University of North Carolina, Chapel Hill, 2003

Director: Kingsley Haynes, Professor  
School of Public Policy

Fall Semester 2013  
George Mason University  
Fairfax, VA



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## **ABSTRACT**

### **THE POLITICAL ECONOMY OF URBAN PRIMACY: A RECONSIDERATION**

Sidney Carl Turner, Ph.D.

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Dissertation Director: Dr. Kingsley Haynes

This dissertation analyzes the political economy of urban primacy both theoretically and empirically. Research on urbanization in the developing countries has consistently found a pattern of high levels of concentration of urban populations in the largest and/or capital cities relative to developed countries. This regularity has typically been explained by noting that these countries' institutions are often autocratic and/or centralized. This mechanism, the lack of constraint on government leads to the redistribution of resources from the politically weak hinterland to the politically strong capital through differences in levels of taxation, public goods provision, or regulation. As demonstrated through two simple models of public goods provision, this explanation may have limited salience in for many developing countries because it does not take into account the weak capacity that characterizes these governments. In states, which have difficulty enforcing their rent-extracting policies over substantial distances, it is likely that rent-payers as well as rent-seekers will be highly concentrated in the capital or primate city. This hypothesis is tested



using cross-country macro level and micro level data relating to experiences and perceptions of government effectiveness and corruption, country leadership turnover, as well as regional level indicators of government quality. Consistent with the hypothesis of this dissertation, the empirical analysis finds that an exogenous increase in percentage of a country's population residing in the capital city is associated with a real or perceived decrease in perceived government effectiveness. In addition, a micro-level analysis drawing on cross-country survey data finds that firms located in primate or capital cities of low and middle income countries are more likely to pay bribes and perceive corruption as a substantial impediment to business than firms located outside the capital. A panel data analysis of country leadership turnover also finds that greater urban primacy is associated with greater political instability, especially during negative economic downturns, consistent with urban concentration facilitating rent-seeking by governments.

## **INTRODUCTION**

This dissertation examines the theory and evidence of the mechanisms behind the relative size of a country's largest, or primate, city and its status as a national capital. Empirical evidence suggests that capital status has a positive effect on the relative size of primate cities. Attempts to explain this empirical regularity argue that government activity generates economic benefits which accrue to capital cities, which in turn leads to increased urban concentration. Specifically, the theoretical literature focuses on two key mechanisms. One is the tendency of high-status, high-wage government employment to concentrate in the capital due to efficiencies related to the geographic concentration of the public sector. The other is that residents of the capital are more effective than residents of the hinterland in lobbying the government for transfers and public goods. Both of these mechanisms are thought to raise the welfare of residents of the capital relative to residents of the hinterland. Over time, these processes lead to in-migration and greater urban concentration.

Implicit in both of these mechanisms is the ability of government to extract revenue from its hinterland that does not attenuate with distance, or if it attenuates it does so at a rate that still allows net accumulation of benefits in the capital city. However, there exists both a literature dealing with historical development of nation states as well as empirical work examining the determinants of variation in the capacity of modern

states to extract revenue from its population which casts doubt on this assumption. The argument of this dissertation is that if this assumption is dropped, and there is in fact distance-decay in the ability of government to extract revenue, then government policy can, under certain conditions, be expected to benefit the hinterland relative to the capital. Such a model could be consistent with the empirical literature linking capital status of country's primate cities to increase urban primacy and concentration. This is because governments would have an incentive to locate in the larger cities in order to facilitate revenue extraction. This implies that past empirical work that has argued that a primate city being the capital leads to increasing urban concentration has suffered from endogeneity issues, as increased size would lead to capital status rather than capital status promoting a primate city's size through growth. The remainder of this introduction describes the organization of the dissertation.

Chapter 1 reviews the traditional apolitical models of urban hierarchy. These include the von Thunen and central place frameworks emphasizing the role of transportation costs and market areas, both in its traditional static formulation as well as in the newer dynamic New Economic Geography models formulated by Krugman (1991 a/b). These challenge the aspatial sector-based agglomeration model originally proposed by Henderson (1974), and the stochastic city growth model (Gaibax, 1999). While these models do not speak directly to the role of politics and institutions in explaining urban primacy/concentration, current models of urban primacy represent extensions of the apolitical models, particularly the New Economic Geography. However, as discussed in the conclusion, these models may suggest alternative mechanisms explaining the

empirical connection between non-democratic institutions and urban primacy. The next part of the chapter reviews the empirical and theoretical literature explaining the link between capital and primate city status. Particular emphasis in this section is placed on detailing the often implicit assumptions of these models and how they align with other literature in historical sociology and political science. This section draws on the literature analyzing the history of European state formation and the revenue-raising policies of modern developing countries.

Chapter 2 describes two models of the ability of government to raise revenue from an excludable publicly provided good. One involves purely internal constraints where the incumbent government is assumed to have a natural monopoly over the good, while the other is modeled on external constraints, by assuming it is possible for an opposition group to enter the ‘market’ for supplying that good. The internal model applies two standard sub-models, the principal-supervisor-agent model and the rent-seeking model. These are used to illustrate potential explanations for government favoritism in political capitals. The primary takeaway of these internal models is that the level of services provided to the capital will be higher than the hinterland is uncertain. This is due to the potential for collusion between public goods providers in the capital and principals/supervisors. The external model features a multiple step process with two regions (capital and hinterland). This game has the incumbent government first setting the price for the good, then a potential local (one in each region) opposition deciding to enter the local market and offer the good based on local prices. Once it has entered, the opposition can provide the good to the other regions. Entry is limited by a fixed cost

which represents the coercive ability of government to deter rival organizations. This power is assumed to decay with distance due to principal-agent problems within a coercive apparatus. In the capital, government is assumed to have an automatic monopoly. There is not enough residual demand to make entry by local opposition in the capital profitable given the high costs that coercion place on entry into the capital's market. In the hinterland, the government could pursue one of two potential strategies. It could produce a level of output, increasing in distance from the capital, that was sufficient to deter entry by a local opposition or it could simply allow entry and produce a level of output consistent with a Stackelberg duopoly game. This model implies that in countries with extremely high urban primacy, the role of interregional transfers in explaining concentration may be small. This is due to the government having an incentive to provide services in the hinterland at low or even negative cost, to deter entry by political movements that threaten the government's control over rents in the capital. The nature of these rents is unspecified, but can include bribes and profits (often in the form of expanded government employment) from government-run monopolies. Both the internal and external constraint models of government rent extraction predict that the rate/level of rent extraction is likely to be higher in the capital than in the hinterland.

In Chapter 3, the predictions of these models are tested empirically using macro-level data on both subjective and objective indicators of government service provision. The subjective indicator is a country-level index measuring government quality. It is derived from interviews collecting expert perceptions. The relationship between this indicator and the percentage of a country's population concentrated in the capital, a proxy

for the proximity of individuals to their government, is examined using both simple OLS as well as instrumental variable regression. The results are consistent with perceived government effectiveness declining as a country's population concentrates in the capital and consistent with the models outlined in Chapter 2. An analysis of objective indicators of government goods and service provision at the regional level looks at the relationship between capital and primacy status and these indicators. Little evidence is found to suggest that capital cities enjoy greater levels of public goods provision than non-capitals and in the case of two indicators they were found to have worse service. This chapter also examines the relationship between urban primacy and extra-legal leadership turnover using panel data. As the theory in Chapter 2 suggests, urban primacy is associated with increased levels of political instability as rent extraction facilitated by concentration in the capital induces greater conflict. Consistent with this theory, it is found that an increase in urban primacy raises the probability of political turnover in the next year, especially in non-democratic countries. This evidence is consistent with the quality of governance declining as the proximity of a country's government and population declines. This is also consistent with the theory outlined in Chapter 2.

The empirical evidence in Chapter 3 is far from conclusive. The country level nature of the analysis does not allow one to ascertain who is paying the cost of welfare-diminishing government policies as the population becomes more concentrated. It could well be that the poor governance is concentrated in the hinterland, consistent with the traditional models of urban primacy outlined in Chapter 2. The theory in Chapter 3 may also result in ambiguous predictions for a country-level analysis. Under certain

assumptions the hinterland might benefit from high urban primacy. Specifically, the government has an incentive to increase service provision in the hinterland in order to prevent an opposition movement from organizing and threatening access to the rents the government extracts from the capital city. To mitigate inferences being undermined due to an ecological fallacy, chapter 4 presents a micro-level analysis of data from a cross-country survey of private-sector firms in developing countries. This was employed to test whether the efficiency of government and prevalence of corruption was perceived to be higher or lower in the capital relative to the hinterland. The results indicate that firms in a country's capital on average perceive government and specifically government corruption to be an obstacle to business to a greater degree than firms in the hinterland. This is consistent with the predictions of both models. In addition, the effect of capital status on percentage of sales made in informal payments reported by survey respondents was found to vary positively with the level of urban primacy in the country. This is consistent with the predictions of the model with external constraints.

Finally, Chapter 5 presents of summary of the dissertation's findings, discusses some key limitations with respect to data and inability to explain some regularities in the empirical literature on urban primacy, and considers directions for future research.

## **CHAPTER ONE - BACKGROUND**

This chapter provides a background to the debate concerning the role of politics in the formation of urban systems. Specifically it summarizes of the traditional, apolitical theories of the spatial distribution of economic activity. Next, theories that incorporate a specific role for government in determining the concentration of non-primary economic activities are briefed and critiqued.

### **1.1. Urban Hierarchy**

As Krugman (1996) notes, there are three influential theories concerning the origins of urban systems: central place theory; a theory of sector-based external economies; and city formation as a stochastic process.

#### **1.1.1. Central Place Theory**

An early theory that attempted to explain how firms were distributed across space was central place theory. Central Place Theory uses principles of firm location to extrapolate the size and distribution of cities within a territory (King 1984). The most basic version of this theory, as described by Walter Christaller, represents different firms providing the same goods and services as having mutually exclusive market areas, usually depicted as a series of nested hexagons, with the production facility located in the center of the market area. Different industries have an overlapping series of market areas with the size of the markets in a given industry defined by a threshold market size needed



to support an individual production facility; there will consequently be fewer facilities/production locations for industries with a high threshold in a given space.

The theory assumes that an efficient solution is to minimize the number of total production locations, so that different facilities providing different goods or services will often share the same location. Locations which have low order facilities will be relatively small in terms of population, but numerous because of the low threshold market. Locations, or cities, with both low and high order facilities will be large due to the large number different types of productive facilities located there, but will be few in number with greater space in between them due to the high market threshold needed to support their goods and services. There will thus be an urban pattern of a large number of small villages/towns closely packed together and a smaller number of large town (and even smaller number of cities) which is less dense. August Losch (1938) found that by rotating different market maps representing different goods and services that a system of city rich and city poor regions will occupy the central place's hinterland.

The major limitations of this early conceptualization of central place theory are related to its core assumptions, specifically an open space with an evenly spread out population with homogenous tastes and purchasing power. These assumptions may hold for culturally homogenous, agrarian spaces, but not for modern industrial economies. Differences in preferences and purchasing power mean that different types of goods and services will predominate in different regions and consequently the size and geographic distribution of cities may also vary. Population, resources, and transportation infrastructure are also unevenly spread out, especially on the international scale, which in

practice means that the density of the provision of high order goods will be greater in regions which can meet a market threshold many times over than in places that can support fewer such firms. The geographic and size distribution of cities will thus be different in different regions. Another problematic assumption is that urban spaces are primarily defined by their service to a hinterland: Due to changes in economic structure, value added industries have become more prominent than extractive industries, and with the related rise in agglomeration economies, cities have grown much faster than their agricultural hinterlands. This implies that many firms service other individuals and firms in the same city rather than simply in their hinterlands. Like the most traditional form of location theory, central place theory, because of its static assumptions, does not have much to say about these internal dynamics of agglomeration and innovation processes or how these patterns can be affected by cultural and institutional factors that differ between cities. Influences that create differential rates of growth and thus the distribution of cities of different sizes are not a part of central place theory. Traditional central place theory consequently has little relevance in predicting an urban landscape in a modern, industrial/service based economy.

The early versions of the theory fail to explain the process by which the central place system came about. It is unclear whether the system of central places represents an optimum means of minimizing transportation costs resulting from planning or whether it represents a natural equilibrium resulting from the economic decisions of individuals and firms. Fujita, Krugman, and Mori (1994), utilizing a model consistent with the new economic geography, found that under conditions where the hinterland of a large initial

city was growing, firms with low fixed costs or high transportation costs would have an incentive to invest in new facilities in the hinterland in order to service the new rural population. Unlike traditional central place theory, which didn't put much emphasis on agglomeration economies but rather on urban/rural commerce, this refined model also incorporates an incentive for firms to locate in a preexisting urban location in order to service workers of other firms. This results in a series of discrete urban places at given distance intervals of various sizes based on scale economies and transportation costs. This version of central place theory integrates the classical Weber location model's emphasis on transportation costs to explain patterns of urban settlement.

#### **1.1.2. External Economies and Urban Hierarchy**

While central place theory, even as conceptualized by the new economic geographers, is primarily focused on transportation costs between firms and (primarily rural) consumers, and implied optimal distances between cities, Henderson (1974) presents a model of the distribution of urban settlements driven by relationships internal to the city and is presented in non-spatial terms. The model posits that there are both positive and negative externalities that result from agglomeration, with the first related to backward and forward linkages between and among firms and households, while the second involves costs of congestion (commuting, etc.). There is an implied optimal city size where the utility of individual residents and firms are maximized, i.e. when the marginal positive externalities related to spillovers is equal to the negative congestion externalities. After that point, further growth is accommodated through the creation of a new city. However, because the positive spillovers are industry specific, while the

negative spillovers are assumed to be a function simply of size, industries which do not share external economies will have an incentive to locate in separate cities, because locating in the same city would only result in increased congestion costs. Because different types of firms experience different degrees of external economies, they have an incentive to sort in different size cities. Prices in the different cities will adjust so that utility of the average resident is the same across all cities. The Henderson model also assumes that there are large developers able to coordinate the founding of new cities of optimal size, motivated by the desire to capture rent from the new location. There would be no incentive for an individual business to move from even a suboptimal sized city to a new site, because they would lose whatever positive external economies that exist in the current cities while not gaining the same economies in the new location. The Henderson model, more so than central place theory, emphasizes the role of agglomeration economies in the creation of urban hierarchies, reflecting the emphasis of post-Weber location theory on external economies in determining where firms locate.

#### **1.1.3. Urban Hierarchy as a Stochastic Process**

While both central place theory and the Henderson model explain urban hierarchy as the result of economic factors such as transportation costs and external economies, they fail to provide an explanation for the fact that the actual size distribution of large cities reflected in the classic power law distribution (Krugman 1996). In other words, the number of cities of a given size,  $P$ , is an inverse function of the size, and can be written as  $1/(P^a)$ , where  $a$  is equal to 1. This has been found to be the case both in case of United States metropolitan areas (Carroll 1982) and in other countries (Rosen and Resnik 1980).

In the case of the United States, this has been the case since at least the end of the 19<sup>th</sup> century. Given that both the Henderson model and central place theory imply that the distribution of a country's urban population is a result of transportation costs, economies of scale, and the potential for external spillovers, which should in turn change as a result of technical innovation, then the urban hierarchy should itself change over time. These theories are not consistent with the persistence of the power law/rank-size distribution.

Simon (1955) suggested a stochastic process by which this power law rule of city sizes could come about. In it, new, discrete lumps of urban population are formed over time, and locate to either an existing urban location with probability  $p$ , or a new location with probability  $1 - p$ . If located to an existing urban center, an individual center has a chance to receive the new population with a probability proportional to its population. In other words, the growth rate of current cities is not related to its current size, contrary to theories implying increasing returns to scale. This process predicts the power law of city distribution only for large cities. However, Gabaix (1999) argues that this divergence can be explained by the greater random variance in the growth rate of smaller cities which may be heavily specialized in basic industries that have difference growth rates. Consequently, even taking cities of all sizes into account, the distribution of population can still be explained by a stochastic process.

Krugman (1996b) argues that the Simon process cannot explain the power law distribution, because to do so it would require an extremely large urban population or a high probability of urban growth occurring on new sites. As an alternative explanation of the power law, Krugman hypothesizes that due to the distribution of geographic features

(ports, rivers, etc.) that are advantageous to city growth, the market areas of cities, and thus their sizes, are distributed as a power law. This theory preserves the focus on transportation costs as a determinant of urban hierarchy, while dropping the assumptions of traditional location theory of a homogenous space.

As already mentioned, the power law is consistently accurate both over time and space in characterizing city size distributions. The two exceptions are in the cases of small cities, as already mentioned and national capitals, which are usually larger than would be predicted by a power law. This implies that capital city size is affected by factors other than a stochastic process (whether growth or geography). The next section will review theories why urban hierarchy or urban primacy may be affected by political processes.

## **1.2. Urban Primacy and Capital Cities**

One notable tendency observed by many researchers of urban hierarchy has been for a country's political capital to also be its largest, primate city (Dascher, 2000). Specifically, less than 25% of larger countries have a political capital that is not also a primate city (Dascher 2000). Studies that have empirically modeled the size of a country's primate city based on country and city level characteristics such as GDP per capita, amount of infrastructure, overall levels of urbanization, or whether the primate was a port, primate cities are generally found to be larger when they are also the capital. This is consistent with a city's capital status being a determinant of its size. The size of this effect varies from study to study but is generally quite large. De Cola (1984) found that the primate city was approximately 48% larger when it was also the capital; Ades

and Glaeser (1995), using country level data averaged over the years 1970-1985 and controlling for institutional factors such as the degree to which a country was democratic or unstable, found a capital city effect ranging between 28 to 57%: Moomaw and Shatter (1996), controlling for both developmental variables and whether the country was unitary or federal, found a capital city effect that ranged between 35 and 37%; Henderson (2002), controlling for population, land area, GDP per capita, infrastructure density, and fiscal centralization, found estimates of a capital city effect that varied between 26 and 45%. More recent articles have used panel data to estimate the effects of capital city status on urban primacy. Moomaw and Alwosabi (2004), using a wide range of measures of urban primacy, found a strong, positive capital city effect. Similar findings are reported by Davis and Henderson (2003) using urban primacy, the fraction of the urban population in the largest city for their dependent variable in panel data set up; controlling for a similar set of variables as Henderson (2002), the authors find that the largest city being a capital is associated with an approximate 7-8 percentage point increase in urban primacy. Behrans and Bala (2011), using a similar specification to Davis and Henderson (2003), find an effect that varies between 6-8 percentage points. All of the above cross country studies that include such variables typically find that institutional features such as democracy (Henderson, 2002; Davis and Henderson, 2003; Behrans and Bala (2011), bureaucratic efficiency/good governance (Moomaw and Alwosabi (2004); Behrans and Bala (2011), and fiscal decentralization/federalism (Henderson, 2002; Davis and Henderson 2003) are associated with smaller primate (mostly capital) cities. Further, studies that have compared the growth between capitals of sub national jurisdictions,

such as American states (Carroll and Meyer 1982) and German counties (Dascher 2000) and their non-capital equivalents have found that capitals have grown statistically significantly faster over the same period. These sub national studies are important because they presumably do not suffer from biases that result from unobserved heterogeneity between countries.

For the most part the empirical work on urban primacy takes the form of country-level cross sectional analysis which does not attempt to disentangle what direction the association between capital city status and primate city size runs. Presumably especially large primate cities may have a higher probability of becoming the capital, because governments which locate inside the capital would have superior access the local amenities as well as access to constituents. However, most theoretical work on the subject has been focused on the effect that capital city status itself has on the growth of cities.

One set of theories which attempt to explain the tendency for capital cities to also be primate cities posit that the capital city enjoys a growth advantage due to the greater ability of capital city residents to influence public policy (Ades and Glaeser 1995; Bates and Block 2011). The mechanism underlying the lower transaction costs faced by capital city residents varies based on the author. Ades and Glaeser (1995) argue for an overt role for capital city residents in the country's politics, at least under certain institutional arrangements. The authors hypothesize that urban primacy is a function of the nation's political economy. Specifically, under autocracies where there is by definition no voting, the threat of organized violence is the most efficient way of influencing policy; because



that violence is easiest to organize in large cities, the country's autocrat will have an incentive to redistribute resources from smaller population centers to large population centers to assuage the residents of larger regions. This will in turn promote the growth of the largest city at the expense of smaller regions. This threat of violence may be more effective when the autocrat is resident in the largest city, as the urban mob can more credibly threaten the ruler. Consequently, capital cities would be expected to grow faster under autocratic governments.

Henderson (2002 a/b, 2007) makes a similar argument, but rather than emphasizing the role that residence in a large city plays in facilitating political influence. He simply notes that a country's elites are more likely to locate in the largest city due to the greater availability of private sector amenities and business opportunities, or, in the case of politicians, because the capital is, for whatever reason, more likely to be located there. These elites consequently internalize the public goods and services provided to the capital more so than public goods and services provided to the hinterland. Consequently, the policy of the central government will favor the capital (or primate) city relative to the hinterland. So while the Ades and Glaeser model emphasizes the role that residence in the capital city has in creating political influence, Henderson argues for the importance of the role that political influence has on the growth of the capital.

Perhaps the most fully specified model of the effect of capital influence (of which this author is aware) is that described in Behrens and Bala (2011). The model assumes a country where labor exogenously allocated between high skilled and low skilled. High skilled labor is mobile and can choose to be either productive or be part of an

unproductive, rent-seeking elite. The elite set separate taxes on both high and low skilled labor so as to maximize their utility, which is a function of total consumption. The elite are assumed to be resident in the capital (though why is left largely unexplained) and consequently purchase goods and services in the capital. Consequently, tax revenue which is raised from both the capital and hinterland is spent entirely in the capital, which raises the demand for goods and services in the capital, and due to increasing returns resulting from fixed costs and/or differentiated goods, leads to path dependent growth consistent with the new economic geography. Because skilled workers can choose to be either productive or unproductive elites, the model predicts that the elites will never tax skilled labor, as it will lead to a reduction in productive skilled workers and an increase in the number of non-productive elites. This in turn lowers the per capita transfers the elites will receive through an increase in the number of elites, a reduction in taxable production, and a reduction in the local variety of goods and services. Consequently, the model predicts that interregional transfers are likely to be greatest in less developed countries where the number of skilled workers is lower. The low number of skilled workers encourages rent-seeking behavior on the part of skilled workers because the potential tax base is large relative to the total number of potential elites, who can only be drawn from the small number of high skilled individuals. In addition, because the potential for product differentiation is low, skilled labor is less productive and the cost in tax revenue from skilled labor becoming elites is lower. The second interesting finding of this article is that it emphasizes the potential for transfers within the capital cities, specifically from low skilled to high skilled workers. Low skilled workers may, however,

still be willing to live in the capital, even if their taxes are higher than in the hinterland, because of the extra benefits that result from agglomeration economies. As long as the capital region is a net importer of rents, which simply requires that it be sufficiently small (in terms of number of unskilled laborers) relative to the hinterland, then the government's rent-seeking behavior will naturally provide a boost to the capital's growth. The notion that a capital bias can exist even if per capita taxes net of public goods provision are higher in the capital will become important in interpreting the significance of the model and empirical results discussed in later chapters.

A second set of theories also emphasize the role that superior provision of public goods and services has in explaining the capital city size advantage. The Ales and Glaeser/Henderson model argued that residents of the capital, for whatever reason, are more politically influential and use this influence to redistribute resources from the hinterland to the capital. In contrast the second set of theories argues that the hinterland will likely receive fewer public goods and services because it is more costly for the central government to provide services to the hinterland. This is because government inputs, specifically labor, is more likely to be concentrated in the capital or largest city. The most formal statement of this theory comes from Dascher (2000/2002/2004), who argues that government expenditure tends to raise demands for inputs in the capital city, which then has a multiplier effect on the capital's private sector, leading to enhanced capital city growth. This multiplier is the result of two mechanisms; expenditure on labor in the capital which in turn is likely to be spent in the capital to purchase goods, services, and land. In addition, unless the hinterland is given some sort of transport subsidy,

residents of the capital are likely to enjoy superior access to public goods and services. Consequently, the degree to which the capital enjoys a growth advantage will depend on the size of government (measured in expenditure), relative to the total economy. In contrast to the earlier mechanism involving more effective lobbying by capital residents, this agglomeration mechanism may be more relevant in countries where government policies are welfare maximizing.

While Dascher (2000/2002) attempts to model the effect of government expenditure of agglomeration under the assumption that governments tend to draw on the capital region for its inputs, the author does little to explain the mechanisms underlying this tendency. A prominent source of agglomeration economies in the urban economics and regional science literature is the greater potential for knowledge spillover, specifically in tacit knowledge, i.e. knowledge which is transferred informally (Audretsch, 1998; Howells, 2002). The potential for knowledge spillover between the administrative and service providing agencies may be an especially strong driver of agglomeration of government, specifically in the capital city, where the administration resides. When a headquarters and branch facility are located near each other, transaction costs may result in efficiency gains because communication associated with coordination of activities and oversight activities is less expensive at shorter distances (Grote and Ueber, 2006; Mariotti and Piscitello, 1995; Ragozzino, 2007). Administrators spend less time on other inputs involved such as traveling between locations in order to gather and spread information to and from branch locations. Consequently, one potential explanation for the geographic concentration of government activity is the effect that distance has on

information asymmetry between policy makers and bureaucrats, resulting in potential principal-agent problems. Governments will tend to locate their facilities and employees locally because they are easier to monitor, raising the marginal productivity of inputs in the capital relative to this in the hinterland. Principal-agent factors may have been especially important for pre-industrial economies. For example, Herbst (2000) argues that much of Sub-Saharan Africa's political and institutional problems are linked to the inability of African states to extend power and services beyond the political capital, which is a result of both a lack of physical infrastructure as well as the costs implied in provisioning a dispersed, rural population, part of which derive from the inability of the central government to monitor activity of its agents in the hinterland. In a similar vein, both Dudley (1991) and Landers (2005) both attribute changes in increased average state size over time to the advent of transportation and communication technology which made oversight of provincial government officials more effective and less costly.

One interesting facet of this agglomeration explanation of urban bias is that it typically assumes that the tax revenue used to fund government expenditures is not more costly to raise from the hinterland than from capital. This is despite the fact that the government presumably has to employ agents, tax collectors/auditors, law enforcement, to raise the revenue, and these agents are just as subject to principal agent problems, if not more so, than other government agents. Specifically, tax payers may have an incentive to pay bribes directly or indirectly to tax officials, the size of which is bounded by the size of the tax obligation, to avoid paying taxes to the government. The incentives for bribe acceptance will depend on enforcement (probability of getting caught), which,

for reasons already stated, may decline from distance from the capital. To the degree that such bribes reduce the welfare of those citizens who pay them as well as the revenue net of collection costs that government can expect from imposing a tax, governments have less of an incentive to impose higher taxation on the hinterland relative to the capital. Consequently, while principle-agent problems may reduce the access of residents of the hinterland to government goods and services, it may also reduce their tax burden. This is due to the fact that the central government has less to gain from taxation in the hinterland and may consequently set a lower de jure tax rate on the hinterland. This in turn lowers the leverage of the tax collecting agents, as a tax payer who is asked for a bribe higher than their tax burden has an incentive to report on the tax collector. For reasons discussed in Chapter 2, the central government may still have an incentive to punish bribe taking agents in the hinterland even if doing so does not result in a direct increase in rents extracted from the hinterland. The net impact of fiscal expansion on the relative welfare of capital and hinterland residents is thus ambiguous, and will likely depend on the marginal product of public versus private goods and services.

One historical example of the difficulty of collecting rents over distance as described by Stasavage (2011), was in the development of the system of the French monarchy's public debt financing after 1522. Initially, the government borrowed from the municipal government of Paris, with the debt being financed by pledging to the municipality revenue obtained from the taxation on certain goods owed to the monarchy in Paris. Later as the government required additional loans, the sources of the municipality's rents were expanded to include territory far from the capital. However,

assuring the collection of taxes in distant provinces proved difficult due to the tendency of provincial government officials who were theoretically required to enforce the rights of the municipal government to the tax to divert revenue to other uses due to the inability of Paris' government to monitor their activity. Eventually, this inability of the municipal government to collect tax revenue damaged its ability to purchase the monarchy's debt.

The expense in collecting taxes directly from a dispersed population has historically manifested itself in the tendency of governments to raise revenue by creating and selling monopolies for products and services (Ertman 1997; Levi 1989; Ogilvie 2011). This seems to be due to the fact that revenue can be raised from one point, the location of the monopolist, presumably because restricting the ability of firms to enter a market is less costly than in accurately assessing and extracting the wealth because the firm receiving the monopoly presumably has local knowledge of potential black market activities and has an incentive to share this information with the government to make enforcement of the monopoly possible (Ogilvie 2011). Revenue is derived from voluntary transactions by individuals involved in production rather than from costly coercion involving specialized tax collectors.

Raising revenue through a strategy of selling monopoly rights is most effective when there are economies of scale that lead to a natural concentration of economic activity. This further forestalls the need for the government to engage in expensive enforcement of the monopoly. The British government, for instance, derived a large part of their revenue from excise taxes on beer brewers, well into the 19<sup>th</sup> century who were heavily concentrated in the city of London due to technological changes that made that

industry more capital intensive (Nye 2007). Similarly, many modern developing countries suffer from a combination of low fiscal capacity and dependence on revenue from taxes on trade as opposed to broad-based, non-distortionary taxes on income (Besley and Perrson, 2011).

Another alternative is for the government to sell the right to raise taxes to the highest bidder, which overcomes the principal agent problem as the potential for the tax collector to benefit from bribes will be incorporated into the bid for the tax farm (Ertman 1997; Levi 1989; Ogilvie 2011; Stella 1993). However, tax farming is only effective in the sense that it maximizes short-term tax revenue, as the owner of the tax farm probably does not internalize the loss of trade that results from taxation to the same degree as the government, and thus will tend to overtax relative to the preferences of the government, who would like to minimize the cost of taxation with respect to economic integration and growth (and thus future tax revenue). In addition, any political opposition that arises from high taxation may represent a threat to the government as well as the tax farmer. This potential political externality will be discussed in more detail in Chapter 2.

Another critique that can be made of the agglomeration based argument for capital city growth is that, contrary to Dascher (2000), its salience in fact does depend on specific institutional arrangements. If a government is very autocratic and not popularly constrained by the need to provide goods and services, or is only accountable to interest groups in the capital, then it is unlikely that the relative costs of the provision of those goods and services will play much of a role in explaining differential growth between the capital and hinterland. Agglomeration economies in government are thus more relevant in



democratic counties where the government's chances of staying in power is dependent on its ability to balance the provision of government goods and services with the costs of providing those services.

However, to the degree that principal agent problems are real, they may also limit the salience of an argument for capital city growth based on the political influence of capital city residents. If raising revenue from the hinterland is costly due the difficulty of monitoring tax collecting officials, then this would obviously act at least to some degree as a constraint on the ability of a central government to redistribute resources from the hinterland to the capital. In addition, the political influence of capital city residents may be endogenous to the effect of distance on monitoring costs. If governments are more effective in gathering information locally such that they are better able to monitor both coercive agents (Saber Mahmud and Vargas 2011) and potential political rivals, then, contrary to Ades and Glaeser (1994) and Bates and Block (2011), they may be in a better position to constrain the collective action in the capital relative to the hinterland. This is consistent with empirical findings in the conflict literature that shows that the probability that a region will experience informal collective resistance to governments to be inversely related to the distance of the region from the capital (Buhaug and Lujala, 2005; Herbst 2000; Ostby, 2006; Weidmann et al., 2006)<sup>1</sup>. In addition, a significant literature on the history of state formation emphasizes the role of population density in allowing the consolidation of power by a small elite specialized in coercion due to economies of scale

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<sup>1</sup> For another factor that may limit collective action in large agglomerations, see Robert-Nicoud and Sbergami (2002), who argue that the ideological diversity in urban regions relative to rural ones means that, in a democratic, probabilistic voting framework, rural residents may be more likely to be the median voter when ideological issues are particularly salient, and thus may benefit from preferential economic policy such as agricultural subsidies.

in the use of violence combined with high transportation costs (Carneiro 1970; Mann 1986; Dudley 1991; Landers 2005; Scott 2009). This literature places particular importance on factors that limit the mobility of the rent-paying population, and thus their ability to escape exaction, such as contiguous (to the ruler's territory) regions which are not fit for habitation or the existence of institutions such as slavery and serfdom (Carneiro 1970; Mann 1986; Scott 2009). In the modern context, agglomeration economies may serve to compensate individuals for heavy government exaction and thus limit the potential for migration away from the capital. The only formal model of such a process appears to be Mayshar, Moav, and Neeman (2011), where a rent-extracting elite chooses a level of population density based on the tradeoff associated with two competing mechanisms: the first mechanism is the costs of monitoring a small number of agents working a large amount of land, which leads to a higher density equilibrium the second mechanism is the cost of paying the minimum maintenance of large number of agents, leading to a low density equilibrium; however, this model is heavily tied to assumptions which may only be appropriate for a Malthusian agrarian economy. The principal-agent costs associated with lower population density arise from the greater effort necessary for an agent to work a large amount of land rather than from increased transportation/communication costs as emphasized in this paper. A prominent recent contribution to this literature comes from Acemoglu et al. (2002/2012) who argue there has been a reversal of fortune between North America, which was, prior to European colonization, sparsely populated but is now relatively developed, and Latin America, which was relatively densely populated in the pre-colonial period but now lags behind

North America. The authors argue that this is in part due to the fact that the densely populated nature of pre-colonial Latin America along with low European colonization due to non-temperate climates, and thus greater potential for disease, made it particularly susceptible to the creation of extractive institutions that benefited a small European elite. By contrast, European colonists of North America had few natives to exploit and attempts by the government to extract resources from the colonists themselves were stymied by the colonists' ability to migrate west into (relatively) unsettled, "free" territory. Consequently, to retain a productive tax base, English colonial authorities were forced to create representative institutions which provided credible constraints on the ability of the government to extract rents from the population.

Given these potential contradictions between the models, it is unlikely that both models will be salient determinants for the same country at the same time. An explanation for capital city growth which emphasizes the role of lobbying by capital city residents will be most relevant in countries where the government is 1) not determined through a universal franchise and 2) can monitor and enforce tax collection at a distance at relatively low cost. By contrast an explanation which argues that capital cities grow faster than the hinterland because the provision of public goods and services to a community increases with the distance of that community from the capital is most likely to be valid in countries and times where 1) government is determined by through a broad franchise, thus giving residents of the hinterland *de jure* political influence and 2) the cost of monitoring government agents from a distance, including those involved in tax collection, is relatively high. The degree to which these models explain the general

phenomena of large capital cities will thus be determined by the degree to which the majority of countries or regions within countries in most periods can be placed in one of the above categories.

However, political scientists, sociologists, and institutional economists have long noted that throughout history, political representation and state capacity, as measured by the ability of a government to raise revenue or take out loans, tend to go hand in hand (Ertman 1997; Levi 1989; North et al. 1989/2009; Stasavage 2010; Tilly 1992), at least in the case of early modern Europe. The most complete explanation for the link between political representation and revenue can be found in Levi (1989), who argues that the transaction costs related to coercing revenue from their population lead rulers to grant representation to individuals who possessed capital in return to complying voluntarily with taxation<sup>2</sup>. By giving wealthy factions in society a voice in fiscal policy, rulers were able to align their interests with those of the government. Consequently there was an incentive for these enfranchised elements in society to assist the government in raising revenue as it would facilitate the ability of the government to provide public goods. First among these public goods was security from external threats. There was of course a tendency to free-ride among both the representatives and individual constituents. However, the combination of collective action facilitated by the representative body, where representatives could threaten sanctions against free-riding members, as well as the substantial local power enjoyed by individual representatives, such as the case in early modern England (Ertman 1997), allowed for means of punishing those who would not

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<sup>2</sup> See Perroni and Scharf (2007) for a formal expression of this mechanism.

pay taxes as well as tax collecting officials far from the capital who might otherwise have little incentive to pass revenue on to the central government. Essentially, by enfranchising a part of the population over which they were ruling, the government was buying a large number of informal agents. These could substitute for a costly professional tax-paying apparatus.

This phenomenon has its parallels in modern “consensually strong states” (Acemoglu 2005; Besley and Perrson 2011; Torgler and Schneider 2009), mostly OECD countries where the government is politically weak. They are politically weak due to the enfranchisement of the population which they govern, but are economically strong (i.e. raise a substantial amount of their economic output in taxes), as citizens trust that those taxes will be passed back to the public in the form of public goods. This theory is consistent with studies on the determinants of individuals’ stated (in surveys) willingness to pay taxes, or ‘tax morale’, which generally finds that: controlling for individual characteristics, variation of country of residence is associated with variation in willingness to pay taxes (Alm and Torgler 2006). This inter-country difference in willingness to pay taxes is positively associated with the degree to which a country’s institutions are democratic and uncorrupt as well as the perception that others pay their taxes (Torgler 2005 a/b; Frey and Torgler 2007); and that this stated willingness to pay taxes is negatively associated with the size of a country’s informal sector (Torgler 2005b; Torgler and Schneider 2009), which is consistent with governments inability to enforce imposing rent-creating monopolies, and thus black markets. While under the lobbying model an autocracy may in fact have a large, informal constituency in the form of the

residents of the capital, they likely have limited ability to monitor or enforce tax collection in the hinterland. Consequently, this positive association between democracy and taxation is inconsistent with the necessary sets of conditions under which the two primary theories for the capital city effect will hold.

Given the limitations of earlier theories linking a city's status as a capital with its growth prospects due to their inability to consider the constraints that distance places on rent-extraction, this paper seeks to create a new model. The focus of the model is on the effect proximity of government has on public service provision. This is in contrast to the earlier literature on urban primacy. It does not seek to create a model of urban concentration itself, but rather to consider the effect of urban primacy on governance. In the next chapter, two variants of this simple rent-seeking model are presented. In both models, the governments raise revenue by providing public goods and services to a region. Whether or not the government collects revenues in excess of the cost of the provision of the public goods is determined by its willingness and/or ability to set prices. In the first variant, the central government holds a monopoly over the provision of the public good, but has to employ an agent to produce and collect revenue from the region. The price the government charges is based upon exogenous institutional constraints and the ability of the central government to contract an agreement with the agent to share the rent with the government; the rent that the government can be expected to receive declines with the distance of the region from the capital. In the second variant of the model, the government does not face principal agent problems in rent-collection, but does face the threat of entrance by a political opposition; the fixed costs associated with

establishing the this alternative government are assumed to be a function of central government's ability to use coercion to suppress the organization of a political opposition, which in turn declines with the distance from the capital. In both models, in contrast to the two existing models of capital city effect, an outcome where public goods provision is positively related to distance from the capital is possible.

In chapter 3, hypothesis drawn from these models are tested using country level data on perceptions of government effectiveness and corruption. The results indicate that countries where a larger percentage of the population is concentrated in capital are perceived to have lower effectiveness. In addition, in this chapter two other macro-scale tests of the model predictions are discussed. The model is tested by examining the effect of being a capital or primate city has on a set of objective, city-level indicators of quality of life. Capital and primate cities generally show little differences from hinterland cities with respect to these indicators, and are in fact worse with respect to transportation and housing. This further undermines the traditional explanations which argue that governments favor local communities. The specific political economy assumptions underlying the lobbying explanation for capital city growth are tested by examining the effect of urban primacy on political stability. If capital city residents have disproportionate political influence, then leaders of countries with large capitals and fast growing capital cities should be less vulnerable to losing their jobs through informal means, as their policies and resulting coalition should be strong enough to protect them from challengers. The results indicate, however, that in periods where a country has a high level of urban primacy, and especially during periods of negative economic growth,

leaders are more likely to be overthrown, while the prior periods growth in the relative size the capital has no effect on whether a leader will be overthrown in a given year.

These results again contradict an explanation for capital city growth involving a relatively high level of political influence amongst the residents of capital cities. Instead, this paper argues that if the government is more capable of extracting rents when the population is heavily concentrated, political instability is expected to increase due to increased competition for those rents.

In addition to the country-level and metro-level results, in chapter 4 results from an analysis of firm-level survey data is used to test the robustness of the results to disaggregation. These results indicate that firms located in the capital are found to be more likely to make informal payments to government agents for business related licenses, are more likely to perceive corruption as an obstacle to their operations. They are more likely to perceive poor government provisions of government goods and services as an obstacle to their operations. Both sets of results are robust to correction for endogeneity. These results are consistent with the models described in the next chapter, but inconsistent with explanations of capital city growth involving the greater provision of public goods and services in the capital.

Finally, in the concluding chapter, the argument of the dissertation and empirical results are summarized. Weaknesses of the analysis and potential contradictions between the empirical results here and those in the larger literature are discussed with an eye towards potential for future research.



## **CHAPTER 2 - THEORY**

### **2.1. Introduction**

The role of politics in the geographic distribution of economic activity, and specifically the observed levels of high economic activity in national capitals, has received increased attention from urban scholars (Ades and Glaser 1995; Dascher 2000). Typically, two general explanations have been offered. One argues for the efficiency of concentrating government activity in the capital due to economies of scale and a presumed distance cost effect in the provisioning of government goods and services in more remote areas. The second argues that residents of the capital enjoy an advantage in access to and lobbying of policy makers, a kind of “rent seeking” advantage. However, the literature to date generally does not consider the microeconomics of organizations when suggesting mechanisms underlying these effects. For the first time, this paper attempts to make these relationships explicit and assess the competing hypothesis empirically.

This chapter describes a principal-agent model of government where the principal is assumed to be the public. There are three types of agents. One is the abstract service provider, who creates a public good to the public, analogous to a low-level public official. This service provider is monitored by a Supervisor, analogous a president/prime minister who, upon discovering rent-seeking by the service provider, has the option of

either preventing rent-seeking activity or colluding with the service provider for a portion of the rents. Finally there is a Recruiter, who contracts the service provider for a specific quantity of public goods at a price the public is willing to pay. While the service provider may be located in either the primate city/capital or the hinterland, the Supervisor and Recruiter are assumed to be resident in the capital city. In addition, the Supervisor and Recruiter may be either the same or different agents.

This paper is divided into three parts. The first part applies the principal-supervisor-agent and Tullock rent-seeking models to the case of government contracting and supervision, modifying both so as to account for the role of geography in determining the transaction costs of rent seeking, as well as the joint implications of oversight and rent seeking on the level and geographic distribution of government output. The second part presents the methodology used to test the propositions of the models as well as empirically assess the results. The third part summarizes the results and their policy implications and briefly describes avenues for future research.

## **2.2. Theory**

### **2.2.1. The Principal – Supervisor – Agent Model with Geographic Constraints**

One assumption, which has typically underlain the literature dealing with the link between political and economic geography and the provision of public goods, has been the notion of a “distance decay” effect (Arzaghi and Henderson, 2005; Dascher, 2000; Herbst 2000). This suggests that the quality declines and/or cost of the provision of public good increases, the further the center of consumption is from the center of provision (usually assumed to be the capital). The underlying mechanism for this

distance-decay effect has generally been suggested to be the difficulty that governments have in overseeing agents at a distance (Arzaghi and Henderson; Herbst, 2000). The consequences of this lack of oversight may take many forms, including increased incidence of corruption (i.e. bribery and/or low production ---the unproductive uses of resources) by government managers and workers in politically and physically peripheral regions. One economic assumption of this literature is that administrators in the capital use their powers of oversight to maximize consumer welfare in respect to public goods by maximizing the output of public goods at a given price. The possibility that agents and their supervisors may collude and thus both benefit from rent seeking is rarely considered.

To see why collusion within government is relevant to the role of geography in the provision of public goods, consider a simple revision of the Principle-Supervisor-Agent Model originally proposed by Tirole (1992). In the original model, the government, the principle, hires an agent to provide a public good. The cost of providing the public good is known by the agent, but not by the government, and so the agent can take either a high or low value,  $C_h$ , and  $C_l$  respectively, for providing the public good with some probability,  $u$  and  $(1 - u)$ , respectively. The agent is assumed to be risk-neutral with a reservation price of 0. The government is assumed to engage in monopoly pricing such that the wage of the agent will be set to  $C$ . Absent a supervisor, the government is assumed to pay the high price for the good, because even if the true cost is the low one, the government will not attempt to offer the low price absent information about the true cost structure due to the possibility that the agent will not produce at all, resulting in no

surplus. It is thus the case that the value derived from producing the good or service exceeds the cost of production, and thus the government will always produce at a level higher than zero. If a supervisor is employed, there is a probability,  $\alpha$ , that the true cost of the good will be discovered if it is  $C_l$ , and a probability  $(1 - \alpha)$  that the true, low cost will not be discovered. If the low cost is discovered, it is possible for the agent to provide an offset (bribe) to the supervisor to keep the discovery from the principle, with maximum offset (bribe) being equal to  $k(C_h - C_l)$ , where  $k$  has a value between 0 and 1 and represents the fraction of rents not lost during transfer. The supervisor is assumed to have a base wage equal to 0. However, the government is willing to pay the supervisor to reveal information concerning the cost of the public good when the cost is low. To induce the supervisor to reveal their information rather than take the offset (bribe), the payment from the government would have to be  $k(C_h - C_l)$  in cases where the supervisor reveals a low cost<sup>3</sup>. Consequently, the cost of provisioning one unit of the public good under non-spatial assumptions will be:

$$MC = uC_h + (1 - u)[\alpha(C_l + k(C_h - C_l)) + (1 - \alpha)C_h] \quad (\text{Eq. 1})$$

Under the assumptions of the model, the cost of provisioning the public good will be lower when the government/principal employs a supervisor, but the savings will depend on the transaction costs of collusion, represented by  $k$ . The supervisor will receive  $\alpha k(1 - u)(C_h - C_l)$ .

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<sup>3</sup> For evidence that government executives' salaries are associated with performance, see Di Tella and Fisman (2004).

### 2.2.2. The Distance Dimension

In developing a spatial version of this model, the parameters  $\alpha$  and  $k$  are assumed to be endogenous to the distance between the supervisor and the agent,  $D$ , such that:

$$\alpha = f(D) = \frac{1}{D^W} \quad (\text{Eq. 2})$$

$$k = g(D) = \frac{1-\sigma}{D^Q} \quad (\text{Eq. 3})$$

In other words, the closer the agent is to the supervisor, the higher the probability of detection and the lower the transaction costs of collusion,  $(1 - k)$ . Because in this model the supervisor is a politician,  $k$  is also assumed to be a function of  $\sigma$ , a measure of government accountability that takes a value between 0 and 1 (see the next session). Supervisors who are more accountable may perceive a greater cost to accepting rent, thus lowering the amount that they have to be paid in order to not to collude with the service provider.

It is also reasonable to assume that the further away the consumer of the public good is from the agent, the higher the cost. If there is assumed to be a linear space, with the consumer on one end and the supervisor on the other, which is equal to  $D_T$ , with the agent somewhere between, the distance between the agent and consumer will be  $(D_T - D)$ .

Consequently, the cost equation can be rewritten as follows:

$$C = uC_h + (1 - u) \frac{\left( C_l + \frac{(C_h - C_l)}{D^Q} \right)}{D^W} + \left( 1 - \frac{1}{D^W} \right) C_h + 1(D_T - D)$$

(4)

$$\frac{dMC}{dD} = (1 - u) \left[ \frac{-(q + w)(\Delta C)}{D^{(q + w + 1)}} + \frac{w + 1}{D^{w + 1}} \right] - l \quad (5)$$

, where  $l$  is the cost of transporting the public good from the place of production to the consumer and  $D \geq 1$ . These equations carry a couple of implications. One is that the supervisor will tend to receive higher pay the closer he/she is to the agent. This is because the supervisor is both better able to detect rent seeking activity on the part of the agent as well as being better able to collude with the rent-seeking agent, requiring the government to pay more to the supervisor in order to report the agent's rent seeking. Second, contrary to the assumptions of earlier literature, the cost of providing services through local agents to residents of the capital will not necessarily be lower than provisioning the same service to the hinterland. If it is assumed that the supervisor is in the capital, but consumers and agents can be jointly located in either the capital or hinterland, then the relative cost of provisioning the good will depend on the relative values of  $w$  and  $q$  and the distance between the capital and hinterland. Any benefit that comes with increased detection may be offset by an increased chance of collusion, and thus a higher wage paid to the supervisor.

### 2.2.3. Geography and Patrimonialism

The principle-supervisor-agent model assumes that government acts as a price setting monopolist in respect to employing agents, such that wages paid to agents will not exceed costs, and that corruption only takes place in the 'side contract' between supervisors and agents. However, this may not necessarily be the case. If potential providers of a public good are few in number, then they may be able to exercise

bargaining power in respect to government. In addition, potential suppliers/agents may be able to lobby those in government who determine who is eligible to be hired (the Recruiter) in order to artificially restrict service providers and thus realize rents. Both of these conditions seemed to be at play in early modern Europe, where certain parts of society had monopoly control over government positions, a system which has been termed 'patrimonialism' by economic historians and historical sociologists (Ertman 1997; Epstein 2000). In light of the assumption made above that collusion is facilitated by proximity between workers and supervisors, it is worth exploring what role geography may play in fostering patrimonial forms of organization.

What follows is a simple model drawn from the rent seeking literature (Tullock 1967) of the decisions that a government makes when deciding who is eligible to produce a public good. There are assumed to be two different sets of conditions. In the first an individual is hired under competitive circumstances, i.e. they receive a wage consistent with marginal costs and produce a level of output determined by market conditions and government demand. In the second, a patrimonial set of conditions, an individual is given a monopoly over the provision of labor for a government position and thus acts as a wage setter, with the wage and level of output based on the goal of maximizing rents given public demand for the good.

The model thus assumes that there is no coercion, as demand for a public good is dependent on the willingness for the public or some utility maximizing social planner to pay. This assumption is in keeping with historical sociology and institutional economics literature that finds that even non-democratic governments often rely on achieving some

level of public consent in order to raise taxes (Levi 1989; North 1981; Tilly 1992; Ertman 1997; Haber 2005; Ogilvie 2011). Coercion is costly because both tax payers and tax collecting agents have an incentive to deny the government tax revenue and may collude to make that possible. Monitoring the tax collection process may be costly. While the government may engage in collective punishment of a community, both tax evaders and non evaders alike, that locals may police themselves to ensure taxes are paid, such a strategy may be costly both politically, by stimulating collective action to resist the central government, and economically by damaging trade. Consequently, the government may not be able to credibly commit to such an act. By contrast, if the government reciprocates the payment of revenue by providing public goods that are at least as valuable to the residents of a region as the revenue provided, then the incentive for tax evasion is mitigated. The government can credibly commit to not provide the publicly provided good if payment is not met. Such a model of public finance becomes somewhat more complicated when the good or service offered by the government takes on public or quasi-public good characteristics, specifically non excludability, as there is an incentive of individual members to free ride. However, in this case, local residents have an incentive to enforce compliance by members of their community, whether by collecting revenue amongst themselves and paying the government in a lump sum, or informing the central government of the free-riding or corruption on the part of local residents and government agents. Local residents are probably in a position to perform these monitoring and enforcement activities at lower cost than the central government because of their proximity and more frequent interaction with the community (Ogilvie 2011).



Certainly, early modern European governments often felt the need to convene a general assembly to endorse the collection of revenue to fund military defense and aggression against external threats (Levi 1989; North 1981; Tilly 1992; Ertman 1997). Those governments unwilling or unable to create such a body were forced to rely on the sale of offices and government enforced monopolies over private goods to fund their foreign adventures. Of course, such collective action may also be manifest in the local or national (formal or informal) institutions exploiting its monopsonistic position to drive a hard bargain with the government. It should also be noted that such sanctions may not be enforced when the government raises the price of the good or service above costs, as a reduction in revenue will not necessarily lead to a reduction in service provision. This point will in fact drive the results from of this analysis. Consequently, it is most likely that the government's ability to extract rents will be limited to cases where the good being provided is excludable and in the following model it will be assumed that the government provided good is closer in character to traditional private goods in so far as non-paying individuals can be excluded. Under these assumptions, the government thus acts as a monopoly provider of a publicly provided good and there are assumed to be no transaction costs to taxation.

Several other simplifying assumptions are made in the model. Recruiters are assumed to receive a fixed salary as compensation for their work. The political agents (both Recruiter and Supervisor) are also assumed to be institutionally constrained in such a way that they cannot directly translate tax revenue into income, thus necessitating the use of side agreements if they wish to obtain rents beyond the salary they receive in

return for their work. There is no attempt to explicitly model behavior that occurs once an individual is hired such as principle-agent issues. These are treated abstractly, with the assumed optimal organizational structure built into the cost function. Similarly, potential service providers are assumed to be unable to incorporate information about rents that can be obtained on the job when bargaining about the terms of their employment<sup>4</sup>.

Contracts are assumed to be long term, with no ability to renegotiate. Competitive recruitment is assumed to be costless. Both consumer and agent location are assumed to be fixed and in the same region, with one service provider per region. Service providers are assumed to be homogenous in abilities. Regions are assumed to be homogenous in preferences. Finally, the number of potential candidates for the service providing position within a region is assumed not to vary systematically with distance.

The Service Provider has a production function,

$$W = f(x) = aL - bL^2 \quad (6)$$

Where W is the public's utility and L is the quantity of output produced by the service provider. The labor/supplier market which the government draws on is assumed to be competitive absent rent-seeking such that with equilibrium price/wage rate (aggregated for both service providers and supervisors),  $w_c = MC$ . Consequently,

$$L_c = \frac{a - MC}{2b} \quad (7)$$

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<sup>4</sup> This assumption seems reasonable given that, if agents knew they could extract rents once hired due to lack of oversight, this would be expected to affect the wage they would be willing to accept from the principal. Specifically, the equilibrium wage would be lower in cases where oversight was limited, in turn lowering the marginal costs of public goods. If this were the case, there would be little need to employ a supervisor. In addition, if the agent is risk averse, the potential for rent seeking is not constant due to uncertainties in oversight, and knowledge of these risks only comes from substantial experience, then agents are likely to place a small weight on potential rents when bargaining for their wage (Glazer 2002).

in a situation where a government worker is contracted absent rent seeking. Using equations (6) and (7), the net public good produced by a position can be written as

$$NB_C = a \left( \frac{a-MC}{2b} \right) - b \left( \frac{a-MC}{2b} \right)^2 - MC \left( \frac{a-MC}{2b} \right) \quad (8)$$

Under a condition of rent seeking, an individual is given a monopoly over the provision of a public good and is consequently able to set the amount of  $L$  she is willing to provide such that,

$$L_M = \frac{a-MC}{4b} \quad (\text{Eq. 9})$$

The net benefit under this patrimonial contract would be,

$$NB_M = b \left( \frac{a-MC}{4b} \right)^2 \quad (\text{Eq. 10})$$

When considering whether to hire a new employee on competitive or patrimonial terms, the government is assumed to be influenced at least to some degree by the potential for individual gain. The rent seeking literature contends that agents will lobby politicians to acquire monopoly power. The amount of resources expended on this rent-seeking activity is capped by the maximum rents that can be extracted. Here that can be written as

$$R = \left( a - 2b \left( \frac{a-MC}{4b} \right) \right) \left( \frac{a-MC}{4b} \right) - MC \left( \frac{a-MC}{4b} \right) \quad (\text{Eq. 11})$$

However, the actual level rents that the government will receive in return for granting a monopoly is also a function of transaction costs. Specifically, there is assumed to be some risks that either the service provider or recruiter will not receive rents. It is possible that the hiring official will be caught in the act and thus subject to adverse legal

or press scrutiny. Another possibility is that one party to the rent-seeking transaction will choose to not hold up their end of the bargain, lowering the perceived value of engaging in rent-seeking activity. This results from the fact that there may be a gap between when the payment for a monopoly is made and the implementation of the monopoly. For instance, if the service provider pays first, the politician could decide to resubmit a contract for new bidding shortly after collecting rents. On the other hand if the monopoly is given before the payment is made to the politician, the service provider may have an incentive to not follow through on the payment. For instance, in a case where the bidders on a monopoly are credit constrained, payment may be made from future rents, which the eventual monopoly service provider may simply refuse to make. Or the prospective service provider may imply a job is waiting for the politician after she leaves office, only to not follow through when the time comes.

These risks (or perceived risks) are assumed to increase as a function of distance between the agent and the official responsible for the contracting the work due to a potentially lower level of trust between individuals who rarely make personal contact. Trust may benefit from proximity due to the increased ability of both parties to anticipate, detect, and sanction cheaters, either through their own efforts or their local and possibly overlapping social network, thus allowing both parties to credibly commit to upholding their end of the bargain (Ogilvie 2011). In addition, a local social network may provide more opportunities for transferring rents, such as through having a family member offer the politician or a politician's relative a job once they leave office (Prud Homme 1995; Tanzi 1995). Building and retaining this trust through frequent meetings or through

employing local agents may be more costly the greater the distance between the agents' place of work/permanent residence<sup>5</sup>. Assuming one or both of the parties are risk averse, the perceived gains of the rent-seeking transaction will be reduced as a result of this increased risk. If it is assumed that the agent does not relocate after accepting a government contract, i.e. if agents are hired in same location they will work<sup>6</sup>, then agents competing for a monopoly contract may spend resources traveling to the capital in order to build relationships with the hiring agent in order to enhance their chances of receiving a monopoly over the position. Resources spent on transportation, which is likely a function of distance, translates to lower transfers to the Recruiter. They may also forestall participation in a rent-seeking contest by potential holders of the position who are unwilling to bear the fiscal and opportunity costs associated with traveling to the capital, reducing the number of active rent-seekers and thus lowering the level of rent dispersion (Tullock 1980; Che and Gale 1997). Therefore, the expected transfer that the Recruiter will receive can be written as:

$$E(R) = \frac{\left[ \left( a - 2b \left( \frac{a-MC}{4b} \right) \right) \left( \frac{a-MC}{4b} \right) - MC \left( \frac{a-MC}{4b} \right) \right]}{D^2} \quad (Eq. 12)$$

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<sup>5</sup> On the relationship between distance and trust, see Bonte (2008), Sorenson (2003), Hansen (1992), Desrochers (2001), and Morgan (2004). On the relationship between trust and rent-seeking, see Morck and Yeung (2004), Prud Homme (1995), and Tanzi (1995).

<sup>6</sup> This assumption should not change the basic implications of the model, as moving to the location of a new job (say from the capital to the hinterland) may impose either financial or psychological costs on a prospective agent that will, all else being equal, lower the amount they are willing to spend in rent-seeking. It may also be the case that non-indigenous agents will find performing a job or enforcing their monopoly more costly simply due to lack of experience with the region (Ogilvie 2011).

<sup>7</sup> If the assumption that service providers do not internalize rents that can be obtained due to lack of oversight is relaxed, then the relationship between distance and expected rents might also be expected to change. Because oversight is assumed to decline with distance between the service provider and supervisor (capital), the rents that the service provider could obtain from holding a monopoly on a position would also increase with distance, and thus the rents that the Recruiter could expect to obtain

The utility the Recruiter derives from either alternative arrangement (competitive or patrimonial) can be written as:

$$U_C = \sigma \left( a \left( \frac{a-MC}{2b} \right) - b \left( \frac{a-MC}{2b} \right)^2 - MC \left( \frac{a-MC}{2b} \right) \right) \quad (13)$$

$$U_M = \sigma \left( b \left( \frac{a-MC}{4b} \right)^2 \right) + (1 - \sigma) \left( \frac{\left[ \left( a - 2b \left( \frac{a-MC}{4b} \right) \right) \left( \frac{a-MC}{4b} \right) - MC \left( \frac{a-MC}{4b} \right) \right]}{D^\beta} \right) \quad (14)$$

where  $\sigma$  is a parameter with a range between 0 and 1 representing how democratic/accountable the government is, the degree to which there are cultural norms against rent-seeking, or more generally how well institutions align the interests of government officials with the interests of the public. The politicians of a more democratic/accountable country are assumed to derive greater utility from the provision of public goods, because failure to do so will result in a loss of office, while a dictator is less accountable, and thus places greater weight on the ability to extract rents for personal gain<sup>8</sup>. The long-term career consequences of being thrown out office due to inadequate provision of public goods may be especially high if the politician earns a reputation for being a poor manager, reducing demand for their services in the private sector

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from farming out the position. Such a situation might have prevailed in many early and pre-modern states, where communications, transportation, and administrative technologies were so weak that agents in distant provinces bore little risk that the exploitation of their positions would be detected by governments in the capital, giving an incentive for the government to sell the position to the highest bidder. For a potential example of such a state, see Levi (1989) on the Late Roman Republic.

<sup>8</sup> It is possible that the effect of distance on expected rents (Eq. 12) is a function of a country's institutions. For example, a strong dictator may have little to fear politically or legally even if his or her rent seeking became public. This would imply distance may have a more limited effect on rent-seeking in a dictatorship. Conversely, the lack of restraint on a strong dictator limits the ability of the monopoly seeking agent to punish cheating through the offer of support to rival politicians, raising the perceived risks of cheating by the dictator. Because the relationship is likely ambiguous, this model makes the simplifying assumption that  $\beta$  is constant across different institutions.

(Holmstrom 1999; Besley 2004)<sup>9</sup>. In addition, while individual rent-seeking transactions may not be public, in a more open society the benefits that politicians obtain from rent-seeking behavior may be more visible and likely to be punished if it is assumed that those benefits are derived at the expense of the public.

Alternatively, it may be argued that non-democratic regimes are predicated on the existence of rents. In a country with weak democratic institutions, the ability of an individual to influence the selection of a leader may not be based on voting, but rather other mechanisms, one important example being violence (North et al. 2009). Consequently, the costs of political participation for an individual might be high, specifically the risk of death and opportunity costs that arise from the time spent fighting. However, like in a democracy, there may be returns to scale, in that a potential leader with more supporters may also be more likely to take control of the country. This obviously entails strong collective action problems, as public goods, which will by definition be widely distributed regardless of whether or not one chose to fight, will not attract individuals to a leaders cause. Consequently, to organize enough followers to take control of a country, the leader under non-democratic institutions would have to provide private, as opposed to public rewards to those who fight (Collier and Hoeffler 2004; North et al. 2009). Rents will consequently be more valuable to politicians in a non-democratic country.

The probability that the government will chose to farm out a monopoly on the provision of a public good can be written as:

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<sup>9</sup> Career ambitions may play less of a role in disciplining the rent-seeking of congressman/mps than executives, as aggregate government performance cannot be attributed to any one individual.

$$P = f\left(\frac{U_M}{U_C}\right) \quad (15)$$

$$\frac{U_M}{U_C} = \frac{1-\sigma}{2\sigma D^{\frac{1}{\sigma}}} \quad (16)$$

$$\frac{dP}{d\left(\frac{U_P}{U_C}\right)} > 0 \quad (\text{Eq. 17})$$

$$E(NB) = Pb\left(\frac{a-MC}{4b}\right)^2 + (1-P) \left[ a\left(\frac{a-MC}{2b}\right) - b\left(\frac{a-MC}{2b}\right)^2 - MC\left(\frac{a-MC}{2b}\right) \right] \quad (\text{Eq. 18})$$

Equations 15 through 18 imply that under conditions that are less than perfectly democratic, a greater proximity between a government agent and the official responsible for government contracting will be associated with an increased likelihood that the agent will be awarded a monopoly. This implies that in geographically small countries and capital cities, where government agents are necessarily close to officials/politicians awarding contracts, public goods providers are more likely to hold a monopoly over their position, resulting in higher wages and lower output. One potential historical example of this phenomenon is the northern Italian city-states of the early modern period, where the state bureaucracy remained small and government positions were the monopoly of certain politically powerful families while during the same period the larger territorial states of Italy and northern Europe were developing more advanced, less corrupt bureaucracies (Epstein 2000). One explanation for these differences in outcomes that is consistent with this model is that the greater geographic proximity of Italians, and presumably government agents, to the seat of government lowered the transaction costs of rent-seeking and collusion. Consequently, governments in Italian city-states would be



expected to be less efficient and monopolized by individuals with the resources necessary to engage in rent-seeking behavior.

Of course, rent seeking may provide a net benefit to the capitals of large states. If it is assumed that public goods providers do not have to co-locate with the consumers of their goods, i.e. such as when transport costs are relatively low, then capital residents may lobby for a monopoly of the provision of a public good for the entire country. While this would of course lead to higher costs related to transportation of goods and services to the hinterland and lower government output in general, such costs would presumably be spread over the entire population in the form of taxes or be borne by the residents of the hinterland, while capital residents would enjoy a concentration of rents from the production of public goods. Rent-seeking thus offers an alternative explanation to principle-agent issues in explaining the agglomeration of government activity. In this case, migration from the hinterland to the capital would have the effect of increasing government efficiency, due to increased accessibility.

#### **2.2.4. Joint Implications/Interaction Effects**

The above analysis indicates that collusion in both oversight and contracting has important implications for government efficiency and geographic equity, but it is also important to consider how both of these phenomena interact. Specifically, how the equilibrium level and dispersion of government output is likely to differ based on whether supervision and contracting are done by separate agents or the same agent. From the above discussion, it is clear that if there is a division between who contracts government agents and who supervises them, then there will be a large, cumulative

impact on government output and consumer surplus. High potential for collusion increases the amount expended on oversight, increasing the marginal cost of government output (or lowering demand, given that the agent does not directly pay the supervisor) by  $\frac{(1-\sigma)}{D^q+w} (1-u)(\Delta C)$ . This lowers consumer surplus under a system of competitive hiring. This surplus is further reduced by the deadweight loss arising from the granting of a monopoly over provision as well as the rents that are paid to the monopolizing agent. While the supervisor loses out when a monopoly is granted, because lower output reduces the potential for bribers and thus the need for the government to pay the supervisor not to accept a bribe, this does not change the supervisor's behavior because we assume he/she has no ability to alter the behavior of the contract.

$$U_C = \sigma \left( a \left( \frac{a-MC}{2b} \right) - b \left( \frac{a-MC}{2b} \right)^2 - MC \left( \frac{a-MC}{2b} \right) \right) + \frac{(1-\sigma)}{D^q+w} (1-u)(\Delta C) \frac{a-MC}{2b} \quad (\text{Eq. 19})$$

$$U_M = \sigma \left( b \left( \frac{a-MC}{4b} \right)^2 \right) + (1-\sigma) \left( \frac{\left[ \left( a - 2b \left( \frac{a-MC}{4b} \right) \right) \left( \frac{a-MC}{4b} \right) - MC \left( \frac{a-MC}{4b} \right) \right]}{D^2} \right) + \frac{(1-\sigma)}{D^q+w} (1-u)(\Delta C) \frac{a-MC}{4b} \quad (\text{Eq. 20})$$

This can be contrasted with the case where the supervisor is also the contractor. In this case, the supervisor would face a tradeoff between the potential rents to be derived from granting monopoly and the demand for his/her supervision. Especially when both the probabilities of discovering a lower cost means of provisioning a public good and collusion with the agents who are being supervised are high. In that case the supervisor would be less likely to grant a monopoly over the agent. The counterintuitive result is that in cases where collusion within the bureaucracy is high, the socially optimal solution may

be to devolve hiring decisions to the corruptible supervisors. And because under the assumptions of this model, the supervisor's reward for reporting rent seeking among agents increases when the agents are in close proximity, and assuming the supervisor is located in the capital/primate city (due to economies of scale and accessibility), granting him/her the rights to screen agents under his/her jurisdiction will disproportionately reduce the likelihood of rent seeking in the capital. This results from the fact that, as shown in equations 19 and 20, as the distance between the supervisor and agent decreases, the income received as a result of supervision rises faster under a competitive contract than under a patrimonial/monopolistic contract, increasing  $U_C$  relative to  $U_M$ , and thus reducing the probability that a patrimonial contract will be granted. The negative impact of proximity on the expected net benefit derived from the output of a government agent is expected to be smaller in the case where the same agent is both Recruiter and Supervisor than when contracting and supervision are undertaken by two separate agents. This result is consistent with the argument of Shleifer and Vishny (1993) that centralized bribe taking has a less adverse impact on output because the centralized bribe taker internalizes the adverse effect of corruption on output and thus on other potential sources of bribery.

However, it should be noted that because marginal cost has an unambiguously negative relationship on expected net benefit, and because  $D$  has an ambiguous relationship with marginal cost, as seen in Equation 5, the overall relationship between proximity of an agent to the capital (the location of the Supervisor and Recruiter) is ambiguous.

### 2.2.5. Alternative Assumptions

Future research may also consider whether the predictions of the model hold up when its assumptions are relaxed. This section briefly discusses how the models implications change under different set institutional constraints.

Earlier studies examining the relationship between rent-seeking and urban hierarchies tended to emphasize the positive effect that the presence of government had on capital/primate city growth. Ades and Glaser (1994) argued that due to the potential for collective action, the residents of a country's primate cities had a greater degree of political influence, especially in non-democracies, which gave an incentive for the government to redistribute resources from the hinterland to the capital. Henderson (2002 a/b) argued that government officials, being resident in the capital, internalize the benefits from efficient provision of local public goods, again leading to greater public goods provision in the capital. In both cases, governments place a relatively high value on the provision of public goods in the capital/primate city. The easiest way to incorporate this in the simple model presented above is by simply stating:

$$\sigma_i = f(D_i), \text{ where } \frac{d\sigma_i}{dD_i} < 0 \quad (\text{Eq. 21})$$

Making the institutional parameter endogenous would add an additional confounding element to the relationship between distance and collusion: while the risk involved in engaging in rent-seeking is reduced by proximity between the government and region  $i$ , the marginal utility of rents relative to public goods will also decline. Consequently, the degree to which distance actually encourages the extraction of rents from a region will depend on the specific form of (21).

The basic model assumed that direct rent-seeking by elite government officials was prohibited, thus requiring a side contract with service providers. The roles of the rule-maker and supervisor are limited to creating and enforcing a contract with the supervisor, who then is presumed to receive tax revenue for their services directly. Whether or not the implications of this model hold in the case of governments with no formal controls where the service provider is paid by and acts as an agent of the central government rather than the public depends on the degree to which the ruler's ability to extract rents decays with distance, even in the absence of a strict requirement for collusion. There is reason to believe this is the case, though the emphasis shifts from collusion between two equal parties towards a principal-agent (ruler – service provider) relationship. When a ruler raises the price of a public good, the service provider may gain leverage over the public; they can offer public goods at a slightly lower price than that set by the ruler and pocket the rents. Tax revenue may be lost and instead go to the service provider in the form of bribes. Consistent with the spatial variant principal-supervisor-agent model presented here, the ruler's ability to detect and prohibit this activity may decay with distance.

On the flip side, public goods may have positive marginal utility even for autocrats not subject to formal constraints; the increase in consumer surplus to residents of regions far from the capital may lead to an increase in demand for products produced in the capital, increasing rents that the ruler can extract from capital residents. In addition, if public goods raise the income of non-capital residents, the opportunity cost of participating in rebellions will be higher (Collier and Hoeffler 2004). To the degree that

such a rebellion can spillover to the capital, increasing public goods in the periphery can increase rents in the capital (though both interregional trade and conflict effects are likely to decrease with distance as well). Rulers may consequently be less inclined to extract rents from regions far from the capital both because 1) the rents that can be obtained from a region decrease with distance and 2) public goods may have a positive marginal utility for the ruler in and of themselves, even for an unconstrained, rent-maximizing ruler. This suggests that while the underlying mechanisms are different, even a government without formal constraints on rent-seeking may experience a lower marginal benefit to an increase in price above cost as the distance between consumers and the government increases. The ambiguity in the relationship between consumer surplus and distance from rulers emphasized may thus hold even in cases where collusion between the central government and service providers is not the only means of rent seeking.

Another assumption of the model was that trust was symmetric between politicians and service providers. When the ruler has a high discount factor with respect to rents (i.e. values rents in present but puts a low value on costs to the future), such as in the case of capital-intensive warfare (Ertman 1997), the ruler may wish to sell a government position for a large upfront payment. In this case however, the ruler may have difficulty credibly committing to paying back the potential service provider (North and Weingast 1989). Consequently, the service provider may be characterized as the principle and the ruler/politician the agent. In such a case, because detecting and enforcing rent extracting is difficult at a distance, the ruler may get a better deal by selling a job located far away from the capital, because the principle agent problem that

results from distance provides assurance to the service provider, that they can recoup the amount expended for the position. In the model, this difference between sharing a regular stream of rents and the service provider making an upfront payment for future rents in respect to the role of distance in securing an agreement can be reflected in a change in the size or sign of parameter  $\delta$ . Variation in the temporal aspects of the side agreement provides a source of heterogeneity in the relationship between proximity and rent-seeking which should be a focus for future theoretical and empirical work.

#### **2.2.6. External Challengers**

Distance may also affect the ability of the government to enforce a monopoly. If the price of the public goods reaches a sufficiently high level, some political entrepreneur may be able to overcome respond by paying whatever fixed startup costs are necessary to create an alternative public goods provider and charge a lower price than the government, weakening demand for the government's good and thus lowering the rents that can be gained by selling the office. These illicit public goods may take the form of private schools, hospitals, and mass transportation. Where the necessary scale to start up operations is high and thus difficult to conceal from the authorities even at a distance, the cost of entering the market and competing with central government may include raising a sufficiently strong army to resist the central government military which presumably enforces its monopoly. The costs of setting up this rebel movement are likely to be lower for regions which have lower public goods provision, specifically less transportation infrastructure and education, as this may be reflected in lower wages and thus a lower

opportunity cost for participating in a rebellion; on the flip side, the costs of overcoming this resistance and thus enforcing the government's monopoly may increase with distance, as seen in the difficulty African governments have in quelling insurgencies far from the capital (Weidmann, Hegre, and Raleigh, 2006). These sub national competitors may be either formal or informal. Michalopoulos and Papaioannou (2011) present evidence that economic outcomes in African regions far from capital cities are determined more by quality of traditional, pre-colonial regional institutions rather than the quality of the central government. In addition, Arzaghi and Henderson (2005) find evidence that the larger a country's hinterland population relative to that of the primate city, the more fiscally decentralized a country tends to be. While the authors argue that this results from the weak provision of public goods in the hinterland owing to the inability of central governments to control petty corruption far from the capital, it is also consistent with a lower cost to entry by governments that wish to compete with the central government. This implies that, the further a region is from the capital, government goods provision becomes less monopolistic and more monopolistically competitive. The demand for public goods provided by the central government is likely to be more price (tax) elastic the further the consumers are from the rulers, which would naturally limit the rent that the ruler could extract in return for selling a monopoly over service provision in regions far from the capital. Distance related difficulties in enforcing a monopoly may also preclude efforts to raise demand for, and thus rents which can be extracted from, publicly provided goods in the capital by raising the price of goods in the hinterland.



A simple illustration of this can come in the form of a three stage game, where there are two regions, the capital and the hinterland, initially ruled by a single government, the incumbent. In addition, in each region, there is a potential challenger. Demand for the public good is exogenous and the political economy of rent extraction is similar to that in the patrimonial case. The stages of the game can be characterized as follows:

- The Incumbent chooses a level of output for each region.
- Based on the local level of output of the Incumbent and residual demand, each potential challenger chooses whether or not to enter and, if so, a level of output so as to maximize the rents that can be extracted from the local market.
- If a challenger has entered the market in their home region, they will then compete in the other region based on the output of the Incumbent and other challenger in the first two steps, information on which is presumed to be acquired at zero cost due to specialized human capital or lower opportunity cost which comprise part of the fixed cost of entry.

This game can be solved through backwards induction. Unlike the model of intra governmental rent-suck specified earlier, here the central, incumbent government is assumed to be unitary, with no principal-agent problems with respect to direct service providers; critically, however, the security/policing force which suppresses challenges by other governments is assumed to suffer from monitoring costs. This difference in the costs of monitoring government agents again derives from the role of citizens, consumers as informal monitors of government agents. While they have a shared incentive with the

central government to reduce the cost of public goods and services, and are thus more likely to inform on government agents engaged in petty corruption such bribery (at least absent collusion with the central government) and time theft, they have no incentive to monitor the policing apparatus, whose only function is assumed to be to secure the central government its rents, as a more effect policing force means less potential for intergovernmental competition, and thus less government output. In addition, the Incumbent government is assumed to be essentially unconstrained, and thus rent-maximizing.

Assuming both regions have a demand schedule equal to (7), the rents taken from each region from Incumbent and for each challenger in their local region are defined as:

$$R_{Ij} = Q_{Ij} \left( a - b \left( 2Q_{Ij} + 2Q_{Cj} \right) \right) - Q_{Ij}MC \quad (\text{Eq. 22})$$

$$R_{Cj} = Q_{Cj} \left( a - b \left( 2Q_{Cj} + 2Q_{Ij} \right) \right) - Q_{Cj}MC - \frac{F}{(1+D_j)} \quad (\text{Eq. 23})$$

where the first subscript (I, C) indicates the incumbent and challenger respectively and subscript j indicates the region. Parameter F indicates the fixed costs associated with a challenger entering the market, which are assumed to decline with a region's distance from the capital, D, due to the inability of the government to police distant populations due to principal agent problems.

Differencing (23) with respect to  $Q_C$  and solving obtains the challengers reaction function:

$$Q_C = \frac{a - 2bQ_I - MC}{4b} \quad (\text{Eq. 24})$$

Substituting (24) into (23) and solving for  $Q_I$  results in,

$$Q^*_I = \frac{a - 2\frac{8}{2} \sqrt{\frac{Fb}{D+1}}}{2b} \quad (\text{Eq. 25})$$

This is the production of the Incumbent which will result in no rents for the challenger, thus making the challenger indifferent as to whether or not it will enter the local market. It is obvious (given the assumptions already specified as well as a rational, rent-maximizing opposition) that the output of the incumbent government necessary to deter entrance is declining in  $F$  and rising in  $D$ , reflecting the fact that as fixed costs rise, the residual demand necessary to make entrance into the market worthwhile also increases.

Whether or not (25) is actually binding for the Incumbent government depends on whether or not more rents can be obtained through monopoly or duopoly pricing. Specifically, if  $Q^*$  is lower than the quantity that the incumbent would produce when there is no threat of entrance by additional governments, then it is obvious that the Incumbent will choose to produce the monopoly level output. Solving this inequality for  $D$ , results in

$$D^* = \frac{32Fb}{a^2 - 2aMC + c^2} - 1 \quad (\text{Eq. 26})$$

when  $D < D^*$ , the Incumbent is assumed to choose the level of output consistent with it being a monopolist. For the remainder of the analysis, the capital region is assumed to have  $D < D^*$  while the hinterland has  $D > D^*$ . The Incumbent will thus always act as a monopolist in the capital. This simplifies the analysis by excluding the possibility that there will be more than two governments, as a challenger can only arise from the hinterland.

For the hinterland, the Incumbent can pursue one of two strategies: produce a level of output consistent with (25), thus deterring entrance by a challenger; or allow entrance of the challenger and produce the Stackleberg consistent level of output,  $R^{**}$ . Which strategy proves binding depends on which of the following conditions holds:

$$R_I(Q^*) > R^{**} - R_{Diff\_Capital} \quad (\text{Eq. 27})$$

$$R_I(Q^*) < R^{**} - R_{Diff\_Capital} \quad (\text{Eq. 28})$$

$R_{Diff\_Capital}$  is the difference between the rents under monopoly and the rents under

Stackleberg duopoly for the capital region. When (27) is true, the Incumbent will choose to deter entrance by increasing output such that the rents that the challenger can obtain from the residual demand is low enough as to not cover the fixed costs, while if (28) were true, the Incumbent would choose to allow entrance by the challenger in the hinterland.

The Incumbent takes into account the cost that could result from potential competition from the challenger not just in the hinterland where the challenger is assumed to arise, but in the capital as well in step 3 of the game ( $R_{Diff\_Capital}$ ). One specific implication of this model is that (25) is more likely to bind as demand for the public good rises relative to the hinterland. Distance from the capital will thus tend be associated with greater central government output in countries with high urban primacy. At extreme levels of urban primacy and D, the incumbent government would be willing to extract zero rents from the hinterland, as doing so would be necessary to reduce entrance by a potential competitor, and thus prevent a loss of rents in the capital. While, consistent with traditional theories of urban primacy, rent extraction from the hinterland

may be associated with increases in urban primacy due to the expenditure of those rents in the capital, this model implies that this fiscal expansion mechanism may be less salient when the level of urban primacy is already high. This is because of the size of the hinterland (and thus the rents that may be extracted) will be reduced as a fraction of the capital city's economy and because of migration from the hinterland to the capital. However, the rate of rent-seeking in the hinterland will also be reduced as a result of the threat to revenue extracted from the capital posed by a political challenge from the hinterland will dominate consideration of the revenue that can be derived from the hinterland itself. The only time this will not hold is in the extreme case where the hinterland's population/economy is so small that the residual demand is not enough to support the fixed costs of organizing a government for a potential challenger. This implies that to the degree that fiscal expansion results in high levels of primacy by the capital, it is likely to do so with a lag, as the rents extracted from the hinterland are likely to be highest both on an absolute and per capita basis, when the capital is relatively small. This would indicate that empirical analysis that link fiscal policy to short-run changes in urban primacy may be suffering from endogeneity or some other statistical artifact. In the terminology of the New Economic Geography (Krugman 1991 a, b/1996), the role of fiscal expansion may potentially be that of a short term shock that shifts a country's urban hierarchy from one characterized by low primacy/small capital city, to a high primacy/large capital equilibrium.

The above model was simplified for the sake of tractability. For instance, because it uses a standard duopoly framework to explain government behavior, it does not model

the types of winner-takes-all types of games that are more typical in the conflict and rent-seeking literature. The Incumbent government thus has no chance to actually collapse, but only lose some (but not all) rents. One way of incorporating this type of winner takes all dynamic is to add a fourth stage to the game where a winner is chosen by a standard (Tullock 1980) contest success function

$$P_I = \frac{R_I}{R_I + R_C} \quad (\text{Eq. 29})$$

where  $P_I$  is the probability that the Incumbent will win the conflict and  $(1 - P_I)$  is the probability that the challenger will win. This makes the plausible assumption that rents can be translated into political support for a government. If we assume that governments wish to maximize their probability of survival, it becomes obvious that they do not simply wish to maximize their own revenue but reduce the revenue of their challenger. Under these conditions, it is clear that the Incumbent will be even more inclined to prevent entry by a challenger, and thus will increase output in the hinterland accordingly.

Of course, winner takes all may not be the inevitable outcome. Specifically, if both sides in the contest for control of the country are subject to constraints on their soldiers and other agents, then a stalemate with the de facto split of the country into two may be a more realistic outcome (see Saber Mahmud and Vargas 2011) as neither side will be able to accumulate a critical amount of strength to overcome resistance of the opponent in their home territory. Similarly, the model up to this point has assumed that once established in one province, a challenger may enter the other regional market

without cost. In reality the government may have an incumbent's advantage there as well, with a fixed cost, though perhaps with a smaller  $F$  and rising in  $D$ , which applies to a challenger attempting to enter another region (given the assumption of the model up to this point, the capital). Imposing a sufficiently high fixed cost to market entry by region rather than by country would tend to mitigate the threat that the Incumbent faces from a challenger arising in the hinterland moving into the capital. This would make it less likely that (25) binds in the hinterland. (25) is more likely to bind in the case of the capital, as the central government has an incentive to raise output in the capital in order to deter a challenge from a government arising in the hinterland. In this case, a challenger may arise, but be restricted to the hinterland. In this case,  $R_{Diff\_Capital}$  represents the

difference between revenue under a pure monopoly and revenue under the level of output associated with deterring entrance from the hinterland, which will necessarily be lower. There might consequently be a de facto devolution of some revenue raising authority to the hinterland that can be analogized to fiscal decentralization.

The choice between a winner takes all outcome and a peaceful outcome may also endogenous the amount of rents at stake. Because conflict consumes resources that would otherwise go to consumption, both sides may find it in their interests to come to a settlement unless the rents that can be obtained by being the incumbent in the next round are considerable. Formally, and assuming a zero discount rate for future rents, objective functions under both 'war' and 'peace' can be stated as:

$$U_{WI} = R_{It} + P_I * R_{I(t+1)} - C_I$$

$$U_{WC} = R_{Ct} + (1 - P_I) * R_{I(t+1)} - C_C \quad (\text{Eqs. 30})$$

$$U_{PI} = R_{It} + R_{D(t+1)}$$

$$U_{CI} = R_{Ct} + R_{D(t+1)} \quad (\text{Eqs. 31})$$

where C is the amount the faction spends on conflict and  $R_D$  is the rent that is obtained in

equilibrium under a duopolistic, simultaneous move game, with  $R_D < R_I$ , budget

constraint,  $C < R_t$ , and substituting C for R in (29). The war state is assumed to hold

when  $U_W > U_P$  for either the incumbent or challenger; if, however,  $U_W < U_P$  for both

factions, then a peaceful state prevails. Making appropriate substitutions and rearranging

terms in the former inequality, a state of war can be said to prevail when either of the

following equations holds:

$$R_{I(t+1)} > (R_{D(t+1)} + C_I) * \frac{(C_I + C_C)}{C_I}$$

$$R_{I(t+1)} > (R_{D(t+1)} + C_C) * \frac{(C_I + C_C)}{C_C} \quad (\text{Eqs. 32})$$

The values of C for both factions under the conflict state can be derived from the modeling in Che and Gale (1997), where the authors solve equilibrium rent dissipation under a lottery type contest function with budget constraints (see paper for details).

Specifically, when (as will be assumed for the remainder of the analysis<sup>10</sup>)

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<sup>10</sup> Where  $R_{I(t+1)} \geq \frac{(R_{It} + R_{Ct})^2}{R_{Ct}}$  does not hold, the wealthiest faction, likely the incumbent due to the first move advantage, is not necessarily budget constrained. In such a case, the equilibrium level of expenditure (Che and Gale 1997) by the incumbent is  $C_I = \sqrt{(R_{I(t+1)} * R_{Ct})} - R_{Ct}$ . The relationship between  $R_{I(t+1)}$  and probability of conflict when the stakes ( $R_{I(t+1)}$ ) are sufficiently low is thus



$R_{I(t+1)} \geq \frac{(R_{It} + R_{Ct})^2}{R_{Ct}}$ , then both factions will be budget constrained such that  $C_I = R_{It}$

and  $C_C = R_{Ct}$ . In practice, this result would never occur for a two period game as

described above, because, anticipating the potential for all current rents to be dissipated in conflict, the incumbent may simply choose to exclude entrance by a challenger by expanding output in the hinterland. However, in a perpetual game there may be multiple incumbents due to anticipated rents from retaining an incumbent advantage being low enough in earlier periods for the incumbent to both allow entrance by a challenger and for peace to prevail. In such a case, and assuming underlying demand functions for the government goods does not change, then it is possible that  $R_{Dt}$  can be substituted for

$R_{It}$  and  $R_{Ct}$ , and  $R_{Dt} = R_{D(t+1)}$ . After making appropriate substitutions, (32) can be

rewritten as:

$$R_{I(t+1)} > 4R_{D(t+1)}$$

Winner takes all conflict is thus more likely to break out when the future rents that can be extracted from incumbency are sufficiently large relative to the future rents that can be derived from a duopolistic market with simultaneous moves. It is clear that  $R_{I(t+1)}$  will rise relative to  $R_{D(t+1)}$  with the level of urban primacy as the incumbent is

able to retain monopoly rents from large capital by only giving up a relatively small amount of rents in the hinterland (due to increased output to deter entrance by a new

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ambiguous, as an increased potential for rent-seeking by a future incumbent raises the cost of conflict for the current incumbent as well as the expected benefit of engaging in the conflict.

challenger). Consequently, urban primacy can be expected to be positively associated with conflict in situations where there are multiple incumbents. However, in the situation where there is only one incumbent government, urban primacy may be associated with lower conflict as the no entrance condition (27) will be more likely to hold.

Another possible expansion would be to make the security costs that the Incumbent imposes on potential challengers,  $F$ , endogenous to initial government revenue. If an additional step was added before the first move, where, prior to the challenger's entrance, the Incumbent government is able to convert rents from the previous game into increased security. While such a modification would seem to increase the incentive for the Incumbent to raise initial rents, it should not change the relationship between distance and output. Expenditures would still become less effective in suppressing challenges the further the hinterland is from the capital.

An additional expansion could be made by assuming that variable costs for both players, rather than being fixed, increase with distance from their respective headquarters. This could be the case because the ability of the political faction to monitor goods providing agents becomes more difficult with distance and because local consumers of the public good do not have the technical expertise or time necessary to detect shirking or other types of passive corruption (i.e. not bribery). In this case the incumbent would find it more expensive to provide public goods than the potential challenger in a distant hinterland. Thus preventing entrance may require that the incumbent government provide the good at below cost. The incumbent may choose to do this in equilibrium if the capital region is large enough relative to the hinterland in order to deter a challenger from

entering the market for public goods or engage in military conflict with the government, especially if it is assumed that the challenger can shift headquarters from the hinterland to the capital without cost and thus not incur the increases in marginal costs associated with operating in the capital from the hinterland. In this case, the no entrance equilibrium would be financed from rents extracted from the capital, and may be viewed as an interregional transfer from the core to the periphery. However, if there were an adverse negative shock to external demand for a country's exports, which would be expected to disproportionately affect the formal and/or advanced sector located in or passing through the larger capital region, then the government, especially if it is budget constrained, may be unwilling or unable to make these interregional transfers. This will in turn lead to entrance by a challenger in the hinterland, who, anticipated the negative economic shock to be temporary, may challenge the incumbent for control of the country and thus future rents that accrue to incumbents through control of the capital. Even if the government could will little time and resources shift the headquarters from the initial capital region to the hinterland and thus prevent the rise of a challenger in the hinterland, unless the new capital produced sufficient level of rents to subsidize government operations in the hold and now distant capital, a challenger would simply arise in the old capital. Economic shocks would thus lead to political fragmentation and, if both agents have sufficiently low discount rates, conflict.

This in turn implies that if the effect of distance on marginal costs is sufficiently strong, and if urban primacy is low, then there would be little incentive for the faction headquartered outside a region to expand their production in that region, as they would be

at a strong cost disadvantage relative to the opponent headquartered in the region. This would possibly result in both the incumbent and challenger having dominant positions in the capital and hinterland regions respectively which may be viewed as the equivalent of a de facto territorial partition. Consequently, and contrary to traditional explanations of urban primacy which argue that the primate/capital city benefits from having a large hinterland to exploit, such a model would imply that the willingness and ability of a government to control a large jurisdiction is determined by the existence of a large capital providing sufficiently large rents to subsidize the hinterland and prevent the rise of potential challengers.

Such a model seems consistent with the narrative told by Bates (2008) of the course of political development of post-colonial African states. For most of their existence, sovereign African governments were authoritarian and rent-seeking. Governments maintained power through a combination of coercion and interregional transfer schemes meant to maintain the loyalty of groups outside the capital. However, following the end of the Cold War, the loss of military aid (lower F), and ailing economies reduced both the governments' ability to pay the army, and thus coerce and pay-off potential political opponents, leading to widespread unrest, the development of 'warlords' in the hinterland, and sometimes full government collapse. The relationship between urban primacy, economic shocks, and political instability is explored empirically in the next chapter.

The general model of external constraints is also consistent with the empirical findings of Arzaghi and Henderson (2005), where a fiscal decentralization measured in

the percentage of revenue raised by local governments was negatively related to the concentration of a country's population in the largest city. As the population of the hinterland increases relative to the capital, the potential rents that can be extracted from the hinterland become more important for the government's decision as to whether or not to allow entrance by a challenger in the hinterland. The model predicts that the central government may wish to charge a higher than cost price for public goods and services when the capital is small relative to the hinterland, even if that induces entrance by the challenger, because the potential loss of monopoly rents in the capital become smaller. To the degree that the challenger and government can come to some settlement that gives the local government constitutional legitimacy, this could explain the tendency for country's with low levels of urban primacy to have higher levels of fiscal decentralization. Similarly, the model finds support in the anecdotal evidence in Herbst (2000) and the statistical evidence in Hegre and Raleigh (2005) that sub national regions in Africa are more likely to experience anti-government violence when they are simultaneously densely populated and far from the capital, if it is assumed that such incidents are indicative of the entrance of new 'governments'. On the other hand, as the level of urban concentration increases, the model would predict that formally decentralized countries would become more centralized, as the benefits from being the sole incumbent increases with urban primacy.

This model indicates that even in the case where principal-agent problems are not an issue, external agents could act to reduce the government's ability to extract rents from its populace by lowering output and raising the price of public goods and services. This

may result in a situation where the hinterland experiences lower levels of rent-extraction than the capital, in contrast to traditional models of urban primacy which typically assume the hinterland is taxed at the same or greater rate than the capital. This hypothesis will be tested in the fourth chapter.

#### **2.2.7. Empirical Implications**

This chapter identified several macro and micro-level empirical predictions that will be tested in the next chapter.

On the macro, country scale, both the principal-agent and external challenger models predict that increased population concentration in and around the capital should be associated with greater levels of rent-seeking by government elites and lower levels of government quality. This is due to the fact that rent-extracting agents in the capital, whether service providers or coercive agents, should be easier to monitor in the capital relative to the hinterland due to greater proximity, leading to less leakage through rent-diverting agents or political challengers. This raises the benefits to the government of pursuing rent seeking policies relative to the costs of pursuing such policies, where the latter takes the form of de jure sanctions such as elections or de facto threats such as coups and civil wars. The primary alternative hypothesis, discussed in the introduction, holds that greater proximity to government gives residents of the capital greater political influence, leading to greater transfers from the hinterland to the capital and the growth of the capital relative to the hinterland. So while both models would predict that urban primacy may be correlated with lower government quality, the causal direction differs. The models presented in this chapter argues that urban primacy facilitates rent-seeking,

while the alternative emphasizes that urban primacy is the outcome of rent-seeking as well as a cause. This hypothesis is tested in Chapter 3 using cross-sectional evidence at the country level, with the causal relationship identified using two-stage least squares (2SLS).

The external challengers model identified another effect of urban primacy on country-level outcomes. Specifically, an exogenous increase in urban primacy may, under certain conditions, increase the risk of political instability. This results from the increased benefits that accrue to the ruling elite in the context of high urban primacy, raising the stakes of political conflict relative to the costs. While the higher rents may facilitate the retention of power by incumbent governments by giving them the rents to pay for increased security or transfers to the hinterland, these incumbent advantages may be undermined in the short run by negative economic shocks. The combination of 1) high urban primacy and 2) negative economic shocks would thus be expected to be correlated with an increased risk of regime change. By contrast, the traditional story of the political economy of urban primacy implies that rents, and thus the benefits in being a country's ruler should be lower as urban primacy increases, as the movement of the population from the hinterland to the capital should give greater de facto power to the population, and thus lower pool of potential total rents (due to the relative decrease in the size of the hinterland) and increasing the distribution of those rents (due to the increase in the size of the number of political 'elites' in the capital. This hypothesis is tested using country level panel data of country leadership changes and urban primacy in Section 3.3.

Finally, the theory presented in this chapter predicts that there should be variation in the level of government quality within the country. Specifically, the quality of government services should be lower in the capital relative to the hinterland. This is due to the greater ability of the ruling elite to monitor their agents, raising the benefits of rent seeking, and suppress challengers in capital relative to the hinterland, thus lowering the costs. This prediction provides perhaps the starkest contrast with traditional narrative which holds that the political influence that results from proximity to government leads to increased service provision of the capital relative to the hinterland. This hypothesis is tested using both objective, city-level cross-sectional data on government service provision (Chapter 3) and cross-country survey data of firms in developing countries (Chapter 4).



## CHAPTER 3: MACRO-LEVEL EVIDENCE

### 3.1. Data and Methodology

The theory presented in the previous section suggests a relationship between the cost of public good/service provision and the distance between governments and their agents, due to the differing effects of distance on collusion/rent-seeking and oversight. However, it is unclear whether the provision of goods is more efficient/costly to residents of a country's hinterland or its capital, where both supervisors and the officials responsible for deciding the terms of agents' contracts are assumed to reside. In this part of the paper, an empirical analysis is undertaken in an attempt to clarify this ambiguity and test specific assumptions of the stylized model presented in the previous section. Because of data limitations, the variables used in the analysis are aggregated to the country level. The base empirical model takes the form of a linear equation,

$$\begin{aligned} GOVEFFECT_{it} &= \beta_1 CAPPOP + \beta_2 POLITY + \beta_3 (CAPPOP * POLITY) + \beta_4 CHECKS \\ &+ \beta_5 (CAPPOP * CHECKS) + \beta_6 POP + \beta_7 URBAN + \beta_8 DENSITY \\ &+ \beta_9 GDPPC + \beta_{10} BRITISH + \beta_{11} GOVEFFECT1996 + year\ effects \\ &+ e_{it} \end{aligned}$$

,where i indicates the country and t the year of the observation.

The proxy for government output, GOVEFFECT, is the country score from the World Bank's Government Effectiveness governance indicator (Kaufmann, Kraay, and Mastruzzi 2009). This index is a composite of indicators of government effectiveness

from experts assessments (NGOs, governments, and business risk consultants) as well as survey responses (both households and firms) concerning their perceptions of the quality of a country's civil service, its independence from political interference, the quality of government outputs, and bureaucratic delays. The indicator is available for the period 1996-2008, is comparable across years, and has wide coverage. The index ranges from -2.5 to 2.5, with higher scores on the index associated with greater government effectiveness.

To test of the validity of GOVEFFECT, it was compared to another indicator of government quality, the "Weberianness Scale" created by Evans and Rauch (1999). The scale was created from survey responses from experts of specific country governments and seeks to measure the degree to which government recruitment and advancement is dependent on meritocratic, rules based criteria as opposed to through political appointment as well as the degree to which salaries of civil servants are based on bribes for the years 1970-1990. Under the model described above, increased proximity may lead to greater potential for collusion between civil servants and politicians as well as a greater degree of patrimonial hiring, reflected in increases in bribery and/or political appointment. This indicator thus more directly reflects the mechanisms by which distance between service providers and politicians would affect government effectiveness, as opposed to the GOVEFFECT, which measures perceptions of overall quality. Unfortunately, the Weberianness Scale is only available for 35 countries. Thankfully, the correlation between GOVEFFECT (in 1996, the closest year to the period the Weber Scale measures) and the Weber Scale is a substantial .67 ( $N = 35$ ), indicating that

GOVEFFECT captures the features of governments which are predicted to be sensitive to distance. In addition, when GOVEFFECT is regressed on the Weber Scale and (logged) GDP per capita (N=34, results available on request), it remains statistically significant with the expected direction (i.e. greater Weberianness is associated with higher government quality). This is consistent with the correlation between the two indices is thus the result of more than the fact that more developed countries have a more rules-based government and greater government effectiveness due to superior technology.

**Table 3.1. Relationship between GOVEFFECT and Weberianness.**

	(1)	(2)
Weberianness Scale	0.1864479***	0.0882062***
	(0.0403782)	(0.0278393)
GDPPC		0.4604319***
		(0.0487898)
Constant	-1.199993***	-4.122537***
	(0.2995369)	(0.3987685)
N	35	34
Adjusted R <sup>2</sup>	0.4284	0.8086

\* $<.10$ , \*\* $<.05$ , \*\*\* $<.01$ . Clustered Standard Errors in Parentheses

The proxy for the mean distance between the government and its agents, CAPPOP, is the percentage of the country's population residing in the capital city. The intuition behind the use of this variable is simply that in the presence of non-trivial transportation/accessibility costs, an exogenous increase in the number of residents living in the capital city, will, in equilibrium, increase the mean proximity of government agents to the politicians with contracting and supervisory authority. To account for the potential for diminishing marginal effects of average distance on the incidence of collusion and

rent seeking, this variable is logged. Specifically, there may be a maximum number of collusion-facilitating relationships which politicians in the capital can plausibly maintain, regardless of the size of the capital metro area. Capital city population data was taken from the United Nations' 2007 Revision of the World Urbanization Prospects. Data is available for countries with capitals larger than 750,000 in 2000, and all capitals in the years 2005 and 2007, limiting the sample to those three years.

POLITY is an index of autocracy/democracy produced by the Polity 4 Project (Marshall and Jaggers, 2010). The index ranges from -10 (most autocratic) to +10 (most democratic). This variable is included to test for the assumption that in countries with more transparent/accountable institutions rent-seeking in government will be less prevalent. Under the assumptions of this paper's stylized model, the potential rents derived from bestowing a monopoly on a government position plays less of a factor in the decision making of politicians in relatively democratic governments. In addition, because potential rents are themselves a function of distance, the expectation is that any negative effect of CAPPOP on government effectiveness will be mitigated under relatively open, democratic institutions. To test these hypotheses, POLITY is included both separately and in an interaction with CAPPOP.

The other institutional effect predicted by the model is that in governments where the same agent is responsible for both contracting and supervising, agents will be less likely to grant monopoly contracts. This is due to the tradeoff between potential rents and the revenue agents receive from supervisory activities. To test this hypothesis, the CHECKS index of checks and balances from the World Bank's Database of Political

Institutions is included in the regression (Keefer and Stasavage 2003). Higher values of CHECKS indicate a larger number of veto players within a government as well as a greater degree of political division (controlled by opposing political parties) between different government bodies (legislature and president). If the members of the legislature have the ability to write regulations concerning who can fill a government position or have veto authority over the president's choice of who can occupy certain government posts, and if the majority of its members are affiliated with a political party opposed to the president, it would be expected that the legislature would be more likely to extract rents from those seeking a monopoly access to government positions. This is because, unlike the president, they do not exercise regular oversight over the bureaucracy, and therefore are not compensated in terms of wages for greater productivity. Different political affiliations would also complicate any ability of the president to exercise influence over the legislature. The coefficient for this variable is expected to be negative, reflecting the inability of politically and institutionally divided governments to internalize the costs of rent seeking. An interaction variable for CHECKS and CAPPOP is also included to test the proposition that the effects of proximity between government workers and political officials has a smaller impact on rent seeking when a government is less divided.

In addition to the theoretical explanatory variables, the base empirical model also includes several control variables. POP is the logged population of the country (World Bank). In the presence of fixed costs in government (Alesina and Spolaore 1997; Arzaghi and Henderson 2005), large countries would be expected to have lower average costs,

and thus be perceived as more effective. On the other hand, larger populations lead to greater competition for government favors (Fisman and Gatti 2002), undermining government effectiveness. POP is included to control for these possible scale effects.

In the base model, a country's urbanization rate, URBAN (UN Urban Prospects, and population density, DENSITY (population and land area data taken from the World Bank), are also controlled for. These variables are proxies for the overall level of concentration of the country's population. More concentrated populations may make the provision of government goods and services less costly, due to lower transport costs and thus the ability to exploit economies of scale in production. In addition, greater population density and urbanization outside the capital/primate city may be associated with greater levels of fiscal decentralization (Arzaghi and Henderson 2005), which has been associated with lower corruption (Fisman and Gatti 2002).

The base empirical model includes two other structural variables which have been found to be empirically associated with effective governance (La Porta, et al. 1999). Logged per capita GDP (World Bank), GDPPC, is included to control for the possibility that investments in effective governance is likely to be greatest when the returns to government are high. These returns may be highest when the country is already relatively productive. BRITISH is a dummy variable that takes a value of 1 when a country has a British-style legal system. Common law legal systems may empower citizens in relation to their government thus increasing accountability and government effectiveness. The coding of this variable is taken from Laporta et al (1997).

Alternative specifications of the base model included additional control variables, though in the interest of parsimony and because of incomplete coverage by some of these variables, they were entered into the model one at a time. GOVREV is government revenue as a % of GDP (World Bank); governments with more resources may be more effective. Alternatively, a higher cost of government in the form of taxes may lower perceptions of government effectiveness. FEDERAL is the tax revenue of local governments as a percentage of total government tax revenue, averaged over the year 1996-2000 (World Bank); this is a more direct measure of decentralization than the density variables, but available for a smaller number of countries. ETHFRAC is a measure of the ethnic fractionalization of a country, and is the probability that any random pair of residents will be of the same ethnicity. The residents of ethnically fractionalized countries may have a greater heterogeneity in preferences for public goods, which could limit the ability of the government to exploit economies of scale (Alesina and Spolaore 1997). It is calculated from ethnic data taken from the 1964 Soviet Atlas and is taken directly from Fearon and Laitin (2003). Finally, regional effects are included to represent unobserved spatial or cultural factors that influence government quality. Regions include the western countries plus Japan (WESTERN), Eastern Europe (EEUROP), Latin America (LAMERICA), Asia minus Japan (ASIA), North Africa and Middle East (NAFRME), and Sub-Saharan Africa, which is used as the base. Regional definitions are taken from Fearon and Laitin (2003).

To control for unobserved factors that affect government performance and are fixed over time, the value of the Government Effectiveness indicator in 1996 is included

in all models. Year effects are also included to account for heterogeneity across time (year 2000 as the base). The models estimated using Pooled Ordinary Least Squares (OLS)<sup>11</sup> and General Least Squares (GLS) with Random Effects are reported here. Standard errors are clustered by country and are thus robust to heteroskedasticity and temporal autocorrelation.

One issue that arises with this base specification is that a conditional negative correlation between government effectiveness and the concentration of a country's population in the capital is potentially consistent with a traditional story of governments transferring rents from the hinterland to the capital. This is because the lower level of public goods provision in the hinterland implied by the traditional core periphery hypothesis may be reflected in the GOVEFFECT, due to the fact that the latter is a country-level, rather than regional level variable. Consequently, a negative correlation between GOVEFFECT on CAPPOP may reflect a positive effect of increased corruption on population concentration in the capital, rather than the effect of increased population concentration on corruption and government effectiveness due to the increased ability of high-level government officials to monitor and extract rents from service-providing agents. To account for this source of endogeneity, a two-staged least squares (2SLS) regression is run where in the first stage, the contemporary endogenous predictor variables (CAPPOP, POLITY, CHECKS, and their interactions) are regressed on the

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<sup>11</sup> Given the high similarity between the OLS and GLS results, unless otherwise noted, the discussion of the results refers to the OLS regressions. The regressions were also run with fixed effects, but due to the short time period from which the observations were taken, the estimates FE estimates suffered from a high degree of noise, with no variables having statistically significant coefficients. Consequently, the fixed effect results are not reported.



other predictor variables along with lags of the endogenous and exogenous predictor variables (CAPPOP in 1970<sup>12</sup>; POLITY in 1970, 1980, 1985, and 1990; CHECKS in 1975, 1985, and 1995; the interactions between lagged CAPPOP and the lagged POLITY and CHECKS, logged GDPPC in 1970, logged urban population in 1970, logged total population in 1970), under the assumption that these lags will only effect present government quality through their effect on present day institutions and population concentration, conditional on the exogenous predictors. While it is plausible that this exclusion restriction would be violated if there is path dependence in government quality, and thus past government quality affected past population concentration, this is accounted for in the base specification by included GOVEFFECT in 1996 as a control.

### **3.2. Results**

OLS and 2SLS results (using CAPPOP in 1970 as an instrument) for the core empirical model excluding interactions is presented in the Table 3.3. CAPPOP has a negative and significant association with government effectiveness in both regressions, indicating that the average effect of the concentration of the population in the capital for country level perceptions of government effectiveness is negative. This is consistent with the collusion and/or repression mechanisms detailed in the theoretical models. In addition, the 2SLS coefficient is larger than the OLS coefficient, indicating a downward bias is the magnitude of the OLS results; this is consistent with poor governance causing a decrease in the size of the capital relative to the hinterland. This is also consistent with the

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<sup>12</sup> In addition to the United Nation's Urbanization Prospects, lagged CAPPOP is supplemented by data from Vernon Henderson's World City Data.  
<http://www.econ.brown.edu/faculty/henderson/worldcities.html>

theoretical model in so far as it would be expected that capital residents would experience a greater deadweight loss due to higher rent extraction in the capital.

**Table 3.2 – Descriptive Statistics, Year 2000**

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Government Effectiveness Index</b>	196	.0013582	1.016322	-2.245215	2.257568
<b>CAPPOP</b>	110	.0001713	.0001625	4.30e-06	.0009995
<b>POP</b>	197	3.05E+07	1.19E+08	19129	1.26E+09
<b>POP (logged)</b>	197	15.29791	2.155389	9.858961	20.95647
<b>DENSITY (logged)</b>	197	4.151873	1.49846	0.425791	9.657247
<b>URBAN</b>	186	0.54086	0.239252	0.085282	1.000231
<b>DENSITY (logged)</b>	197	269.2955	1263.418	1.530801	15634.68
<b>IMPORTS</b>	177	46.83737	24.12603	0.589956	138.8181
<b>EXPORTS</b>	177	41.91309	26.02629	0.494646	150
<b>GDP per capita</b>	185	6544.858	9984.061	84.94586	56459.16
<b>GDP per capita (logged)</b>	185	7.638366	1.615297	4.442014	10.94127
<b>POLITY</b>	158	2.898734	6.592014	-10	10
<b>BRITISH</b>	212	0.084906	0.279401	0	1
<b>FEDERAL</b>	55	19.84539	12.69148	1.265227	52.27656
<b>ETHFRAC</b>	152	0.413502	0.276754	0.001	0.925035
<b>GOVREV</b>	82	25.00536	10.66936	3.7338	48.39618
<b>CHECKS</b>	167	2.850299	1.527376	1	8

**Table 3.3. OLS and 2SLS results without interactions**

	<b>GOVEFFECT</b>	
	<b>OLS</b>	<b>2SLS</b>
<b>CAPPOP</b>	-0.0821038**	-0.1022345**
	(0.0375528)	(0.0394163)
<b>POP</b>	-0.0280877	-0.0460727**
	(0.022129)	(0.0224898)
<b>URBAN</b>	0.0209822	0.00594

	(0.1683194)	(0.2142058)
<b>DENSITY</b>	0.0000777***	0.0000917***
	(0.0000251)	(0.0000306)
<b>GDPPC</b>	0.1670789***	0.1670789***
	(0.0333755)	(0.0333755)
<b>POLITY</b>	0.0185051***	0.0194983***
	(0.003914)	(0.0051145)
<b>BRITISH</b>	-0.0049783	0.0007046
	(0.0613755)	(0.0674746)
<b>WGILag</b>	0.6457124***	0.6373202***
	(0.0417261)	(0.0592099)
<b>Y2005</b>	-0.1125971***	-0.1459879***
	(0.0282148)	(0.0323241)
<b>Y2007</b>	-0.1464727***	-0.1474694***
	(0.0355347)	(0.0408785)
<b>Constant</b>	-1.647858***	-1.592404***
	(0.3579195)	(0.4727438)
<b>N</b>	402	275
<b>Countries</b>	152	97
<b>R^2</b>	.9102	.9327
<b>Hanson J-Statistic P-Value</b>		.5574

\*<.10, \*\*<.05, \*\*\*<.01. Clustered Standard Errors in Parentheses

Because of a high correlation between GOVEFFECT and other world governance indicators, in the next table, the government effectiveness index is replaced with the WGI's Voice and Accountability, Political Stability, Control of Corruption, Regulatory Quality, and Rule of Law in Tables 3.4 and 3.5. These indices are perhaps more direct measures of rent-seeking behavior than GOVEFFECT, which in our model is the outcome of rent-creating policies. In each case, the coefficient on CAPPOP is negative and of the same magnitude as for the government effectiveness index, though only in the case of control of corruption was the OLS coefficient significant. With the exception of

political stability, all the 2SLS coefficients are significant and larger than their OLS counterparts. The results are thus consistent with increases in urban primacy leading to worse governance, specifically greater rent-seeking on the part of government.

**Table 3.4. World Governance Indicators, OLS and 2SLS**

	<b>VOICE</b>		<b>STABILITY</b>		<b>CORRUPTION</b>	
	<b>OLS</b>	<b>2SLS</b>	<b>OLS</b>	<b>2SLS</b>	<b>OLS</b>	<b>2SLS</b>
<b>CAPPOP</b>	-0.0573721 (0.0366888)	-0.0952722** (0.0438708)	-0.0638315 (0.0498178)	-0.1065555 (0.064348)	-0.08493** (0.042378)	-0.1377195*** (0.051160)
<b>POP</b>	-0.0088978 (0.0181914)	-0.0377255 (0.0235701)	-0.076382** (0.0318034)	-0.1304083** (0.0411296)	-0.0484584* (0.027098)	-0.0934279*** (0.032314)
<b>URBAN</b>	-0.0880143 (0.1907748)	-0.1475005 (0.2222928)	-0.1225352 (0.2546353)	-0.1295257 (0.2972639)	0.0472162* (0.275085)	0.3327105 (0.277022)
<b>DENSITY</b>	0.0000372* (0.0000187)	0.000047** (0.000021)	0.0000649 (0.0000438)	0.0001073** (0.0000343)	0.000065** (0.000032)	0.0000817** (0.000034)
<b>GDPPC</b>	0.1632744* (0.0297377)	0.1816815*** (0.0324509)	0.2132273*** (0.040922)	0.2024808*** (0.0487792)	0.153048*** (0.050629)	0.1691517*** (0.056603)
<b>POLITY</b>	0.0561678* (0.0063278)	0.058456*** (0.0077508)	0.0117926* (0.0063587)	0.0203056** (0.0084953)	0.009633* (0.004869)	0.0115043* (0.006398)
<b>BRITISH</b>	-0.0194838 (0.0738733)	-0.0587387 (0.0751671)	-0.2280853** (0.1042695)	-0.2487241** (0.1169931)	0.01989 (0.079095)	-0.0545006 (0.090892)
<b>WGILag</b>	0.4971818* (0.0521976)	0.4703926*** (0.0573145)	0.5129749*** (0.0559329)	0.5137846*** (0.0708502)	0.618896*** (0.054891)	0.6390329*** (0.059998)
<b>Y2005</b>	- 0.0863884* (0.0366888)	-0.0761123** (0.0438708)	-0.1870786*** (0.0498178)	-0.234567*** (0.064348)	-0.11697*** (0.042378)	-0.1513856*** (0.051160)

	(0.0272855)	(0.0302792)	(0.0506787)	(0.0560774)	(0.034007)	(0.034926)
<b>Y2007</b>	- 0.1384203* **	- 0.1233429***	-0.2060128***	- 0.2627623***	-0.15314***	-0.1627369***
	(0.0338828)	(0.0379404)	(0.0574157)	(0.0629705)	(0.047108)	(0.049784)
<b>Constant</b>	- 1.821066** *	-1.80187***	-0.9517164**	-0.3540461	-1.47086***	-1.21415**
	(0.3095627)	(0.3503449)	(0.471066)	(0.5891315)	(0.502544)	(0.5569575)
<b>N</b>	402	275	402	275	369	258
<b>Countries</b>	152	97	152	97	137	90
<b>Adjusted R^2</b>	0.9197	.9203	.7158	.774	.8736	.9066
<b>Hansen J-Statistic</b>						
<b>P-Value</b>		.3885		.4141		.2251

\*<.10, \*\*<.05, \*\*\*<.01. Clustered Standard Errors in Parentheses

**Table 3.5. World Governance Indicators, OLS and 2SLS**

	<b>REGQUALITY</b>		<b>RULEOFLAW</b>	
	<b>OLS</b>	<b>2SLS</b>	<b>OLS</b>	<b>2SLS</b>
<b>CAPPOP</b>	-0.0485603 (0.0440752)	-0.1329677** (0.0515267)	-0.0305017 (0.0368392)	-0.0852717* (0.0435794)
<b>POP</b>	-0.0192548 (0.0252114)	-0.0776536** (0.0309619)	-0.0265771 (0.0280504)	-0.0463234* (0.0254693)
<b>URBAN</b>	-0.3802733 (0.2921159)	-0.6553254* (0.3311202)	-0.1326076 (0.2238883)	-0.0914943 (0.2485961)
<b>DENSITY</b>	0.0001558*** (0.0000325)	0.0001801*** (0.0000362)	0.0000556** (0.0000236)	0.0000718*** (0.0000253)
<b>GDPPC</b>	0.2986403*** (0.043197)	0.3812558*** (0.0476476)	0.1296183*** (0.0419996)	0.1182159** (0.0513686)
<b>POLITY</b>	0.0342958*** (0.0054179)	0.0277351*** (0.0065241)	0.005216 (0.0053447)	0.007236 (0.0052449)

<b>BRITISH</b>	0.0775092	0.0112672	0.0039036	-0.0647429
	(0.0953229)	(0.1054839)	(0.0741683)	(0.0748911)
<b>WGILag</b>	0.3805359***	0.3225354***	0.7253873***	0.7647423***
	(0.0582582)	(0.0782208)	(0.0546682)	(0.0575533)
<b>Y2005</b>	-0.1927947***	-0.2484268***	-0.0876293***	-0.1211818***
	(0.0374241)	(0.0369017)	(0.0279962)	(0.0308018)
<b>Y2007</b>	-0.2349465***	-0.2929946***	-0.1075611***	-0.1290136***
	(0.0467262)	(0.0481153)	(0.0374756)	(0.0405055)
<b>Constant</b>	-2.31201***	-2.5245***	-0.8349911*	-0.9226575*
	(0.4522378)	(0.5124868)	(0.4279554)	(0.5127645)
<b>N</b>	402	275	396	275
<b>Countries</b>	152	97	149	97
<b>Adjusted R^2</b>	.8224	.8484	.8794	0.9188
<b>Hansen J-Statistic P-Value</b>		.4129		0.5355

\* $<.10$ , \*\* $<.05$ , \*\*\* $<.01$ . Clustered Standard Errors in Parentheses

The OLS results from the core empirical model including interactions are reported in Table 3.6. The coefficient on CAPPOP is negative and statistically significant in both, indicating that government effectiveness decreases as the percentage of a country's population living in the capital increases. Theory concerning the effect of distance from the capital on government performance was ambiguous; these results are consistent with government performance suffering as service providing agents are closer to high-level policy officials. This result may be due to proximity facilitating collusion and rent seeking, raising costs and lowering output. Both POLITY and its interaction with CAPPOP have positive, significant coefficients, consistent with the proposition that more accountable, democratic governments are less likely to engage in intra-governmental

rent-seeking. The significant interaction term indicates that the negative effect of proximity between civil servants and politicians on government effectiveness is mitigated under more democratic, open governments, consistent with the model. Neither the coefficients for CHECKS or its interaction with CAPPOP are statistically significant, though the interaction has the predicted negative sign. The prediction of the model that more divided governments are less likely to engage in intra-governmental rent-seeking because of their inability to internalize the costs of corruption is not supported in the base regression results.

**Table 3.6. Pooled OLS Regression Results with interactions**

	OLS				
	1	2	3	4	5
<b>CAPPOP(logged)</b>	-0.0931819**	-0.0882075**	-0.1443602***	-0.118502***	-0.1090551***
	(0.035696)	(0.03567)	(0.0522886)	(0.0288217)	(0.0294075)
<b>POLITY</b>	0.0188824***	0.0247289***	0.0233968**	0.0209299***	0.0239953***
	(0.004796)	(0.007022)	(0.01123)	(0.0047003)	(0.0054465)
<b>CAPPOP * POLITY</b>	0.0141963***	0.011455**	0.0203578***	0.0136392***	0.0153715***
	(0.004056)	(0.0045625)	(0.0064304)	(0.004009)	(0.004227)
<b>CHECKS</b>	0.0000357	-0.0238675	-0.0246475	-0.0002715	0.0016291
	(0.0165033)	(0.0256298)	(0.0250589)	(0.0166698)	(0.0166807)
<b>CAPPOP * CHECKS</b>	-0.0125568	-0.0224365*	-0.0298868**	-0.0128371	-0.0124861

	(0.0088769)	(0.0133808)	(0.0130155)	(0.0089996)	(0.0091404)
<b>POP (logged)</b>	-0.0390776*	-0.0581734***	-0.114684***	-0.0639974***	-0.0560307***
	(0.0222404)	(0.0203095)	(0.0266329)	(0.0171297)	(0.0193944)
<b>URBAN</b>	0.1271734	0.0281168	0.1549448	0.1171056	0.1875656
	(0.1656359)	(0.218722)	(0.2614288)	(0.1560997)	(0.1483888)
<b>DENSITY</b>	0.0000924***	0.0000843***	0.0001832	0.0001084***	0.0001044***
	(0.0000239)	(0.0000285)	(0.0001874)	(0.00002)	(0.0000326)
<b>GDPPC (logged)</b>	0.1701345***	0.2260391***	0.2832764***	0.1880738***	0.2024594***
	(0.0326198)	(0.0470452)	(0.0694079)	(0.0308402)	(0.0284156)
<b>BRITISH</b>	0.0185231	0.0405243	0.2609525***	0.0192787	0.0089624
	(0.0616656)	(0.0530186)	(0.0790652)	(0.0661395)	(0.0623164)
<b>GOVREV</b>		-0.0014536			
		(0.0027323)			
<b>FEDERAL</b>			0.003104*		
			(0.0018007)		
<b>ETHFRAC</b>				0.0122164	
				(0.1051078)	
<b>WESTERN</b>					-0.1408942
					(0.1267968)
<b>EEUROP</b>					-0.0217327
					(0.0710699)



<b>LAMERICA</b>					- 0.2254838 ***
					(0.070583 7)
<b>ASIA</b>					- 0.0615905
					(0.086623 )
<b>NAFRME</b>					- 0.0905417
					(0.093547 2)
<b>GOVEFFECT 1996</b>	0.6350734***	0.570132***	0.4876688***	0.6032337***	0.5946164 ***
	(0.0385798)	(0.0557978)	(0.0798521)	(0.0368303)	(0.053869 5)
<b>Y2005</b>	-0.13117***	-0.1868051***	- 0.2465556***	- 0.1411746***	- 0.1551919 ***
	(0.0294132)	(0.0457144)	(0.0564187)	(0.0287078)	(0.028156 8)
<b>Y2007</b>	-0.1598488***	-0.2469518***	- 0.3512144***	- 0.1720717***	- 0.1907046 ***
	(0.0369198)	(0.0605645)	(0.0746043)	(0.0361001)	(0.034951 4)
<b>Constant</b>	-1.646869***	-1.517929***	-1.788178**	-1.608088***	- 1.724072* **
	(0.3209791)	(0.5511578)	(0.7179307)	(0.3281279)	(0.306341 2)
<b>Regional Effects</b>	NO	NO	NO	NO	YES
<b>N</b>	392	218	141	376	376
<b>Countries</b>	151	101	52	144	144
<b>Adjusted R^2</b>	.9174	.9331	.9547	.9247	.9289
<b>Hansen J- Statistic P- Value</b>					

\*<.10, \*\*<.05, \*\*\*<.01. Clustered Standard Errors in Parentheses

**Table 3.7. Pooled OLS Regression Results with interactions**

	<b>w/o Outliers</b>	<b>2SLS</b>
	6	7
<b>CAPPOP(logged)</b>	-0.1053687***	-0.1786429***
	(0.0257989)	(0.0523433)
<b>POLITY</b>	0.0197677***	0.0366342***
	(0.0039415)	(0.0090284)
<b>CAPPOP * POLITY</b>	0.0145629***	0.0292335***
	(0.0035335)	(0.0098869)
<b>CHECKS</b>	-0.0083791	-0.1368227**
	(0.0135944)	(0.0560924)
<b>CAPPOP * CHECKS</b>	-0.0181209**	-0.0771405**
	(0.0071227)	(0.031142)
<b>POP (logged)</b>	-0.0515791***	-0.0903651**
	(0.015525)	(0.0354774)
<b>URBAN</b>	0.1847928	0.1988109
	(0.1498471)	0.2658376
<b>DENSITY</b>	0.0000933***	0.0000816
	(0.000018)	0.0003134
<b>GDPPC (logged)</b>	0.1619085***	0.171862***
	(0.0295876)	(0.056508)
<b>BRITISH</b>	0.0053114	0.0309614
	(0.0575112)	0.0823364

<b>GOVEFFECT1996</b>	0.6484899***	0.6753949***
	(0.0353992)	(0.0633594)
<b>Y2005</b>	-0.137555***	-0.1773291***
	(0.0267299)	(0.0471535)
<b>Y2007</b>	-0.1501441***	-0.1598122**
	(0.0336433)	(0.0636067)
<b>Constant</b>	-1.494311***	-1.283834**
	(0.2782176)	(0.532637)
<b>Regional Effects</b>	NO	NO
<b>N</b>	377	208
<b>Countries</b>	149	75
<b>Adjusted R^2</b>	.9409	0.9269
<b>Hansen J-Statistic P-Value</b>		0.4901

\*<.10, \*\*<.05, \*\*\*<.01. Clustered Standard Errors in Parentheses

Moving on to the control variables, the coefficient for POP is statistically significant and negative. This is consistent with the proposition that larger countries have lower effectiveness, possible due to rent-seeking resulting from the greater competition for government jobs and services. The proxies for population concentration, URBAN and DENSITY, have positive coefficients, consistent with more densely populated countries deriving greater benefit from economies of scale, though only the coefficient for DENSITY is significant. GDPPC has a positive and statistically significant relationship with government effectiveness; economically more developed countries also appear to have more effective governments, though the direction of this relationship could be either

way. The coefficient on BRITISH is positive but insignificant, thus providing little support that countries with a common law legal system have more effective governments, though this may be a result of the fact that fixed effects are being controlled for by the inclusion of GOVEFFECT1996.

The results of the base empirical model tend to be robust to the inclusion of additional control variables. In Column 2, the addition of GOVREV does not change the significance or direction of the coefficients for the theory-derived explanatory variables, with the exception of the interaction between CAPPOP and CHECKES which is now negative and significant at the 10% level, consistent with theory. In addition, CHECKS is statistically significant and negative in the random effects model, consistent with theory. The coefficient on GOVREV itself is statistically insignificant. The results do not support a relationship between the size of government relative to a country's economy and its effectiveness.

The Column 3 regression results indicate a statistically significant, positive relationship between fiscal decentralization, FEDERAL, and government effectiveness, consistent with past empirical work (Fisman and Gatti 2002). The coefficient on CAPPOP remains negative and significant, but larger relative to the core model. That variable's interaction with CHECKS is also significant and negative. The differences may be the result features specific to the Column 3 sample, which is substantially smaller than that used in the core regression.

In Column 4, ethnic fractionalization is controlled for through the inclusion of ETHFRAC. The theoretical variables are similar to those of the base model, while

ETHFRAC itself has a positive, insignificant coefficient. This result does not support the expectations derived from the endogenous state literature (Alesina and Spolaore 1997), but may, like BRITISH, be a function of the effect of ethnic fractionalization being fixed over time, and thus being unobservable due to the inclusion of GOVEFFECT1996.

In Column 5, regional dummies are included to control for unobserved region-specific effects. The coefficients for the theoretical variables do not change in significance or direction. The regional dummies themselves are mostly insignificant, with the exception of the Latin American dummy, which is significant and negative. Latin American countries, holding all else equal, appear to have suffered a decrease in government effectiveness relative to other countries since 1996.

In the first column of Table 3.7, the results of the core empirical model are tested for robustness with respect to outliers. Specifically, all observations with a standardized residual greater than two are excluded from the regression. The results are largely unchanged from the base OLS regression with the exception of the interaction between CAPPOP and CHECKS, which is now significant and negative. This is consistent with the hypothesis that more divided governments are more likely to engage in rent-seeking. The coefficient for CHECKS is negative, but insignificant. This is also consistent with the findings of previous regressions that CHECKS relationship on government effectiveness results primarily through an interaction with urban/capital primacy.

The results up to this point, while largely consistent with the theoretical predictions of the model, may suffer from an endogeneity bias. As argued by Henderson (2002), less effective, more corrupt governments may favor investments in infrastructure

in the primate city/capital due to the greater ease of obtaining rents from private sector actors, thus favoring the growth of the capital relative to the hinterland. This would result on an upward bias on the size of the CAPPOP coefficient in the OLS results. On the other hand, if, as predicted by the model, government service providers in the capital are more likely to obtain a monopoly over their position, then the capital city would suffer due to lower provision of government goods and services. This would result in a downward bias on the absolute size of the CAPPOP coefficient.

To correct for potential endogeneity in CAPPOP, POLITY, CHECKS, and their interactions, in Column 2 of Table 3.7 the core empirical model is estimated using Two Staged Least Square Regression (2SLS). The excluded instruments are CAPPOP in 1970<sup>13</sup>; POLITY in 1970, 1980, 1985, and 1990; CHECKS in 1975, 1985, and 1995; the interactions between lagged CAPPOP and the lagged POLITY and CHECKS, logged GDPPC in 1970, logged urban population in 1970, logged total population in 1970, and the country's surface area. The insignificance of the Hansen J-statistic indicates that the assumption that the excluded instruments are jointly uncorrelated with the error term in the OLS regression cannot be rejected, making them valid instruments. The coefficient for CAPPOP remains significant and negative, indicating that an exogenous increase in the concentration of the population in the capital lower's perceived government effectiveness. The coefficients of the theoretical variables are all significant and have the expected signs, including CHECKS. The 2SLS results were compared with the OLS

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<sup>13</sup> In addition to the United Nation's Urbanization Prospects, lagged CAPPOP is supplemented by data from Vernon Henderson's World City Data.  
<http://www.econ.brown.edu/faculty/henderson/worldcities.html>

results for the sub-sample on which the 2SLS regression was run (not shown). The variable CHECKS is significant in the OLS results as well, indicating that its change relative to the Column 1 results may be due to changes in the sample. The coefficient for CAPPOP is slightly larger in the 2SLS regression than the OLS regression on the smaller sample (.18 versus .12) indicating a slight downward endogeneity bias. This is consistent with lower government effectiveness having a negative impact on the size of the capital city relative to the rest of the country. Such a result makes sense in light of the model's prediction that government positions in the capital are more likely to be subject to rent seeking, lowering the availability of services in the capital relative to the hinterland. The other notable difference between the OLS and 2SLS results is in the CHECKS coefficient, which is substantially larger in the 2SLS (.13 versus .04). One interpretation of this difference is that more effective governments may be more capable of ensuring a well functioning electoral system that can support multiple political parties, which in turn makes divided government more likely, raising the value of CHECKS. Another explanation is that the public is more likely to support a unified government as a means of fixing poor government performance.

One concern with interpreting changes in the perception of government effectiveness is that they do not reflect changes in actual government effectiveness, but rather changes in the information available to expert respondents concerning government activity. If this were the case, the results of the regressions could possibly reflect a convergence effect, where countries with high capital primacy are initially viewed as having more effective governments, but, as new information comes to light, perceptions

regress to the mean, only to ultimately converge at a point where there is no statistically significant difference between countries with high primacy versus low primacy. To check for the possibility of long run convergence, the base OLS regression was run without the GOVEFFECT1996 (Table 3.8)<sup>14</sup>. The coefficients for the theoretically motivated variables generally retained the signs and significant levels in the base line results, though with larger coefficients (.12 versus .09 for CAPPOP in the base regression) and standard errors, with the exception of the interaction between CHECKS and CAPPOP, which was not significant but had the appropriate sign. This latter result may reflect a greater endogeneity problem that results from not controlling for fixed effects. Among the control variables, BRITISH was generally significant and positive, consistent with legal origins being a fixed source of variation in government effectiveness. The significant, negative coefficient on capital primacy indicates that, if perceptions are changing due to new information, they are leading to a divergence between high capital primacy and low capital primacy countries.

**Table 3.8. Base Regression Without Lag**

<b>CAPPOP(logged)</b>	-0.1207529**
	(0.0580385)
<b>POLITY</b>	0.0379395***
	(0.0069753)
<b>CAPPOP * POLITY</b>	0.0160352**
	(0.006248)
<b>CHECKS</b>	0.0064879
	(0.0263097)
<b>CAPPOP * CHECKS</b>	-0.0001017
	(0.0133982)

<sup>14</sup> 2SLS was not considered feasible due the theoretical reliance on the inclusion of the lagged index for the excluded instruments to be exogenous.



<b>POP (logged)</b>	-0.0136199
	0.0313472
<b>URBAN</b>	-0.2247685
	(0.3272638)
<b>DENSITY</b>	0.0002769***
	(0.0000299)
<b>GDPPC (logged)</b>	0.4844494***
	(0.0462658)
<b>BRITISH</b>	0.2389838**
	(0.1156647)
<b>Y2005</b>	-0.2565455***
	(0.0361735)
<b>Y2007</b>	-0.3665647***
	(0.0447948)
<b>Constant</b>	-4.633367***
	(0.4466023)
<b>N</b>	394
<b>Countries</b>	152
<b>Adj R^2</b>	0.7984

\* $\leq .10$ , \*\* $\leq .05$ , \*\*\* $\leq .01$ . Clustered Standard Errors in Parentheses

### 3.3. Objective Indicators

While the results up to this point are largely consistent with the model presented in the previous chapter, both the country-level and firm-level data used in the analysis makes inferring the causal mechanism behind the relationship between capital city size and government effectiveness difficult due to the largely subjective nature of the evidence. As already discussed, an alternative explanation for the results comes from Ades and Glaeser (1995) and Henderson (2002b). Both authors argue that due to their primacy and proximity to government, capital cities benefit from infrastructure subsidies that come at the expense of the hinterland. This subsidy encourages the growth of the primate/capital city. If the marginal social utility derived from investment in the primate/capital city is lower than similar investment in the hinterland, then it may be

expected that countries with a large percentage of their population in primate/capital cities would also have governments which are perceived as being less effective at providing public goods, as the explanatory variable of interest could be interpreted as both a cause and effect of increased transfers from the hinterland to the capital.

The Ades/Henderson model is similar to the one presented in this paper in that it hypothesizes that the residents of capital cities have an advantage when it comes to rent seeking. However, the two models differ in terms of the type of rent-seeking that predominates. In the Ades/Henderson model capital residents organize into a regional lobby. Consequently, the rents that flow to capital residents have either positive or neutral local external effects and may take the form of increased provision of public goods. In addition, Henderson (2002b) argues that even in the absence of collective action on the part of capital residents, rulers, due to their presence in the capital, are likely to internalize a greater proportion of the benefit in public goods, both because they make use of that public good itself, and because different local public goods may be complementary; consequently, consistent with Shleifer and Vishny (1993), raising the price of one local public good lowers the demand, and rents which can be extracted from, another. Because rents are more easily captured in the capital, this complimentary effect is stronger in the capital/primate city. In addition, public goods in the capital and the hinterland may be substitutes for each other. Consequently, raising the price or not providing a public good in the hinterland will raise demand for the public good in the capital, which the government can appropriate at lower cost. This dynamic is more likely to hold where capital and labor mobility is high, facilitating migration from the hinterland

to the capital. The costs of rent-seeking are thus expected to be largely born by the hinterland.

By contrast, in this paper's model, rent seeking is thought of as an agent to agent activity, specifically between government agents. To the degree that capital city public employees have an advantage over both other capital residents as well as their counterparts in the hinterland when it comes to rent-seeking, the costs of rent seeking in the capital may be born to a great degree by capital city residents, who will consume fewer or lower-quality public goods. This paper's model thus allows for negative local externalities when it comes to rent seeking by a capital primate city. While the government may still benefit from raising the cost of public goods provision in the hinterland in order to induce migration, in practice this may not be effective because principle-agent problems make restricting black market and informal governmental activity far from the capital costly. In addition, the output of the hinterland and capital, and consequently the public goods which are assumed to be inputs in the production process, may in fact be compliments; denying infrastructure to the hinterland may for instance raise the price of food exported from the hinterland to the capital, which will lower demand for public goods provided in the capital, and thus rents which can be extracted by the government. This condition is likely to be stronger in countries/economies where factors, such as land, minerals, and other natural resources, are relatively immobile and where location fundamentals (ports, rivers, other natural inputs in transportation) are important.

As a test for the regional rent-seeking hypothesis, Henderson (2002b) analyzed a 1993 metropolitan level dataset created by the United Nation's Center for Human Settlements (UNCHS). For a sample of non-primate MSAs, the author regressed six proxies of government effectiveness on the urban primacy of the MSA's country, controlling for MSA size and country GDP per capita. Cities in countries with high levels of urban primacy were found to have worse indicators of cost-of-living and quality of life. This was taken as confirmation of the hypothesis that the hinterland bears the cost of capital/primate city rent seeking.

However this interpretation is problematic given that the regressions did not include a control for MSA per capita income; if primate cities have a higher per capita income than other cities within a country then when controlling for country level GDP a higher level of urban primacy will be associated with lower non-primate city income. Thus the results may be explained by lower local private and public expenditures than on a transfer of resources from the hinterland to the capital. As a more direct test of the regional rent-seeking hypothesis, another analysis of the UNCHS data was undertaken. Specifically, using a sample including both primate and non-primate MSAs, the same indicators used in Henderson (2002b) were regressed on a dummy variable indicating if the MSA was a capital (CAPITAL) and the ratio MSA population to country population (PRIMACY). If the regional-level rent-seeking hypothesis is correct, MSAs which are capitals and/or large relative to the rest of the country would be expected, all else being equal, to have better indicators because they are in a better position to lobby for infrastructure subsidies and/or resist transfers to other regions. The regressions included

controls for MSA population (POP, logged), MSA population growth (POPGROWTH), country population (COUNTRYPOP, logged), country GDP per capita (GDPPC, logged), and the ratio of per capita MSA income to country GDP per capita (INCOMERATIO).

The empirical models were estimated using GLS with country level random effects.

Results are reported in Table 3.10 and Table 3.11.

**Table 3.9. UNCHS Urban Indicators – Descriptive Statistics**

Variable	Obs	Mean	Std. Dev.	Min	Max
<b>Travel Time</b>	166	34.37681	18.54406	8	120
<b>Rent to Income</b>	166	0.205361	0.151744	0.01	0.85
<b>Under 5 Mortality</b>	174	0.063736	0.062412	0	0.32
<b>Access to Water</b>	213	0.844085	0.194135	0.13	1
<b>Waste Collection</b>	181	0.689282	0.323469	0	1
<b>Student to Teacher</b>	186	43.30263	23.25007	10.7	176
<b>Capital</b>	237	0.35443	0.479353	0	1
<b>Primacy</b>	152	9.39E-05	0.000133	0	0.001004
<b>Pop</b>	155	1771.341	2709.784	15.64	16115
<b>PopGrowth</b>	209	0.029474	0.029339	-0.04	0.23
<b>CountryPop</b>	232	1.11E+08	2.58E+08	64671	1.18E+09
<b>GDPPC</b>	227	4105.425	7540.035	82.47766	27100.98
<b>IncomeRatio</b>	153	1.339612	1.15577	0.060973	6.971688
<b>Floor</b>	188	13.84	10.01839	1.17	55

**Table 3.10. UNCHS Urban Indicators**

	<b>Travel time to Work (logged)</b>	<b>Rent to Income (logged)</b>	<b>Under 5 Mortality</b>
<b>Capital</b>	0.1711964** (0.0814252)	0.3023859 (0.1917928)	-0.0020083 (0.0062073)
<b>Primacy</b>	-681.9321 (548.2868)	2300.606** (933.1269)	-51.50099 (58.86817)
<b>Pop (logged)</b>	0.2352937*** (0.0535531)	-0.0361496 (0.0555245)	-0.0028695 (0.0032794)

<b>PopGrowth</b>	-3.119325**	15.70519***	0.3849478***
	(1.431537)	(3.429507)	(0.1261932)
<b>CountryPop</b>	-0.089824	0.1986846**	-0.0097447**
<b>(logged)</b>	(0.0613284)	(0.0910226)	(0.0046717)
<b>GDPPC</b>	-0.1149126***	0.1800878	-
<b>(logged)</b>	(0.029698)	(0.1112687)	(0.0039161)
<b>IncomeRatio</b>	0.0507635	0.1267845	-0.0005101
	(0.0405768)	(0.1079595)	(0.0060576)
<b>Floor</b>		-0.352793*	
		(0.2130048)	
<b>Constant</b>	4.17759***	-6.543272	0.3826202***
	(0.7893748)	1.789976	(0.0884638)
<b>N</b>	87	81	84
<b>Countries</b>	57	55	58
<b>R^2</b>	0.433	0.2862	0.5628

\*<.10, \*\*<.05, \*\*\*<.01. Clustered Standard Errors in Parentheses

**Table 3.11. UNCHS Urban Indicators**

	<b>Access to Water</b>	<b>Waste Collection</b>	<b>Student to Teacher (logged)</b>
<b>Capital</b>	0.0329304	0.0522097	-0.0413626
	(0.0267946)	(0.0489355)	(0.0432312)
<b>Primacy</b>	97.99556	323.0816	-487.0306**
	(176.0872)	(290.9957)	(250.517)
<b>Pop</b>	-0.0180839	-0.0364224	0.0790464***
<b>(logged)</b>	(0.0123219)	(0.0333824)	(0.0155423)
<b>PopGrowth</b>	-1.458251**	-1.737603**	4.388756***
	(0.643026)	(0.8742558)	(1.024526)
<b>CountryPop</b>	0.0273692**	0.0366218	-0.0736304***
<b>(logged)</b>	(0.0115941)	(0.0288489)	(0.0216163)
<b>GDPPC</b>	0.0581928**	0.1289582***	-0.1727941***
<b>(logged)</b>	(0.0126684)	(0.0197156)	(0.0181372)
<b>IncomeRatio</b>	0.0098139	0.0331236	-0.001424
	(0.0141532)	(0.032406)	(0.0249436)
<b>Floor</b>			
<b>Constant</b>	0.1304994	-0.6045816	5.496806***
	(0.238046)	(0.4805544)	(0.4455487)
<b>N</b>	102	88	90
<b>Countries</b>	64	58	59
<b>R^2</b>	0.4191	0.5228	0.7622

\*<.10, \*\*<.05, \*\*\*<.01. Clustered Standard Errors in Parentheses

The regression results present little support for the regional-level rent-seeking hypothesis. While CAPITAL and PRIMACY have significant coefficients on mean travel time to work and the rent to income ratio respectively, which Henderson (2002b) uses as proxies for cost-of-living, they have the wrong sign. Capitals have a statistically significantly greater mean travel time than non capitals. In addition, while the CAPITAL coefficient for the rent to income ratio is insignificant, it is only marginally so ( $p=.115$ ). PRIMACY has a statistically significant, positive coefficient on the rent to income ratio. These results do not support the interregional rent-seeking hypothesis, but are consistent with the individual rent seeking hypothesis presented in this paper. To the degree that these variables proxy for investments in urban infrastructure, they are sensitive to the productivity of government agents in the MSA, which is in turn a function of the level of rent seeking by those agents. Government agents in the capital are hypothesized to have an advantage in terms of gaining monopolies over their position or colluding with supervisors, consequently affecting their output. If these agents produce fewer local public goods than their counterparts in the hinterland, then capitals would be expected to have lower cost-of-living indicators. A similar explanation could apply for the PRIMACY results; cities which are large relative to the rest of their country may be more likely to be visited by government officials from the capital, giving local government agents a greater opportunity to rent-seeking. This interpretation is consistent with the 2SLS results from both the country-level and firm-level regressions, which indicated that lower

government effectiveness was associated with capital cities being smaller relative to the rest of the country.

The only support for the regional rent-seeking hypothesis is found in the primary school student to teacher ratio. PRIMACY has a statistically significant negative relationship with this indicator, consistent with cities which are large relative to their country obtaining a greater degree of educational investment. However, it should be noted that this variable represents a government output rather than outcome. While there may be more teachers per capita in primate cities, there is no way to tell how productive they are. Larger numbers of teachers may be substituting for lower per capita productivity on the part of teachers. In addition, primate cities may host a country's professional and managerial elite, who may have a higher demand for education. The results may consequently reflect greater local expenditure on education rather than increases in net transfers to the city from the central government. These results are thus not inconsistent with the rest of this paper's results.

Of course, the two theories are not necessarily inconsistent. While the residents of the capital may have an advantage in rent seeking, and thus benefit to some degree from interregional transfers, it is also possible that due to collusion between politicians and capital city service providers that government investment in the capital will be particularly inefficient. The existence of both interregional and intra-governmental rent-seeking would explain the inconsistent and insignificant coefficients observed in Tables 3.10 and 3.11.

#### *Urban Concentration and Political Instability*



Another means of testing whether or not urban concentration is associated with interregional or intra-primate rent-seeking by government is to examine the effect of urban primacy on political instability. Rent-seeking may have two opposing effects on political instability (Bazzi and Blattman, 2011; Treisman, 2011). On the one hand, a government which can extract high net rents from its economy can reinforce its rule by creating a coercive apparatus to monitor its population and pay off potential rivals. This would tend to lead to reduced political instability. On the other hand, both traditional public choice theory (Appelbaum and Katz, 1986; Hillman and Riley, 1989; Wenders, 1987) and more recent institutional and development economics literature (Acemoglu and Robinson, 2001/2006; Besley and Persson, 2011) tends to emphasize the tendency of rent-extraction to lower the returns to apolitical productive occupations and raise the returns to being a member of the political elite. This should lead to more intense competition for a country's leadership and thus lead to greater political instability.

One common theoretical prediction that arises from the existence of these two opposing effects is that rent-seeking governments will tend to be most vulnerable in the presence of negative economic shocks (Acemoglu and Robinson, 2001/2006; Chassang and Padro i Miquel 2009; Bazzi and Blattman, 2011; Treisman, 2011). This is due to the fact that lower economic output also lowers government's rents, and thus its ability to resist being deposed by a potential rival in the short run. Because the short-run shock does not necessarily impact the rents that a government can extract in the medium or long run, however, potential rivals incentive to acquire political power is also unaffected. Consistent with this mechanism, Bazzi and Blattman (2011) find that the primary channel

through which negative economic shocks impact the probability of the onset of political violence is through a reduction in state capacity to suppress opposition.

To the degree that urban concentration is associated with an increased ability of the government to extract rents due to reduced principal-agent problems, as argued in this paper, countries with high levels of urban primacy should be at greater risk of leadership change during negative economic shocks. On the other hand, to the degree that urban concentration leads to increases in collective action by residents of the primate city and thus reduces potential rents by reducing the portion of the population that is subject to rent seeking as well as increasing the portion of the population over which the rents are spread, countries with lower urban concentration should be at greater risk of leadership change during severe economic shocks.

To test this hypothesis, the following empirical model is estimated using cross country panel data for the period 1960 – 2004:

$$\begin{aligned}
 IRREGULAR_{it} &= \beta_1 PRIMACY + \beta_2 (PRIMACY * DEMOCRACY) \\
 &+ \beta_3 (PRIMACY * GROWTH) \\
 &+ \beta_4 (PRIMACY * DEMOCRACY * GROWTH) + \beta_5 DEMOCRACY \\
 &+ \beta_6 GROWTH + \beta CONTROLS + country\ effects + year\ effects \\
 &+ e_{it}
 \end{aligned}$$

, where IRREGULAR is a dummy variable takes a value of 1 if a country experiences a leadership failure under irregular, internal conditions (popular protest, civil war, military coup, assassination, etc.) within that year. Data on leadership transitions is taken from the Archigos version 2.9 (Goemans et al., 2009). PRIMACY is the percentage of the country's urban population resident in the country's largest city, taken from the World Bank. DEMOCRACY is a dummy variable where 1 indicates that the country is a

consolidated democracy (Polity 2 score  $> +5$ ) and 0 indicates the country is a consolidated autocracy (Polity 2 score  $< -5$ ). So-called anocracies, or mixed regimes, were excluded because these regimes may be inherently unstable, and thus including them would introduce endogeneity. GROWTH is the logged 1 year change in GDP per capita, and is the proxy for economic shocks. If urban primacy were associated with increased rent-seeking, as argued in this paper, then the interaction between PRIMACY and GROWTH is expected to be negative, while it is expected to be positive if urban primacy is linked to reduced potential for rent extraction by a country's leadership. The interactions with DEMOCRACY are included to test the assumption of much of the political economy literature that democratic institutions themselves solve collective action problems (Ades and Glaeser 1995; Acemoglu and Robinson, 2006; Bates and Block, 2011). If this were true, then the three-way interaction would be expected to take the opposite sign of PRIMACY\*GROWTH when it is positive, i.e. if the interregional transfers hypothesis were true. All the aforementioned variables are lagged by one year to correct for endogeneity.

Control variables include the urbanization rate, logged population, logged GDP per capita, a dummy variable indicating if at least a third of a country's GDP is comprised of oil revenues (Fearon and Laitin, 2003). An interaction with DEMOCRACY is also included with each of these control variables to account for differential effects on the survival of democracies and autocracies (Barro, 1999; Gerring and Zarecki, 2011; Treisman, 2011). Oil dependence is also interacted with GDP per capita given its prominent role in the literature linking economic shocks to conflict (Bazzi and Blattman,

2011). All the aforementioned variables are lagged by one year. The base regression also includes a set of variables taken from Archigos concerning the status of a country's leader in a given country year including the age of leader, dummy variables indicating if the leader had served in office in a previous term, had attained office through foreign intervention, and had attained office through irregular means. In years where there is a leadership transition, these variables relate to the outgoing leader. A dummy variable indicating whether or not there is an election in a given country-year is included, as is a variable indicating whether or not the country was involved in an external war (defined using Correlates of War) in the prior year, as external conflict is often thought to constrain rent-seeking behavior and internal conflict (Acemoglu and Robinson, 2001/2006; Besley and Persson, 2011). Finally, the base specification also includes the dependent variable lagged by one year. To preserve space, the coefficients for these variables are not included.

Typically, when the response variable is not continuous and represents a rare event, as is the case here, empirical models are estimated using some form of survival analysis. However, in the case of unit-level heterogeneity, survival models produce biased inconsistent results and when fixed effects are included to control for this heterogeneity, the standard errors are deflated and inconsistent (Lancaster, 2000). Another alternative would be to use a conditional logit or probit model. However, the logit model is not appropriate for models with interactions, as the marginal effect will be incorrectly calculated (and may even have the wrong sign), and even a properly calculated odds ratio is difficult to interpret (Ai and Norton, 2003). Following Treisman

(2011), the model is therefore estimated using a linear probability model with country and year effects.

**Table 3.12. Urban Primacy and Political Instability – Descriptive Statistics**

<b>VARIABLE</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>IRREGULAR</b>	6570	0.0328767	0.178327	0	1
<b>POPULAR</b>	6570	0.0022831	0.047731	0	1
<b>REBEL</b>	6570	0.0033486	0.057774	0	1
<b>MILITARY</b>	6570	0.0205479	0.141876	0	1
<b>OTHERGOV</b>	6570	0.0024353	0.049293	0	1
<b>JUNTA</b>	6570	0.0025875	0.050806	0	1
<b>ASSASSIN</b>	6570	0.000761	0.027579	0	1
<b>OTHER</b>	6570	0.0009132	0.030208	0	1
<b>PRIMACY</b>	6570	34.03909	17.01316	2.515077	99.98246
<b>DEMOCRACY</b>	5047	0.5026749	0.500042	0	1
<b>LOGRGDPCHGR</b>	6173	0.0184135	0.076047	-1.05861	0.798578
<b>URBANIZATION</b>	6570	46.74097	24.15872	2.08	100
<b>POP</b>	6472	33114.2	116553	124.489	1317066
<b>RGDPCH</b>	6176	7723.769	10070.65	117.2166	150042.5
<b>OIL</b>	6381	0.1416706	0.348739	0	1
<b>AGE</b>	5727	56.74734	11.17298	19	93
<b>PREVIOUS TIMES IN OFFICE</b>	5727	0.1382923	0.446681	0	4
<b>ELECTION</b>	6103	0.2359495	0.424626	0	1
<b>FOREIGN ENTRY</b>	5727	0.0132705	0.114441	0	1
<b>IRREGULAR ENTRY</b>	5727	0.2362493	0.424814	0	1
<b>EXTERNAL WAR</b>	6570	0.0269406	0.161922	0	1
<b>IRREGULAR (LAGGED)</b>	6570	0.0336377	0.180309	0	1
<b>CIVTOT</b>	6403	0.7284086	1.714225	0	10

Results are presented in Tables 3.13 and 3.14. In the first column of Table 3.13, the base model is run with PRIMACY but without its interactions to obtain an average treatment effect. The results indicate that as the level of urban primacy rises in a country,

the probability that a country will experience a leadership change by irregular means rises. This is consistent with the results in Wallace (2011), though that paper only tested for the effect of urban primacy on the survival of authoritarian governments and did not test for an interaction of economic shocks. In the second column of Table 3.13, the full set of interactions is added. None of the interactions are statistically significant, though PRIMACY\*GROWTH is negative, consistent with urban primacy having a positive effect on potential rent extraction and only marginally insignificant ( $p = .143$ ). In the third column of Table 3.13, an alternative explanation for the positive relationship between urban primacy and regime change offered by Ades and Glaeser (1995) is tested; that article suggested that political instability and civil violence could increase the size of the primate city due to the inability of the government to provide security in the hinterland. Such violence could presumably also be associated with economic growth and regime change. CIVTOT, and 10 point index of the intensity of domestic violence (civil violence, civil war, ethnic violence, ethnic war) in a given country year from the Major Episodes in Political Violence (MEPV) Dataset is added to the base specification. While CIVTOT has the expected positive sign and is statistically significant, the coefficients for PRIMACY and its interactions are largely unaffected, indicating that the intensity of civil conflict is not strongly correlated with urban primacy.

**Table 3.13. Urban Primacy and Political Instability**

	Average	Interact	CIVTOT
PRIMACY	0.0017**	0.0017**	0.0017**
	(0.0008)	(0.0008)	(0.0008)
PRIMACY * DEMOCRACY		0.0000	-0.0001
		(0.0001)	(0.001)

PRIMACY * GROWTH		-0.0055	-0.0058
		(0.0037)	(0.0037)
PRIMACY * DEMOCRACY *GROWTH		-0.0001	0.0004
		(0.0064)	(0.0064)
CIVTOT			0.0073*
			(0.0037)
DEMOCRACY	0.3119	0.3074	0.3308
	(0.1889)	(0.2162)	(0.2124)
GROWTH	-0.314***	-0.0665	-0.0493
	(0.1034)	(0.193)	(0.191)
Country Effects	YES	YES	YES
Year Effects	YES	YES	YES
N	4059	4059	4059
Countries	142	142	142

Notes: \* $<.10$ , \*\* $<.05$ , \*\*\* $<.01$ . Clustered Standard Errors in Parentheses.

Controls (not shown) include country urbanization rate; country population (logged); GDP per capital (logged); aforementioned variables' interactions with DEMOCRACY; GROWTH \* DEMOCRACY; (logged) land area \* DEMOCRACY, oil dependence and a full set of two-way and three-way interactions with DEMOCRACY and GROWTH, leader age in year t; dummy for whether leader in year t had previous tenure; dummy variable for whether leader in year t was installed through irregular means; dummy variable for whether leader in year t was installed through foreign intervention; whether or not there was an election in year t; dummy variable indicating whether or not the country is involved in an external war; and the lagged dependent variable. Unless otherwise stated, all independent variables are lagged by one year.

**Table 3.14. Urban Primacy and Political Instability**

	POPULA R	REBEL	MILITAR Y	JUNTA	OTHERGOV	ASSASSIN	OTHER
PRIMACY	0.0016*	0.0012	0.0006	0.0016**	0.0017**	0.0016**	0.0017**
	(0.001)	(0.0007)	(0.0004)	(0.0007)	(0.0008)	(0.0008)	(0.0008)
PRIMACY * DEMOCRACY	0.0002	0.0001	-0.0005	0.0005	-0.0002	-0.0001	0.0000
	(0.001)	(0.001)	(0.0006)	(0.0009)	(0.0009)	(0.0001)	(0.0001)
PRIMACY * GROWTH	-0.0061*	-0.0000	-0.0064*	-0.0058	-0.0056	-0.0055	-0.0041
	(0.0037)	(0.0024)	(0.0038)	(0.0056)	(0.0037)	(0.0037)	(0.0043)
PRIMACY * DEMOCRACY *GROWTH	0.0004	-0.0049	0.0073*	-0.0012	-0.0005	0.0001	-0.0011
	(0.0063)	(0.0057)	(0.0043)	(0.0063)	(0.0064)	(0.0064)	(0.0067)
CIVTOT							
DEMOCRACY	0.2276	0.3266	0.2692*	0.0824	0.3024	0.3129	0.3177
	(0.2024)	(0.2159)	(0.1496)	(0.2056)	(0.2024)	(0.2141)	(0.2135)
GROWTH	-0.0365	-0.1673	0.0532	-0.0512	-0.0599	-0.0651	-0.0666
	(0.188)	(0.1389)	(0.1543)	(0.1861)	(0.1918)	(0.193)	(0.2074)
Country Effects	YES	YES	YES	YES	YES	YES	YES
Year Effects	YES	YES	YES	YES	YES	YES	YES
N	4059	4059	4059	4059	4059	4059	4059
Countries	142	142	142	142	142	142	142

Notes: \* $<.10$ , \*\* $<.05$ , \*\*\* $<.01$ . Clustered Standard Errors in Parentheses.

Controls (not shown) include country urbanization rate; country population (logged); GDP per capital (logged); aforementioned variables' interactions with DEMOCRACY; GROWTH \* DEMOCRACY; (logged) land area \* DEMOCRACY, oil dependence and a full set of two-way and three-way interactions with DEMOCRACY and GROWTH, leader age in year t; dummy for whether leader in year t had previous tenure; dummy variable for whether leader in year t was installed through irregular means; dummy variable for whether leader in year t was installed through foreign intervention; whether or not there was an election in year t; dummy variable indicating whether or not the country is involved in an external war; and the lagged dependent variable. Unless otherwise stated, all independent variables are lagged by one year.

Another explanation provided by the model of external challengers in Chapter 2 for why PRIMACY is positively associated with political instability/leadership-change while PRIMACY\*GROWTH shows no statistically significant association is that there may be unobserved institutions in a country (tribal networks, merchant/labor associations, municipal governments, autonomous bureaucracies such as the military, etc.) which are autonomous of the government but provide substitute goods and services. Consequently, changes in the level of potential rents do not necessarily favor the government's survival chances; as such rents may be collected not just by the government but by preexisting challengers. In the case of negative economic shocks, this means that though the government may collect fewer rents, and thus may be constrained to buying military and political support, potential challengers who had been collecting rents are equally constrained. On the other hand, consistent with the external challenger model presented earlier, higher rents from increasing urban primacy that accrue to sole incumbents may, if sufficiently large, lead to an increased probability of conflict between these pre-existing, unobserved institutions and the government to attain that incumbent status, raising the probability that the leader of the formal national government will be overthrown in the process.

While the results up to this point provide little evidence for an association between urban primacy and rent-seeking in either direction, this may be due to the particular coding of how irregular leadership changes are coded in Archigos, as any change in leadership due to a domestic actor is included, including unsupported



assassinations and changes within the ruling junta. It thus may be a noisy proxy for the type of competition for leadership which is hypothesized to be related to rent-seeking and thus urban primacy. To test for potential heterogeneity in effect of urban primacy across different types of irregular leadership change, IRREGULAR is broken down into separate dummy variables for each type of leadership change (popular protest, rebellion/civil war, military coup, change within the ruling junta, other government, unsupported assassination, and other miscellaneous causes). These dummy variables are then entered one at a time on the right hand side of the regression equation. Variation in IRREGULAR due to that specific category of leadership change is therefore excluded, and the coefficients for the substantive variables can be interpreted as their association with the probability of all types of leadership change except that. Columns in Table 3.14 are labeled by excluded category.

When popular protests are excluded, the interaction between urban primacy and growth in GDP per capita remains negative and becomes marginally significant. This indicates that economic shocks in countries with high rates of urban primacy are associated with leadership changes not directly caused by popular protests. This is inconsistent with another alternative explanation for the effect of urban primacy on political instability, namely that urban mobs are in a better position to punish leaders for perceived policy failures that resulted in slow growth (Wallace 2011), as the two-way interaction was insignificant when irregular leadership change includes popular protests, the most likely means through which this discontent would be expressed.

When rebellion is excluded as a cause of leadership change, the coefficient on the two-way interaction is both insignificant and drastically reduced in magnitude, while the three-way interaction increases in magnitude, though still far from statistically significant ( $p = .40$ ). The coefficient for PRIMACY, which, with the interactions, indicates the relationship between urban primacy and leadership change in autocracies with zero growth, also becomes statistically insignificant. This indicates that one channel through which urban primacy increases political instability is through an increase potential for the government losing a civil war.

When military coups are the excluded, both the interaction between urban primacy and growth and the three-way interaction become statistically significant. The signs and magnitudes of the coefficients indicate that probability of a leadership change not involving a military coup following an economic shock is increasing with urban primacy in autocracies, but not in democracies. This may be explained by the fact that democracies are more likely to distribute a country's resources more equitably across society, thus lowering the incentive for those out of power to rebel by raising the opportunity cost of opposing the government (Besley and Perrson, 2011). In times of fiscal stress due to negative economic shocks, democracies may be more likely to reallocate scarce resources to civilian infrastructure and welfare programs to prevent electoral or armed unrest. On the other hand, the fact that this heterogeneity between autocracies and democracies only becomes apparent when excluding military coups, and that the sign on the three-way interaction changes signs when the excluded category changes from rebellion to military coups indicates that urban primacy may make

democratic governments more vulnerable to military coups, even as they become less vulnerable to armed rebellion. As argued in Acemoglu, Ticchi, and Vindignee (2010), democratic governments may have a more difficult time than autocracies committing to funding their professional military in the long run, as they do not require the military to protect their rule or enforce their control of rents. Consequently, the military has an incentive to launch a coup against the government in order to guarantee access to future rents. Whether they will or not is determined by the tradeoff of future rents against the short run disruption to their payment that would result from replacing the civilian government. In periods of short run negative economic growth, democratic governments may redirect resources away from the military due to fiscal strain, decreasing the cost of the military launching the coup. This effect will be magnified if future potential rents are high, which, under the hypothesis of this paper, they are expected to be when urban primacy is high. The results are thus consistent with urban primacy increasing the potential for rent-extraction. The vulnerability of democratic governments to military coups in periods of high urban primacy is consistent with the results with Anthony (2009), which found that increases in urban primacy were associated with decreases in a country's polity score. These results raise the possibility that a country's institutions are endogenous to its level of urban concentration, which contrasts with the emphasis in the urban primacy literature which treats institutions as exogenous determinates of urban structure (Ades and Glaeser, 1995; Henderson 2002a/2007, etc.).

The results are largely unchanged when leadership changes due to reshuffling within the ruling junta, opposition from other non-military elements in the government,

unsupported assassinations, and miscellaneous causes are excluded. The results indicate that urban primacy is associated with increased instability, with this effect increasing during periods of negative economic growth. This effect on political instability appears to be skewed towards increases in armed rebellions in autocracies and military coups in democracies. However, one difficulty in interpreting the relationship between political instability and urban primacy as causal is that urban primacy could be a proxy for some other unobserved, time-varying feature of the country which is associated with government capacity in regards to rent-seeking. To the degree that these exogenous rents are spent locally, they would tend to increase the size of the capital/largest city due to a consumption based multiplier effect. While a crude measure of oil dependence was controlled for, other resources may be easily extractable by government. However, other empirical results in this chapter, particularly the regression results for the Enterprise Survey Data, provide some support for capital/primate cities being sources of efficiently extractable rents for governments. These results therefore are consistent with the primary hypothesis of this paper, namely the concentration of a country's population increases the ability of the government to extract rents and are inconsistent with theories that hold that governments become constrained as urban primacy increases due to the increased potential for collective action.

## CHAPTER 4: MICRO-LEVEL EVIDENCE

### 4.1. Introduction

While the cross-country regressions indicate that a country's level of capital primacy is positively associated with perceived corruption, due to the level of aggregation used, these results do not have much to say on the mechanisms underlying this relationship. Specifically, they do not indicate who is engaging in corrupt rent-seeking and who is bearing the costs. On the one hand, the positive association may be explained by the increased ability of capital residents to engage in collective actions (such as riots, demonstrations, sit-ins, etc.), giving them more political influence relative to the residents of the hinterland. This results in government policies which transfer resources from the hinterland to the capital in the form of public goods; in this case residents of the capital engage in corruption and rent-seeking behavior, but the hinterland bears the costs. Presumably, strong collective action on the part of the capital residents would also tend to mitigate the tendency of the government to extract rents from the capital, as such rents would come with a social costs. Alternatively, an increase in capital primacy may result in political elites having a larger pool of potential clients who can compete for preferential policies. This gives them an incentive to create rent-seeking policies which favor only a subset of the capital's population. In this case residents of the capital who also engage in rent-seeking activities, but do so in a particularistic, as opposed to collectivist fashion. In that situation = the rents may be transferred both from

the hinterland and from the capital, benefiting only a portion of capital residents, specifically the political elite. The capital may actually be disadvantaged in the later scenario if governments find it less costly to extract rents locally due to lower transaction costs and risks associated with obtaining informal payments. Principal-agent problems between political elites and their agents may generally be less of an issue in the capital, making the enforcement of rent-creating policies in distant regions more costly. This is especially true for capitals where a significant amount of economic activity is undertaken by firms with a local market area such as services (public and private), as the costs of the market distortions that arise from rent creating policies in these areas will be borne by local consumers. Testing these mechanisms requires sub national data which allows comparisons between the capital and hinterland in respect to levels of corruption/rent-seeking behavior and on the distribution of the costs of these activities between the two regions.

To test these alternative interpretations of the country-level analysis, this analysis makes use of the World Bank's Consolidated Business Enterprise Survey for the years 2006-2010. This dataset is derived from surveys of establishments in dozens of developing countries. The key virtues of this data is that it contains responses to questions about both establishment experience with and perceptions of the effects of corruption as well as information on establishment location within countries, specifically whether or not the establishment is in the capital. This will allow for the testing of the contrasting predictions of the two hypothesis discussed above; if corruption and rent-seeking primarily takes the form of interregional transfers, establishments in capitals

would be expected to perceive corruption as less of an impediment to business than establishments in the hinterland. If some of the corruption resulting from an increase in the size of the capital was more particularistic, establishments in capital would be more likely to engage in particularistic corrupt transactions. Generally, the empirical models take the form:

$$CORRUPT_{ij} = \beta CAPITAL_{ij} + CONTROL_{ij} + SECTOR_{ij} + COUNTRY_{ij}$$

, where CORRUPT is the corruption proxy for establishment *i* in country-year *j*, CAPITAL is a dummy variable indicating whether the establishment is located in the capital city, CONTROL is a set of control variables, and COUNTRY is a set of country-year effects. This model therefore tests whether or not there is a difference in corruption experience/perception between firms in the capital and hinterland within the same country. Control variables include size categories (measured in number of employees in the establishment); the age of the firm in years + 1, logged; the number of years of experience of the establishment's top manager + 1, logged; and a set of sector effects. The sample includes all non-governmental, domestic establishments for which data is available.

These proxies for corruption experience used in this analysis are whether or not and to what degree establishments engage in informal payments of government employees. If proximity lowered transaction costs related to corruption and rent-seeking, firms in the capital would be expected to be more likely to make informal payments. The most direct beneficiaries of informal payments are those government workers which collect the payments and whatever supervisors (including politicians in the capital) they

collude with. The most obvious losers are the firms that make the payment, as they represent an additional cost of doing business. These costs may be especially high for firms for which the transaction costs borne by government officials for making such transactions is lower, as the state then has an incentive to create regulations which firms have to make informal payments to overcome. However, informal payments may also create a barrier to entry which allows those firms which are willing or able to make the payments to enjoy rents; the informal payment may therefore represent a price for a monopoly. Informal payments for government services may therefore either harm or benefit firms which make the payment. The survey includes responses to questions concerning whether or not a firm made an informal payments for operating licenses, licenses for a range of government services, typically if a license for those services was sought within a couple of years of the survey, and whether or not an informal payment was made in connection with a tax audit. Because of the discrete nature of the response variable, the model is estimated using conditional logit (country-year as the group variable). In addition, the survey includes responses to a question asking the total amount of informal payments made in the last year as a % of annual sales, which is estimated using OLS.

**Table 4.1. Survey Results – Descriptive Statistics**

<b>Variable</b>	<b>Obs</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Min</b>	<b>Max</b>
<b>CORRUPT</b>	35332	0.000457	1.001375	-1.73251	1.807787
<b>GOVINEFF</b>	30526	-0.03244	0.985672	-1.54945	3.333253
<b>% Informal Sales</b>	22156	2.113652	6.252883	0	100
<b>Operating License</b>	10743	0.193056	0.394715	0	1



<b>Import License</b>	4959	0.155072	0.362009	0	1
<b>Construction License</b>	5470	0.215174	0.41098	0	1
<b>Water License</b>	2784	0.14296	0.350095	0	1
<b>Tax</b>	23080	0.171967	0.37736	0	1
<b>CAPITAL</b>	22758	0.263204	0.440382	0	1
<b>POP, &gt; 1m</b>	22758	0.182617	0.386361	0	1
<b>POP, 250k to 1m</b>	22758	0.214913	0.410771	0	1
<b>POP, 50K to 250k</b>	22758	0.224097	0.416995	0	1
<b>POP, &lt; 50k</b>	22758	0.115168	0.319232	0	1
<b>AGE</b>	39472	16.24787	14.84893	0	310
<b>EXPERIENCE</b>	39371	16.52808	10.99839	0	231
<b>SIZE, &gt; 100</b>	39939	0.15053	0.357594	0	1
<b>SIZE, 20 to 99</b>	39939	0.321315	0.466987	0	1
<b>SIZE, &lt; 20</b>	39939	0.528155	0.499213	0	1
<b>Limited Partnership</b>	39938	0.040488	0.197103	0	1
<b>Partnership</b>	39938	0.051755	0.221535	0	1
<b>Sole Proprietorship</b>	39938	0.381817	0.485838	0	1
<b>LLC</b>	39938	0.483049	0.499719	0	1
<b>Public</b>	39938	0.042892	0.202615	0	1

The results are presented in Table 4.2. The results indicate that, controlling for firm age, manager experience, and sector, among establishments which have purchased a the license, those located in the capital were more likely to have made an informal payment to a government official for a operating license, construction license, and water license. In addition, among those establishments that were inspected by tax officials, establishments in capitals were more likely to have made an informal payment to those officials. These results are consistent with the particularistic hypothesis which holds that individual agents in the capital are more likely to engage in particularistic forms of corruption/rent-seeking. However, the coefficient for total informal payments, though positive, is statistically insignificant, indicating that establishments in the capital pay no

more as a percentage of their total sales than establishments in the hinterland. The apparent contradiction between the results from the specific license questions and the aggregate informal payments results may be due to a number of factors. The respondents to the questions may have had a limited recollection of what informal payments have been made, which is exacerbated by the fact that such payments are unlikely to be recorded, resulting in very noisy responses. The specific services specified in the survey may not be representative of the larger pool of government services for which firms may make informal payments. Establishments in the capital, though more likely to make a payment in relation to the acquisition of a license or tax inspection, may be less likely to experience these events, due to lower regulation, potentially a reflection of their superior lobbying power. Finally, establishments in the capital may have to pay less when they do make a payment due to their more frequent interactions with government officials, lowering the perceived risk of engaging in corrupt transactions for those officials.

**Table 4.2. Informal Payments**

	<b>Operating License</b>	<b>Import License</b>	<b>Construction License</b>	<b>Water License</b>	<b>Tax</b>	<b>% Sales Informal</b>
<b>CAPITAL</b>	1.27*	0.91	1.34***	1.67**	1.40***	0.13
	(0.18)	(0.16)	(0.15)	(0.41)	(0.18)	(0.23)
<b>SIZE, &gt; 100</b>	1.09	0.66	0.99	0.67**	1.18	-0.50**
	(0.16)	(0.13)	(0.13)	(0.13)	(0.12)	(0.21)
<b>SIZE, 20 to 99</b>	1.05	0.75	1.17	0.76	1.20**	-0.10
	(0.14)	(0.12)	(0.12)	(0.15)	(0.09)	(0.17)
<b>AGE</b>	1.07	1.01	1.04	0.86	0.90*	0.22*
	(0.11)	(0.11)	(0.09)	(0.08)	(0.06)	(0.12)
<b>EXPERIENCE</b>	0.95	0.91	1.01	1.22	1.07	-0.02
	(0.08)	(0.14)	(0.08)	(0.15)	(0.06)	0.10
<b>Country-Year Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sector Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes
<b>Countries</b>	49	50	59	47	61	67
<b>N</b>	4588	1765	3050	1365	12532	10243

<b>pseudo R<sup>2</sup></b>	0.0038	0.0206	0.0082	0.0214	0.0066	0.0042
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Notes: Significance thresholds: \*p < .10, \*\*p < .05, \*\*\*p < .01. Standard errors in parenthesis are clustered by country-year. First five dependent variables was estimated using conditional logit (country-year and sector effects), while the last was estimated in using OLS (with country year and sector effects). Explanatory variables include a dummy indicating if establishment is located in capital (CAPITAL); number of employee in establishment categorical dummy variables (SIZE); the log of the age of the establishment + 1 (AGE); the log of the number of years of experience + 1 of the establishment's manager. Establishments are all single-facility, private-sector, domestic firms; including all firms does not qualitatively change the results.

While no question in the survey directly addresses whether or not establishments engage in collective forms of rent-seeking (local public interest lobbies, mobs, etc.), if capital residents did engage in more effective collective action, the result would be expected to take the form of policies which benefit capital city residents and businesses, such as more funding for education, transportation, business subsidies, etc. These policies may be viewed as the result of legal rent-seeking or corruption. The survey does include several questions concerning the effects of political corruption on establishment operations. These questions take the form of multiple response questions asking the respondent the degree to which corruption and political instability are obstacles to business operations. There are five possible ordered responses to these questions: no obstacle, minor obstacle, moderate obstacle, major obstacle, and very severe obstacle. These were coded on a scale of one to five, with higher values indicating a greater obstacle. In addition, another question asks whether or not the court system is fair, impartial, and uncorrupted; possible responses include strongly disagree, tend to disagree, tend to degree, strongly agree. The responses to this question were coded into a four point scale, with higher values indicating greater agreement that the courts are uncorrupt. Any one of these three measures is likely to be an imperfect proxy for the effect of

corruption/rent-seeking by political elites. Consequently, to derive a measure less subject to error, the first principle component was extracted from these variables. Each variable had the expected loading (positive for corruption and political instability, negative for court impartiality). Larger values on this variable are interpreted as indicating that high-level corruption is a more significant obstacle to an establishment's operations.

Results obtained from regressing this composite corruption measure (CORRUPT) on the covariates are presented in Table 4.3. The first column results indicate that establishments in capitals tend to assess corruption as being a greater obstacle to their operations than establishments in the hinterland. This is not consistent with the collective rent-seeking hypothesis, but is consistent with a particularistic rent-seeking mechanism where only specific sections of the capital's population benefits from corruption and rents can be extracted from either the hinterland or capital; for reasons already mentioned, rents may be more likely to be extracted from the capital. One possibility suggested by the results in Table 1 is that these rents take the form of informal payments for government services, the paying of which increases the costs of business for firms in the capital. To test this possibility, the corruption index is regressed on the informal payment variables from Table 1 (INFORMAL). The results are consistent with firms which make informal payments generally perceiving corruption as a greater obstacle to their operations. CAPITAL generally remains significant, even when controlling for aggregate informal payments, indicating that perceptions of the effects of corruption on respondent's operations are not simply a function of their own experience making informal payments, but may represent the effects of other forms of rent-seeking, such as

lobbying for business regulations, or may result from a spillover effect from the increased cost of government services on the respondent's customers and suppliers.

**Table 4.3. Perceptions of Corruption, OLS Results**

	Base	Operating License	Import License	Construction License	Water License	Tax	% Sales Informal
<b>CAPITAL</b>	0.15*** (0.03)	0.08* (0.05)	0.14* (0.08)	0.06 (0.04)	0.10 (0.06)	0.13*** (0.03)	0.12** (0.05)
<b>INFORMAL</b>		0.38*** (0.04)	0.33*** (0.06)	0.44*** (0.04)	0.31*** (0.09)	0.40*** (0.03)	0.01*** (0.00)
<b>SIZE, &gt; 100</b>	0.01 (0.04)	0.08* (0.04)	0.02 (0.07)	0.01 (0.05)	-0.01 (0.07)	0.03 (0.03)	0.06* (0.03)
<b>SIZE, 20 to 99</b>	0.04* (0.02)	0.10*** (0.03)	0.05 (0.07)	0.01 (0.04)	0.06 (0.06)	0.04** (0.02)	0.09 (0.03)
<b>AGE</b>	-0.00 (0.01)	-0.02 (0.02)	-0.02 (0.03)	-0.00 (0.02)	-0.01 (0.04)	-0.01 (0.01)	-0.01 (0.02)
<b>EXPERIENCE</b>	0.03** (0.01)	0.02 (0.02)	0.05 (0.05)	0.04 (0.03)	0.02 (0.05)	0.03** (0.01)	0.03 (0.02)
<b>Country-Year Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Sector Effects</b>	Yes	Yes	Yes	Yes	Yes	Yes	Yes
<b>Countries</b>	67	65	67	67	67	67	67
<b>N</b>	18946	4405	1794	2782	1470	11236	9115
<b>R<sup>2</sup></b>	0.04	0.04	0.03	0.04	0.03	0.05	0.09

Notes: Significance thresholds: \*p < .10, \*\*p < .05, \*\*\*p < .01. Standard errors in parenthesis are clustered by country-year. Explanatory variables include a dummy indicating if establishment is located in capital (CAPITAL); number of employee in establishment categorical dummy variables (SIZE); the log of the age of the establishment + 1 (AGE); the log of the number of years of experience + 1 of the establishment's manager. Establishments are all single-facility, private-sector, domestic firms; including all firms does not qualitatively change the results.

If respondents in a national capital view corruption as more of an obstacle than firms in the country's hinterland, then respondents should also differ in their views of the effects of government activity broadly on business operations. An index of the degree to which government negatively effects a firm's operations, GOVINEFF, was constructed from responses to nine questions available in the consolidated survey concerning the

degree to which government outputs and outcomes were obstacles to the establishment's operations. The outputs included business licensing, tax administration, tax rates, the courts, trade regulation, and labor regulations. The outcomes included transportation, crime, and education. The individual responses were coded in a way similar to the corruption and political instability variables discussed above. The first principle component was extracted from the nine indicators; all had positive loadings. Higher values on GOVINEFF are interpreted as indicating that government is perceived as an obstacle to a firm's operations.

Results are presented in Table 4.4. The results in the first column indicate that respondents in a country's capital city tend to view government as more an obstacle to business operations than respondents in the hinterland, consistent with the corruption results. Due to the possibility that the provision of government goods and services may be subject to economies of scale, in the second column, a set of categorical size variables for non-capital cities are also included. The results from this regression indicate that among firms in the hinterland, those located in cities with a population between 50 and 250 thousand tend to perceive government as more of an obstacle than those located in larger or smaller cities. However the larger and smaller cities do not differ significantly in the perceived effect of government. There is thus not much indication that scale has a linear relationship with business-friendly government. In the third column, CORRUPT is added as a control from the first column specification. The coefficient on CORRUPT is highly significant, while the coefficient on CAPITAL shrinks dramatically and loses significance. This indicates that the difference in perceptions between capital and

hinterland respondents in respect to how much of an obstacle government is to their operations is explained to a large degree by their differences in their views on the effects of corruption. This is consistent with differences in governance quality between capital and non-capital regions being a result of differences in the level of rent-extracting activity by the government. The results in the fourth column indicate that once perceptions of the effect of corruption on business is controlled for, the effect of city population for non-capital establishments on perceptions of government ineffectiveness becomes more linear and positive. This implies that size is associated with lower levels of corruption (or effects of corruption) for non-capital cities. Collectively, these results imply that the effect of being located in the capital on the costs a firm bears as a result of poor governance is not simply a result of the fact that capitals are relatively large cities.

**Table 4.4. Perceptions of Government Effectiveness, OLS Results**

	<b>Unconditional</b>		<b>Conditional</b>	
<b>CAPITAL</b>	0.12***	0.19***	0.03	0.10***
	(0.04)	(0.05)	(0.03)	(0.03)
<b>CORRUPT</b>			0.56***	0.56***
			(0.02)	(0.02)
<b>POP, &gt; 1m</b>		0.08		0.09*
		(0.05)		(0.04)
<b>POP, 250k to 1m</b>		0.08		0.09*
		(0.05)		(0.05)
<b>POP, 50K to 250k</b>		0.12***		0.10**
		(0.04)		(0.04)
<b>SIZE, &gt; 100</b>	0.23***	0.23***	0.22***	0.22***
	(0.03)	(0.03)	(0.02)	(0.02)
<b>SIZE, 20 to 99</b>	0.14***	(0.15)***	0.12***	0.12***
	(0.02)	(0.02)	(0.01)	(0.01)
<b>AGE</b>	-0.00	-0.00	-0.01	-0.01
	(0.01)	(0.01)	(0.01)	(0.01)
<b>EXPERIENCE</b>	0.01	0.01	0.00	0.00
	(0.01)	(0.01)	(0.01)	(0.01)
<b>Country-Year Effects</b>	Yes	Yes	Yes	Yes
<b>Sector Effects</b>	Yes	Yes	Yes	Yes

<b>Countries</b>	67	67	67	67
<b>N</b>	17110	17110	15702	15702
<b>R<sup>2</sup></b>	0.04	0.03	0.41	0.41

Notes: Significance thresholds: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ . Standard errors in parenthesis are clustered by country-year. Explanatory variables include a dummy indicating if establishment is located in capital (CAPITAL); categorical dummies for the population of cities in which non-capital establishments are located (POP); number of employee in establishment categorical dummy variables (SIZE); the log of the age of the establishment + 1 (AGE); the log of the number of years of experience + 1 of the establishment's manager. Establishments are all single-facility, private-sector, domestic firms; including all firms does not qualitatively change the results.

The results up to this point indicate that for the average respondent in the sample being in the capital is associated with both greater experience of rent-seeking/corruption and bearing greater costs from rent-seeking/corruption. However the sample itself may not be representative of conditions that effect firms in developing countries in general. The effect of being in a capital city may vary across countries due to differences in institutional and geographic characteristics. For example, Ades and Gleaser (1994) argue that residents of capital/primate cities have more influence over policymakers in non-democracies due to the fact that, absent universal access to the voting booth, collective action is geographically constrained. In addition, one may expect rent-seeking to be a greater problem in relatively larger countries and capital cities due to there being a larger pool of individuals from which rents can be extracted and more competition for those rents. To test for potential heterogeneity, in Table 4 the three available continues proxies for corruption are regressed the base model, while adding interactions between CAPITAL and a series of institutional, economic, and geographic scale variables. The institutional variables include the Polity 2 index, POLITY, and an index measuring checks in balances within the central government, CHECKS, which is taken from the World Bank's



Database of Political Institutions (higher values mean more veto points in the government. Per capita GDP (logged, Penn World Tables) is used as a measure of economic development. The scale variables include the capital population as a % of the total urban population (PRIMACY), the urbanization rate (URBRATE), the country population (NATPOP, logged)), and the land area of the country (LAND, logged), all taken from the World Bank.

The results for the heterogeneity tests are presented in Table 4.5. For CORRUPT, none of the interaction terms are significant, providing little evidence that the effect of being located in the capital on perceptions of the costs of corruption varies across countries. There is however, evidence of country heterogeneity in the case of GOVINEFF; the interaction between CAPITAL and POLITY is marginally significant and positive, which is consistent with the capital effect on government ineffectiveness being larger in more democratic countries. This is consistent with the model specified in Ales and Glaeser (1994), where capital residents may have an advantage relative to the hinterland in organize the population to lobby for a greater investment in public goods by the government. It may also reflect that fact that politicians in more democratic countries may have territorial constituencies, which gives an incentive to spread resources throughout the country due to distribution considerations in the form of pork barrel spending; autocracies, by contrast, are more politically centralized and may have an incentive to invest public goods in the capital city due to the existence of economies of scale in government. There is also some indication that the effect of being in the CAPITAL varies based on geography. The interaction between CAPITAL and the

national population is statistically significant and negative, while the interaction with land area is statistically significant and positive. This may reflect more densely populated countries having more integrated economies generally, which would tend to reduce regional differences in access to public goods through arbitrage or the potential for migration, consistent with Tiebout (1956). The increase in the size of the capital effect in countries with larger land areas may of course reflect the fact that in large countries, hinterland firms are farther from the government. Consistent with both the intra and inter governmental rent-seeking models presented above, governments may therefore have less of an incentive to extract rents from the hinterlands in larger countries because of the difficulty in monitoring rent-collection by its agents, as well as the greater potential for the rise of black-markets or alternative governments in these countries.

**Table 4.5. Cross-Country Heterogeneity, OLS Results**

	<b>CORRUPT</b>	<b>GOVINEFF</b>	<b>% Sales Informal</b>
<b>CAPITAL</b>	0.16***	0.09**	0.49
	(0.04)	(0.04)	(0.35)
<b>CAPITAL * POLITY</b>	0.00	0.02*	0.01
	(0.01)	(0.01)	(0.08)
<b>CAPITAL * CHECKS</b>	0.00	0.05	0.81*
	(0.03)	(0.05)	(0.46)
<b>CAPITAL * GDPPC</b>	-0.01	-0.00	-0.14
	(0.05)	(0.05)	(0.70)
<b>CAPITAL * PRIMACY</b>	-0.00	-0.01	0.08***
	(0.00)	(0.01)	(0.03)
<b>CAPITAL * URBRATE</b>	-0.00	-0.00	0.03
	(0.00)	(0.00)	(0.02)
<b>CAPITAL * NATPOP</b>	-0.03	-0.16**	0.09
	(0.07)	(0.07)	(0.39)
<b>CAPITAL * LAND</b>	0.02	0.09**	0.29
	(0.04)	(0.04)	(0.34)
<b>Country-Year Effects</b>	Yes	Yes	Yes
<b>Sector Effects</b>	Yes	Yes	Yes

<b>Countries</b>	52	52	52
<b>N</b>	15615	13886	7999
<b>R<sup>2</sup></b>	0.03	0.05	0.41

Notes: Significance thresholds: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ . Standard errors in parenthesis are clustered by country-year. CAPITAL is interaction with country level variables, including the country's Polity 2 score (POLITY); an index of the number of checks within government (CHECKS); per capital GDP (GDPPC); urban primacy (PRIMACY); urbanization rate (URBRATE); logged country population (NATPOP); and the logged country land area (LAND). Other explanatory variables (not shown to save space) include the number of employee in establishment categorical dummy variables (SIZE); the log of the age of the establishment + 1 (AGE); the log of the number of years of experience + 1 of the establishment's manager. Establishments are all single-facility, private-sector, domestic firms; including all firms does not qualitatively change the results.

The effect of being in the capital on respondent's stated percentage of annual sales made in informal payments also appears to vary across countries with different institutions and geographies. The interaction between CAPITAL and CHECKS is statistically significant and positive, indicating that the capital effect is larger in countries with divided governments; one explanation for this is that divided governments do not internalize the full costs of rent seeking relative to unified governments. For example, if one party controls an agency which provides water and demands a high price for a water license, the marginal cost of a firm opening an additional facility may rise. In equilibrium this will reduce the number of establishments and reduce demand for construction licenses, and thus informal payments to the agency which provides construction licenses. If the party in control of the provision of water does not also control the agency that issues construction licenses, they will not internalize the costs of putting a high price on water. If both agencies were controlled by the same party, the total informal payments demanded for services per establishment would then be expected to be lower than when government is divided. The interaction with PRIMACY is also positive indicating that

when the capital is larger relate to other cities, the effect of being in the capital on informal payments is larger. This may be due to the existence of economies of scale in government provision. As the size of the cities rise, the average cost for the provision of public goods may decline; if the formal price is set at cost, then in the larger cities the difference between the formal price and the willingness to pay for publicly provided goods and services will be higher, giving increased scope for informal payments. In addition, this result is consistent with the inter-governmental rent-seeking model; when urban primacy rises, the potential total rents that can be drawn from the capital region rises relative to that of the hinterland. Consequently, the government may be less willing to enact rent-seeking policies in the hinterland as the potential rents that can be extracted there through such policies are outweighed by the rents that can be lost in capital due to the potential of a difficult-to-suppress political opposition arising from the hinterland.

While the results up to this point indicate that establishments in capitals are more likely to engage in particularistic corruption and rent-seeking and are more likely to bear the costs of grand corruption, this relationship cannot be assumed to be causal. This is because establishment location may not be endogenous. If rent-seeking takes the form of interregional transfers, then firms which are susceptible to state predation may choose to locate in the capital; because of unobserved features of these firms, they may be more likely to suffer from corruption even from the capital. This would lead to a positive bias in the OLS results. On the other hand, if firms in the capital were truly more likely to be subjected to appropriation and suffer from state backed monopolies, the firms that would

suffer most from this rent-seeking would be more likely to locate in the hinterland; in this case, the OLS results would suffer from a downward bias.

To determine if the exogenous effect of being located in the capital on experience with and the costs of corruption, the base empirical models for the continuous proxies for corruption were estimated using two-stage least squares (2SLS) regression. This required the use of an appropriate instrumental variable that 1) is correlated with CAPITAL and 2) is uncorrelated with the error term for the base model. Ownership structure was identified as a potential instrument based on these criteria. The justification for the first condition is that firms whose ownership arrangements feature some form of limited liability typically face principle agent problems due to the fact that the majority of the ownership is not held by the managers. As a response to the resulting information asymmetries, the location of limited liability firms tend to be biased towards locations which are in close proximity to their owners who would be expected to be heavily concentrated in the primate/capital city (Uysal et al. 2004; Loughran and Schulz 2005; John et al 2008). The justification for the second condition is that there has been little empirical evidence linking ownership structure to the tendency of firms to engage in political corruption; Frye (2010), for instance, did not find any evidence that Russian firms subject to outside ownership engaged in greater degrees of lobbying. The survey categorizes establishments as being one of five types of firms; limited partnerships, partnerships, privately held, limited liability companies (LLC), publicly listed companies, and sole proprietorships. These categories are coded as a series of dummy variables, with sole proprietorships acting as

the base category. The four dummy variables are used as excluded instruments in the 2SLS.

Results for the first stage of the three 2SLS regressions are presented in Table 4.6. They indicate that establishments belonging to limited partnerships and limited liability companies are more likely to locate in the capital than establishments which are part of firms with other ownership structures. Surprisingly, publicly traded companies show no greater tendency than sole proprietorships in being located in the capital. This may be due to the fact that, in contrast to limited partnerships and LLCs, owners of publicly traded companies have may find it easier to disinvest from underperforming firms and thus put less pressure on management to locate their operations in large cities where their activities can be easily monitored.

**Table 4.6. Two-Stage Least Squares Regression, First Stage Results**

	<b>CORRUPT</b>	<b>GOVINEFF</b>	<b>% Sales Informal</b>
<b>Limited Partnership</b>	0.05**	0.04*	0.02
	(0.02)	(0.02)	(0.02)
<b>Partnership</b>	-0.01	-0.02	0.03
	(0.01)	(0.01)	(0.02)
<b>LLC</b>	0.06***	0.07***	0.04
	(0.02)	(0.02)	(0.03)
<b>Sole Proprietorship</b>	0.00	0.02	-0.05
	(0.02)	(0.03)	(0.03)
<b>Country-Year Effects</b>	Yes	Yes	Yes
<b>Sector Effects</b>	Yes	Yes	Yes
<b>Countries</b>	67	67	67
<b>N</b>	18945	17109	10242

Significance thresholds: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ . Standard errors in parenthesis are clustered by country-year. Four ownership variables indicate whether the company is a limited partnership, partnership, limited liability company (LLC), or publicly traded company. Sole proprietorship is the excluded category. Included instruments (not shown to save space) include the number of employee in establishment categorical dummy variables (SIZE); the log of the age of the establishment + 1 (AGE); the log of the number of years of experience + 1 of the establishment's manager. Establishments are all single-facility, private-sector, domestic firms; including all firms does not qualitatively change the results.

The results for the second stage of the 2SLS regressions are presented to Table 4.7. The coefficient for CAPITAL remains positive and significant for both CORRUPT and GOVINEFF, indicating that an exogenous shift in location from the hinterland to the capital is associated with an increase in the perceived burden of corruption/rent-seeking and poor governance on business operations. In both cases, the coefficients are larger than their OLS counterparts, indicating that the OLS results suffered from a downward bias. This is consistent with firms which are at risk from corruption choosing to locate in the hinterland in order to mitigate corruption-related costs. The coefficient for informal payments is positive, larger than its OLS counterpart, but statistically insignificant. In all cases, the instruments pass the Hansen over-identification test, which indicates that ownership structure does not have a direct effect on the obstacles of corruption independent of location.

**Table 4.7. Two-Stage Least Squares Regression, Second Stage Results**

	<b>CORRUPT</b>	<b>GOVINEFF</b>	<b>% Sales Informal</b>
<b>CAPITAL</b>	0.74*	0.69*	3.40
	(0.43)	(0.39)	(3.07)
<b>SIZE, &gt; 100</b>	-0.02	0.20***	-0.60***
	(0.04)	(0.03)	(0.23)
<b>SIZE, 20 to 99</b>	0.03	0.13***	-0.20

	(0.02)	(0.02)	(0.18)
<b>AGE</b>	0.00	-0.00	0.24**
	(0.01)	(0.02)	(0.12)
<b>EXPERIENCE</b>	0.03***	0.01	-0.01
	(0.01)	(0.01)	(0.09)
<b>Country-Year Effects</b>	Yes	Yes	Yes
<b>Sector Effects</b>	Yes	Yes	Yes
<b>Countries</b>	67	67	67
<b>N</b>	18945	17109	10242
<b>Hansen J p-value</b>	0.68	0.19	0.36

Notes: Significance thresholds: \* $p < .10$ , \*\* $p < .05$ , \*\*\* $p < .01$ . Standard errors in parenthesis are clustered by country-year. Explanatory variables include a dummy indicating if establishment is located in capital (CAPITAL) which is treated as endogenous; the number of employee in establishment categorical dummy variables (SIZE); the log of the age of the establishment + 1 (AGE); the log of the number of years of experience + 1 of the establishment's manager. Establishments are all single-facility, private-sector, domestic firms; including all firms does not qualitatively change the results.

On the whole, the analysis of micro-level survey data is consistent with the country level data. Business establishments located in a country's capital are more likely to both engage in corruption, proxied here by informal payments, and perceive corruption and poor governance as greater obstacles for business. These results lend little support to the interregional transfer interpretation of the country level results as it would imply that residents of the capital would enjoy greater enhanced access to public goods and services relative to the hinterland and presumably lower levels of internal, particularistic corruption in the capital relative to the hinterland. The evidence presented here is more consistent with a greater level of particularistic rent-seeking in the capital, where the rents are generated within the capital itself.



## **CHAPTER 5. CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH**

### **5.1. Summary and Conclusions**

The purpose of this dissertation has been to re-examine theory and evidence concerning the relationship between politics and urban hierarchy, specifically, the connection between the predominance of a country's largest, or primate, city and its status as a national capital. Traditional theoretical and empirical analysis in this issue has argued that being the capital has a positive effect on the growth of a city and that government intervention in the economy has led to increased urban concentration, especially in developing countries. The two primary mechanisms behind this causal inference espoused in the literature are the tendency of high-status, high-wage government employment to concentrate in the capital, and the geographical advantages that residents of the capital have in lobbying the government for transfer payments and public goods. Both these effects are thought to raise returns for capital residents relative to hinterland residence, inducing migration to the capital and thus leading to greater urban primacy.

Both of these effects, however, assume that government capacity is such that there is no difference between the capital and hinterland with respect to the cost of gathering and extracting revenue. Both the literature analyzing the history of European state formation and the revenue-raising policies of modern developing countries indicate that this is not a realistic assumption. To extract revenue, governments typically have to

employ local agents, both civilian and military, who have an incentive to divert rents to their own interests. The ability of the government to curtail these principal agent problems depends on its ability to monitor its revenue-collecting agents. Monitoring costs will in turn be a function of the number of agents and, potentially, their distance from the government. Consequently, the government may in fact find it more effective to rely on rents collected from excises from nearby concentrated populations, economies, and profit making sectors than on widely distributed taxes in local and densely populated and distant regions,. To the degree that some counties have been able to distribute their tax burden widely, historical and contemporary evidence suggests that this has at least partially been due to the existence of political institutions which have aligned the interests of government with those of public and assured that revenue will be spent on locally demanded public goods. Non-government agents thus have a greater incentive to both pay their taxes and assure that others pay theirs and to report cases of abuse of professional revenue collectors, mitigating principal-agent problems and the need of the government to employ an expensive, professional tax-collecting bureaucracy. Thus, to the degree that the government does engage in rent-seeking, the capital may be ‘taxed’ at a higher per capita rate than the hinterland.

These ideas were illustrated in Chapter 2 by two models of the ability of government to raise revenue from an excludable publicly provided good. The first involved purely internal constraints where the incumbent government was assumed to have a natural monopoly over the good. The second modeled external constraints, by assuming it is possible for an opposition group to enter the ‘market’ for supplying the

good. The internal model applied two standard sub-models, the principle-supervisor agent model and the rent-seeking model. Each illustrates potential explanations for government favoritism to capitals. Several counterintuitive implications were found. First, under reasonable assumptions about the role of distance in determining levels of oversight and collusion, it was determined that the costs of providing public goods and services to the capital may or may not be higher in the capital than the hinterland. This is contrary to the assumptions of past theoretical and empirical literature on the topic. Second, it is not altogether clear that the level of services provided to the capital will be higher than in the hinterland. This is due to the potential for collusion between public goods providers in the capital and principles/supervisors. Third, under circumstances of high potential for collusion between supervisors and agents, it may be optimal both from a social welfare and regional equity standpoint to devolve contracting decisions to the potentially corruptible supervisor.

The external model featured a multiple step game with two regions (capital and hinterland) where the incumbent government first sets the price for a quasi-public good. Next a potential local (one in each region) opposition decides whether it wishes to enter and supply the local market based on local prices and then, once, it has entered, it can supply the market in that and/or other regions. Entry is limited by a fixed threshold cost which represents the coercive ability of government to deter rival organizations and which is assumed to decay with distance due to principal-agent problems within the coercive apparatus. In the capital, government was assumed to have an automatic monopoly at the minimum, monopoly quantity provided by the government. This

monopoly quantity does not allow enough residual demand to make entry profitable given the high costs that coercion places on entry into the capital market. In the hinterland, the government could pursue one of two potential strategies. It could produce a level of output, increasing in distance from the capital, that was sufficient to deter entry by a local opposition or it could simply allow entry and produce a level of output consistent with a Stackelberg duopoly game. In either case, the hinterland will enjoy higher output and consumer welfare than the capital. However, which strategy the government will pursue was also a function of the size of the capital, and thus level of demand, relative to the hinterland. If the market in the capital is sufficiently large relative to the hinterland, then the government would have an incentive to provide high enough output in the hinterland to deter entry, even in cases where the cost of entry is low due to high distance from the capital. This is because an opposition, once established, can threaten rents collected in the capital. This implies that in countries with extremely high urban primacy, the role of interregional transfers in explaining concentration may be small both due to the small size of the hinterland and because of the lower rate or levels or both of rent extraction in the hinterland relative to the capital.

Both models of government rent extraction predict that the rate of rent extraction is likely to be higher in the capital than in the hinterland. This prediction was tested using several different analyses and datasets. The first of these was a country level analysis where an index of government effectiveness was regressed on the percentage of a country's population concentrated in the capital as well as several interactions between capital concentration and institutional parameters. These interactions were included

because the model with internal constraints assumed that government preferences for policies which produced rents versus publicly provided goods are influenced by institutional constraints. The results of the empirical analysis were largely consistent with the model. A large concentration of a country's population in the capital was associated with lower government output. The size of the effect was dependent on the degree of openness/democracy and division within the government (though the latter result was not robust). Next, a micro-level, cross-country survey of private-sector firms in developing countries was employed to test whether the efficiency of government and prevalence of corruption was perceived to be higher or lower in the capital relative to the hinterland. The results indicate that firms in a country's capital on average perceive government and specifically government corruption to be an obstacle to business to a greater degree than firms in the hinterland. This is consistent with the predictions of both models that quasi-public goods provision will be lower in the capital. In addition, the effect of capital status on percentage of sales made in informal payments reported by survey respondents was found to vary positively with the level of urban primacy in the country. Again, this is consistent with the predictions of the model with external constraints that governments will have a greater incentive to provide quasi-public goods to the hinterland when the capital region is large, because doing so helps to secure the government's control over the capital. Next, a city level dataset was employed to test the effect of capital status and size relative to the rest of the country on objective measures of outcomes related to the effective provision of public goods. Capitals and relatively large city's were found to have no better outcomes than city's in their country's hinterland when controlling for size

and the country's level of development. In fact they were worse with respect to measures of transportation efficiency and housing policy. This is consistent with this paper's theory, but inconsistent with explanations offered by Henderson and others that the primate city would experience increased public goods provision. Finally, to the degree that increases in urban primacy should be associated with increased rent, standard conflict theory predicts that it should also be associated with increased risk of political instability in periods where a country experiences severe negative economic shocks. This was tested using a country level panel dataset for the period 1960-2004. A dichotomous variable indicating whether a country experienced an informal leadership change was regressed on the country's level of urban primacy. A set of interactions between urban primacy and the one year change in logged per capita GDP and a dichotomous variable indicating whether or not a country was a democracy or autocracy. The results indicate that countries with a high rate of urban primacy tend to be politically more unstable, especially in periods where the economy experiences a downturn. Again, this is consistent with urban primacy being associated with increased potential for government rent-seeking. The empirical analysis thus largely supports the conclusions derived from the theory.

While there has been discussion within the urban primacy literature concerning political and organizational factors which exacerbate inequalities, specifically the tendency of government policy to favor the primate city (usually the capital), little attention has been paid to applying formal theory to the mechanisms underlying that favoritism. This dissertation attempted to address this gap in the literature by considering

the micro-foundations of the geographic biases in government policies. The resulting models imply that the traditional models that hold that governments tends to extract rent from their country's hinterlands and spend it in the capital may not be warranted, as they do not consider the de facto, distance-related constraints on such redistribution. Cross-country empirical analysis is largely consistent with the implications of these models. There is little evidence to suggest that capital/primate cities enjoy substantial benefits over the non-capital regions with respect to the provision of quasi-public goods. In fact, capitals may on average be subject to worse governance than their hinterlands.

## **5.2. Limitations and Directions for Future Research**

Several limitations in the empirical analysis should be kept in mind. While the results of the empirical analysis indicate the existence of a systematic relationship between capital primacy and government effectiveness, there are other potential explanations for this result. Given that capital cities are usually also the country's largest city (Dascher 2000), it is possible that urban scale effects may change perceptions of the effectiveness of governments. If maintaining a given level of public goods is more expensive in large cities than small (Henderson 2002b), then, all else being equal, the governments of countries with large primate cities may be perceived as less effective, even without rent seeking. In addition, large capital cities may facilitate the transmission of information concerning rent-seeking both to country residents and foreign observers, with the result that perceptions of rent seeking within government are biased upwards. A less aggregated analysis may be required to determine the mechanism behind the

observed relationship. In addition, given the ambiguity of the role that proximity between consumers, agents, supervisors, and principles plays in the costs and benefits of government, future empirical analysis should focus on determining sources of cross-country heterogeneity in these relationships. Finally, while the notion of a rent seeking monopolist was touched on here, determining the full social cost of rent-seeking would require a theoretical and/or empirical consideration of rent dispersion. These limitations should lead to caution in using the results of the empirical analysis to make claims about the welfare impact of urban primacy.

Putting these limitations aside, however, if capital/primate cities do not benefit from superior public goods provision, this raises the question of why empirical work often finds that large cities often grow faster under autocratic governments. For example, Ades and Glaeser (1995) found that primate cities were larger under autocratic governments than under democracies; Henderson and Gun Wang (2007) found that larger cities grew faster under autocratic governments. How can these findings be explained in the context of the results presented in this study? It should be noted that neither the theory nor the empirics of this paper are necessarily inconsistent with government fiscal policy leading to increased urban primacy. Even if the hinterland is ‘taxed’ at a lower rate than the capital, if the hinterland is large enough relative to the capital, and if government revenues are spent largely in the capital, then the capital may benefit from a consumption expenditure effect. This might offset a deadweight loss from increased rates of rent-extraction and thus raises aggregate demand for local private goods and services, inducing the movement of capital and labor to the capital and leading to self perpetuating



agglomeration economies consistent with the New Economic Geography (Krugman, 1992 a/b; Krugman 1996a). While the simple models presented here were static and assumed away migration, the creation of a model integrating increasing returns and taxation with geographic constraints would be a worthy avenue for future research.

It should be noted that under such a scenario the benefit residents in the capital receive from being close to government result from the increased income (formal or informal) of government and its agents rather than through the increased provision of public goods. These results provide theoretical and empirical support for an interpretation of the relationship between urban primacy and the capital status of the largest city as reflecting an effect of relative city size on capital status as opposed to the more popular reverse causal direction. If the capital can be taxed at a higher rate than the hinterland, then governments have an incentive to locate the capital in the initially most densely settled region of the country. Doing so will maximize the potential rents the government can extract. As already discussed, other institutional characteristics often thought to cause urban primacy, such as the degree to which a country's government is democratic/constrained and the degree to which a country is fiscally decentralized, may also be endogenous to urban concentration. The results of this analysis also suggest that other, more subtle mechanisms relating institutions to urban primacy should be pursued in addition to a focus on interregional transfers. One possible explanation for the link between institutions and urban primacy, suggested by earlier research (Henderson and Gun Wang, 2007; Bates and Block, 2011), is that autocratic, rent-seeking governments may be more likely to exploit the capital/primate city's size and/or location to extract

revenue from trade passing through the capital. For instance, if the capital is the primary importer of the hinterland's production, due to its size or its status as a port linking the country to external markets, a government may choose to act as a monopsonist. This would lower the price paid for the hinterland's output and constrain demand, thus raising the welfare of residents of the capital. This could result either through raising capital residents' consumer surplus with respect to the output of the hinterland or, if that surplus is absorbed by elite extraction, by raising elite demand for local labor. Wages in the capital would thus rise relative to those in the hinterland. One benefit of such a policy for rulers is that there is no need for the government to employ difficult to monitor rent-collecting agents in the hinterland. Instead, it could simply place customs officials near entry points to capital markets and ports. Such a policy would tend to lower the returns to being a producer in the hinterland and raise the returns to being a consumer in the capital, thus inducing migration and urban concentration. However, the government may also become a residual claimant on the production of the hinterland, and thus has incentive to raise the output of the hinterland through investments in transportation infrastructure, sector-specific education, and the like. Such an explanation is thus not necessarily inconsistent with the empirical evidence presented in Chapter 4 indicating that firms in the hinterland tend to view public goods provision as less of an obstacle than firms in the capital.

A second, related explanation is that the constraints that geography imposes on governments may not affect the provision of all types of public goods equally. In Chapter 2, it was noted that publicly provided goods which allow the government to exclude

individuals from benefiting from their provision are more likely to be subject to rent-seeking. This is because the government can charge a price for access to the good or service without requiring the imposition of a broad based tax, with the necessary institutional reforms, to fund its provision. However, even if providing such a good does not come with a direct net fiscal benefit to the government, there can be an indirect effect to providing such a good to the capital and not providing it to the hinterland. This would be the case if doing so results in migration from the hinterland to the capital and thus allows the government to extract more rents for goods and services which are excludable in the capital. The lack of direct rents that can be extracted from the provision of these pure public goods means that potential challengers in the hinterland may not be able to finance recruitment and operations with the prospect of immediate rents. Even if the residents of the hinterland are aware of the relative under provision of these goods, collective action problems may prevent them from lobbying the government or organizing their own alternative means of service provisions. Consequently, to prevent a political challenge from the hinterland, the government may only have to provide the types of goods and services to the hinterland from which rents can be easily extracted. The government does not have to provide pure public goods. The latter type of public good may include environmental regulations, such as air and water emissions, which have inherently widely distributed benefits which are not immediately observable. Consequently, they may not show up in the data on perceptions of government quality used in Chapters 3 and 4 and may even be perceived as an impediment to business operations by survey respondents due to the visible burden they place on firms operating

in the country. If such goods also have long-run implications for economic growth, then the policies undertaken by autocratic governments may lead to greater urban primacy even if the most visible activities of government appear to favor the hinterland.

Another potential explanation for the relationship between autocratic institutions and urban primacy is that the measures of democracy/autocracy used in the empirical literature are a proxy for the level of fiscal and political decentralization. This decentralization may take the form of local governments having greater fiscal powers or national politicians having local, territorial based constituencies. Political and fiscal decentralization may conceivably lead to a greater public investment in the hinterland by deconcentrating the political elite and politically empowering the residents outside the largest cities. However decentralization may also lead to an underinvestment in public goods due to the fact that local governments may not internalize the full benefits of such investment. For example, investments in education may lead to increases in the growth of the large cities due to the greater technical expertise necessary to mitigate congestion costs (Henderson and Gun Wang, 2007). Neither the governments of jurisdictions located outside the largest regions nor governments in heavily decentralized large cities will internalize all of these benefits, resulting in underinvestment in education. This problem may be exacerbated if, consistent with this paper's model as well as Bardhan and Mookherjee (2000), local governments are more likely to be captured by elites. For example, land owners may under invest in education because it will ultimately result in migration from the hinterland, raising the price of labor. By contrast, heavily centralized governments would have an incentive to invest in education in the hinterland, as a more

educated workforce may lead to the growth of the capital. This would in turn lead to more rents for the government.

Another possibility is that despite the costs associated with living in the capital, individuals, both in the hinterland and the capital, overestimate the benefits of residing in the capital city. This may be especially likely to occur under autocratic governments. Todaro (1969) argues that high levels of urban unemployment are the result of migrants considering both the probability of finding an urban (industrial) job once in the city as well as the income that job will provide relative to rural alternatives. Because urban jobs typically pay more than rural jobs, individuals are willing to migrate to cities and suffer through long spells of unemployment. Their expected income if they migrate to the capital, i.e. the product of the probability of finding a job and the income of that job, is higher than the income that results from rural employment. One reason that large cities may grow faster under autocracies is that individuals living under autocratic governments may have an exaggerated notion of the probability of obtaining a high income urban job. This may result from national media focusing its attention on high income neighborhoods and individuals in the capital city, leading poorly informed individuals in the hinterland with the impression that the average capital resident is rich. This bias would be expected to be higher under autocracies, where the government has control over the media, specifically media coverage of the capital. Such governments have an incentive to exaggerate the level of development of the capital city both for reasons of prestige and to attract migrants who are a potential source of rents. If the media does indeed only focus

on the wealthiest segment of a capital's population, rent-seeking could perversely lead to greater migration to the capital by increasing the incomes of the city's political elites.

In addition to exaggerating the benefits of the capital, autocratic governments may be inclined to exaggerate the underdevelopment of the hinterland. Scott (2009) argued that early state-makers in Southeast Asia fostered ideologies which portrayed residents of core regions, where the state's ability to extract rents is high, as being civilized. By contrast, those who chose to live in peripheral, often mountainous regions were stereotyped as uncivilized and violent. These attitudes still exist in countries such as Myanmar (Scott, 2009). This may be one reason why rural residents are willing to migrate to and remain in the capital and other large cities despite the increased vulnerability to exploitation by the government.

The ability of autocratic governments to control their country's media may also contribute to urban concentration by limiting the hinterland's access to published information originating in the capital. A lack of an independent media may inhibit the formation of opposition groups (Knutsen 2009). In the context of the external challenger model presented in Chapter 2, governments may wish to limit media coverage of corruption and rent-seeking in the capital in order to forestall the formation of opportunistic opposition groups in the hinterland. This in turn may force firms to rely on unpublished tacit information which is transmitted by person to person contracts. This may give individuals and firms an incentive to locate in the largest cities, where the number of potential information-sharing contacts is larger (Howells 2002). The Ades and Glaeser (1995) model presents location in the capital as a substitute for democratic

institutions in so far that geographic concentration by facilitating collective action and political influence. This mechanism implies an apolitical channel through which illiberal policies can enhance agglomeration. While tacit information available in large cities may indeed increase the potential for collective action, it may also encourage migration to the capital by increasing the productivity of capital residents relative to the hinterland. Given, as argued in this paper, the government may be able to extract more rents from a spatially concentrated population, this mechanism may provide another explanation for the tendency of autocratic governments to censor formal media.

Finally, the positive association between autocratic institutions and urban concentration/primacy may be attributed to the effects of institutions on country, as opposed to regional level, economic growth. In the presence of congestion costs, it may be expected that as the total urban population of a country grows, urban concentration will decline over time as the cost of residing in larger cities increases. These congestion costs encourage migration by firms and workers to the hinterland. This is especially true for capital-heavy sectors of the economy that do not benefit strongly from external economies (Henderson, 1974). Empirical analysis of the determinants of urban primacy have found a negative association between a country's level of development, typically proxied by GDP per capita, and urban concentration (Henderson 2002a). To the degree that autocratic institutions lead to greater rent seeking behavior within a country, then the resulting deadweight loss from such activities along with the resources diverted from productive activities to rent-seeking may reduce capital investment in a country. This could in turn prevent a sufficient increase in the number of firms to raise congestion costs

in the primate city sufficiently to result in spillover growth in the hinterland. Autocratic institutions may not facilitate, and may even hinder, growth of the capital/primate city. However, such institutions may also promote the *relative* growth of the largest city relative to other cities by hindering the growth of the urban sectors of a country's economy.

An analysis of the salience of these alternative mechanisms by which governments may favor their capital/primate cities would likely require panel data of income, the incidence of taxes and regulations. It would also require survey data on perceptions of geographic inequalities in economic outcomes of service provision at provincial and city level for a large number of countries. With such data, a test could be devised to examine whether net migratory flows, before-tax income, regulatory quality, and perceptions of interregional inequality vary across space. This spatial dependence could in turn be empirically linked to on the nature of national level institutions and distance from the capital. Because the effects of these factors may operate with a substantial lag, long run data on population change (decades or centuries) at the provincial or city level may be required to properly test these hypotheses. Of course, such detailed data is unlikely to be available for most countries for most periods. While beyond the scope of this dissertation, overcoming these methodological challenges should be a focus of future research.



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## **CURRICULUM VITAE**

Sidney Carl Turner joined the doctoral program of the School of Public Policy at George Mason University in 2007. Sidney received his Bachelor degree in Economics from University of North Carolina, Chapel Hill in 2003, and Masters degree in Public Policy from the College of William and Mary, in 2007. His research interests include local economic development, urbanization, and their relationship with political institutions. He has authored research papers that have been published in journals such as the Annals of Regional Science.