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THE POLITICAL INSTITUTIONAL DETERMINANTS OF LAND-USE CHANGE AND SPRAWL: A CONCEPTUAL MODEL

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Abstract
This paper proposes a conceptual land-use change model that includes a framework for analyzing the political institutional determinants of land-use change. The model is used to explain several previous empirical findings and to generate testable hypotheses. The government bias for sprawl is addressed in the context of the model.
Keywords: Land-use change, sprawl, sprawl bias, planning and zoning

1. INTRODUCTION

In recent years there has been increasing recognition of the importance of studying land and the role human beings play in shaping the land. Much of the inquiry has focused on patterns of land-use change. Theories addressing land-use change have been offered by such diverse fields as economics, urban and regional science, sociology, social physics, environmental history, environmental psychology, biology, ecology, and geography (Briassoulis, 2000). Each discipline has offered useful insights into the processes of land-use change, but to date there is no single unifying theory that integrates the important insights from all the relevant disciplines. In particular, when reviewing the literature a gap in land-use change theory and modeling becomes evident. Many developers of land-use change models acknowledge the importance of political institutional factors. Hubacek and Vazques (2002), for example, note: "Institutional factors set the frame influencing (economic) behavior…Public regulations, such as community plans, zoning ordinances, rent controls, subdivision regulations, building codes, and laws pertaining to mortgage finance shape the development and use of real property". Yet despite the general acknowledgement that institutions play an integral role in the land-use change process, and despite the existence of numerous empirical investigations into the impacts of government policy on land-use, a theoretical framework for analyzing the relationships among various political institutional factors and land-use change has been lacking (see for example Briassoulis, 2000 or National Center for Geographic Information and Analysis, 2001).

The primary purpose of this article is to propose a conceptual model of land-use change that includes a framework for incorporating political institutional factors in the land-use change process. The basic land-use change model developed herein draws extensively from existing theories and models of land-use change, and the political institutional framework is informed by public choice theory. The secondary purpose of the article is to use the conceptual model to explain some empirical results researchers have found regarding the relationship between the political institutional environment of a given locality and the prevalence of sprawl. Extensions of the conceptual model, including testable hypotheses, are also proposed.

2. SPRAWL: DEFINITION AND MEASUREMENT

An analysis of the political institutional dimensions of land-use change would be incomplete without a discussion of sprawl, as it represents the most critical land-use issue in many regions. There is no single accepted definition of sprawl. Burchell et al. (2005) characterize sprawl as "a type of development with…(1) unlimited outward extension into undeveloped areas, (2) low density, and (3) leapfrog development". Burchell et al. (2005) further note that "sprawl is not simply development at less-than-maximum density; rather, it refers to development at a low *relative* density…". Kolankiewicz and Beck (2001) define sprawl as "the rural acres lost as an Urbanized Area spreads outward over a period of time," an Urbanized Area consisting of a central city and its contiguous suburbs. Fulton et al. (2001) distinguish a sprawling area from a "densifying" area as follows: "If land is being consumed at a faster rate than population growth, then [the area] can be characterized as 'sprawling.' If population is growing more rapidly than land is being consumed for urbanization then [an area] can be characterized as 'densifying'".

Even though sprawl is not a precise term, several useful measures have been advanced. Sprawl indices have been developed by such diverse organizations as the Rutgers University Center for Urban Policy Research, Smart Growth America, and *USA Today* (Burchell et al., 2005). Each index has advantages and limitations, a discussion of which is beyond the scope of this article. For the purposes at hand it is simply assumed that a suitable method exists for measuring sprawl, thereby making quantitative assessment possible.

3. A CONCEPTUAL MODEL OF LAND-USE CHANGE

The land-use change model developed here is grounded in economic theory and uses elements of several previous theories and models of land-use change, as well as insights regarding land-use

patterns gleaned from empirical studies. In building the framework, it is assumed that land is allocated or traded via a market mechanism. Government involvement in land-use decisions is therefore viewed as an intervention, for better or worse, in the market for land in a given locality. Since the most relevant scale for sprawl is the municipal level, the study area is assumed to consist of any land that falls under the jurisdiction of a given municipality's policymakers. "Policymakers" is used here as a general term for those who make decisions regarding land use change policy. The land-use change decision is assumed to be made at the level of the individual parcel by the parcel's owner or steward.

Since the model begins with the assumption of the existence of a market mechanism, the demand for and supply of land of a given land-use type must be specified. It is assumed that an initial stock of land exists for each land-use type under study, i.e., the supply of each land-use type is initially fixed. Supply conditions change when government undertakes an action that increases or decreases the supply of land in a given use type. Demand for land is driven by the need for land for certain use types, which could be broadly categorized into residential use, commercial use, and government use. Within each of these there may exist several subcategories. Commercial use might include agricultural land, timber land, industrial land, and land for trade and commerce; residential land may be divided into high, medium, and low density; government land may be divided into municipal, county or parish, state and federal. Demanders of land thus consist of households, business firms, and government agencies. Suppliers of land also consist of members of these three broad groups. All parcels are assumed to be owned initially by some combination of households, business firms, and government. In addition to being primary demanders of land, government may affect the demand side of the market by influencing factors that determine household and business demand for land of various use types. This notion will be examined more closely in a later section as it represents an area where important linkages may be established between various government activities and the land-use change process.

If the initial state at time *t* is considered an equilibrium state in which the quantity supplied for each land use equals the quantity demanded for each land-use type, then the land-use change process is, in economic terms, a process of moving from one equilibrium toward another due to changing market conditions. A time period is the amount of time it takes to transition from one equilibrium to another, or for each economic agent to examine the available information and to make his or her play accordingly, a "play" being to buy, sell, hold, or pass on a given parcel of land. Changes in the relative prices among various land-use types are what lead to changes in composition of land use in a given study area. This postulate follows the pioneering work of J.H. von Thunen (and the later refinements by William Alonso) and the more recent work of Nancy Bockstael, among others (for a review see Briassoulis, 2000).

Following neoclassical theory we may initially assume that the relative prices of the various land-use types in fact carry all relevant information about the market, and that changes in those relative prices reflect changing demand and supply conditions in the market for land of various use types. The price of land may be interpreted as "the price for the use of a piece of land" (Hoover and Giarratani, 1984) or, equivalently, as "the price of the services yielded by land during the specific time period" (Romanos, 1976). This coincides with the economic concept of rent or rental income, which is the return to the owners of land resources.

Following a functional model of land-use change developed by Bockstael, a given parcel of land in the study area, denoted j, which is currently in land-use type a, will be converted to land-use type i at time $t+1$, if

$$(1) \quad W_{jit+l|a} - C_{jit+l|a} \geq W_{jmt+l|a} - C_{jmt+l|a}$$

for all land uses $m = 1,\ldots, M$ (including a). $W_{jit+l|a}$ is defined as the present value of the future stream of returns on parcel j in state i and time $t+1$, given that the parcel was in state a in time t. $C_{jit+1|a}$ is defined as the cost of converting the parcel from land-use type a to land-use type i (which is 0 when m = a). A parcel is converted to land-use type i if the net present value of the future stream of returns to parcel j in land-use type i (net meaning less conversion costs) is greater than for all other uses of parcel j, including the current use, land-use type a (1996).

The expected return, or expected net rent, for parcel j in land-use type a for time period $t+1$, denoted $R_{jt+l|a}$, may then be defined as the expected value of $W_{jit+l|a} - C_{jit+l|a}$ (Bockstael, 1996). When demand for land of a particular use type increases, expected net rent increases for the relevant parcels, *ceteris paribus; ceteris paribus*, when demand for land of a particular use type decreases, expected net rent decreases for the relevant parcels. Regardless of whether the increase in demand is caused by rising population in the study area, rising incomes in the study area (which may lead to shifts in preferences regarding housing densities), or shifts in preferences other than those resulting from changing income levels, the impact on expected net rent will be in the same direction. A reduction in the supply of land of a particular use type will increase the expected net rent, *ceteris paribus; ceteris paribus*, an increase in the supply of land of a particular use type will decrease the expected net rent.

4. THE POLITCAL INSTITUTIONAL DETERMINANTS OF LAND-USE CHANGE

In the conceptual framework outlined thus far, government has the ability to affect the demand side of the market for land in four essential ways: 1) By creating amenities (e.g., parks) or disamenities (e.g.,

landfills) government may directly affect the demand for particular parcels of land surrounding the amenities or disamenites, thereby influencing the expected net rents on those parcels relative to unaffected parcels; 2) Government may influence consumer preferences regarding housing density (e.g., some may view high-density housing and public transit as complementary goods, and so an increase in the availability of public transit may increase the demand for high-density housing; 3) Through its use of tax incentives or other type or other types of subsidies government may increase the demand for certain land-use types beyond a level the market would have achieved otherwise; 4) Government is itself a demander of land, and so by increasing or decreasing its consumption of land directly affects the demand—and the expected net rent—for land in various use types.

Within the framework, there are three basic ways in which government may affect the supply side of the market for land: 1) By rezoning land from one use type to another, government increases the supply of land in the latter use type while decreasing the supply of land in the former use type; 2) By annexing land into its political boundaries, government increases the supply of land of the relevant use types; 3) Government may make publicly owned land available for private use (e.g., selling portions of public forestland), which would increase the supply of land of the relevant use type.

Government may also impact the expected net return for a particular land-use type through actions that affect conversion costs, $C_{jit+1|a}$. Such action could take the form of permits or fees or other requirements that apply disparately to different types of land-use conversions, for instance making it more costly to convert from land use a to land use b than converting from land use a to land use c, thus reducing the relative number of conversions from use a to use b.

TABLE 1. - POLITICAL INSTITUTIONAL DETERMINANTS OF LAND-USE CHANGE

Factor Affecting Parcel j in Land Use a		Impact on Demand or Supply for Parcel j in Land Use a		Impact on Expected Net Net Rent of Parcel j in Land Use a
Government Activities				
Amenities	↑	**Demand** ↑		$R_{jit+1|a}$ ↑
Disamenities	↑	**Demand** ↓		$R_{jit+1|a}$ ↓
Public transit	↑	**Demand** ↑		$R_{jit+1|a}$ ↑
Econ. Growth Efforts	↑	**Demand** ↑		$R_{jit+1|a}$ ↑
Subsidies	↑	**Demand** ↑		$R_{jit+1|a}$ ↑
Government Land Use	↑	**Demand** ↑		$R_{jit+1|a}$ ↑
Conversion Fees	↑	**Demand** ↓		$R_{jit+1|a}$ ↓
Rezoning of Parcel j for Land Use a		**Supply** ↑		$R_{jit+1|a}$ ↓
Release Government Land for Use a		**Supply** ↑		$R_{jit+1|a}$ ↓

Table 1 summarizes the political institutional determinants of land-use change, how each affects demand/supply, and how each impacts the expected net rent for a particular land-use type.

The determinants summarized in Table 1 can be incorporated into the conceptual model of land-use change represented by equation (1) in a straightforward manner. A given parcel of land in the study area, denoted j, which is currently in land-use type a, will be converted to land-use type i at time $t+1$, if

$$(2) \ W_{jit+1|a} - (C_{jit+1|a} + F_{jit+1|a}) + G_{jit+1|a} \geq W_{jmt+1|a} - (C_{jit+1|a} + F_{jmt+1|a}) + G_{jmt+1|a}$$

for all land uses $m=1,\ldots, M$ (including a). $G_{jit+1|a}$ is defined as the expected net reduction (or net gain) in $W_{jit+1|a}$ that results from the government activities listed in the left-hand column of Table 1 (aside from government-induced changes in conversion fees, which are addressed separately below). The other variables retain the definitions outlined previously. $F_{jit+1|a}$ is the expected net impact of fees or changes in bureaucratic procedures on $C_{jit+1|a}$. $G_{jit+1|a}$ could be more explicitly modeled, for all parcels j, as follows:

$$(3) \ G_{jit+1|a} = A - D + O + S + Z + V$$

where,

A = impact of government-induced amenities on W_{jit+1}

D = impact of government-induced disamenities on W_{jit+1}

O = net impact of transportation factors on W_{jit+1}

S = net impact of subsides/taxes on W_{jit+1}

Z = net impact of zoning changes on W_{jit+1}

V = net impact on W_{jit+1} of changes in government demand/supply of land in the relevant use types.

$R_{jit+1|a}$ may then be redefined as the expected value of $W_{jit+1|a} - (C_{jit+1|a} + F_{jit+1|a}) + G_{jit+1|a}$. It bears noting that Bockstael's expression of the basic model, very similar to equation (1) above, does not necessarily preclude political institutional factors that affect expected net rents; depending on the data used to estimate net rents, the impact of governmental activities could very well be included in the results. However, equations (2) and (3) together *explicitly* incorporate these factors. Though the expression is straightforward, such an explicit formulation of the impact of governmental activities on land-use change has been surprisingly absent from the land-use change literature to date. Rather the literature has tended to focus on empirical analysis of one or two components of local land-use policy, such as the impact of property taxes or transportation subsidies on land-use patterns (see for example Pendall,

1999, Song and Zenou, 2006 or Su and DeSalvo, 2008) or on the impact of zoning regulations on housing prices (see for example Pogodzinski and Sass, 1990 or Quigley and Rosenthal, 2005).

Using the expanded conceptual model of land-use change represented by equations (2) and (3), one may make various propositions about government activities that would tend to increase the rate of sprawl. Following Burchell et al.'s concept of sprawl and assuming that all j parcel are divided into two basic types—f, which would include parcels within the current development boundaries (infill type development), and e, which would include parcels at the town edge or beyond the current development boundaries—the rate of sprawl for a given locality would increase either when (a) $R_{et+1} > R_{ft+1}$ for a sufficient number of the j parcels, or, (b) when development that occurs is at low relative density. Government activities that, *ceteris paribus*, would tend to increase the rate of sprawl through the first channel, (a), would include policies that restrict certain kinds of development in type f parcels relative to type e parcels, policies that subsidize development in type e parcels relative to type f parcels (e.g. – subsidized infrastructure such as utility infrastructure that does not pay for itself given the density of development), policies that result in a sub-optimal transportation system, which could include a lack of public transit and an absence of walkable routes, and policies that impose more costly bureaucratic procedures on development in land use type f parcels relative to land-use type e parcels. Government activities that would tend to increase the rate of sprawl through the second channel, (b), include policies that favor lower density development over higher density development in relation to already existing development (i.e., limitations on building densities).

In order to practically apply this model of sprawl it would be necessary to more specifically define the term "low relative density." As a suggestion, new development could be considered low relative density if the average density of the new development is below some empirically selected threshold, or if a specified percentage of the new development occurs at a lower average density than the average density of existing development in the study area.

The government activities outlined in this section may be taken as a whole to represent the political institutional determinants of sprawl. Note that these determinants affect the rate of sprawl in the ways mentioned whether policymakers in a given locality are intentionally trying to impact the rate of sprawl in their locality or not.

5. A THEORY OF GOVERNMENT AND SPRAWL

In developing a theory of government's impact on sprawl the question of primary interest is whether there is a relationship between a locality's governance structure and its rate of sprawl, and, if so, what

form that relationship takes. Studies have been conducted providing evidence that land-use controls affect a locality's rate of sprawl, as does the local tax structure, the type of infrastructure provided by the local government and the degree of political fragmentation in a given area. Pendall (1999) found that land-use controls that shift development costs onto builders and away from the general public tend to reduce sprawl, and that land-use controls that mandate low densities increase sprawl. In the same study Pendall (1999) found that localities whose local governments rely on ad valorem property taxes to fund services and infrastructure tend towards higher rates of sprawl than those that rely on a broader tax base. Fulton et al. (2001) found that the rate of sprawl is influenced by infrastructure endowments and finance, and specifically that the rate of sprawl is negatively correlated with the endowment of public sewer systems and positively correlated with the endowment of public water systems. Fulton et al. (2001) also verified the work of previous researchers in their finding that the more politically fragmented a locality is the greater its rate of sprawl. In a study indirectly related to sprawl, Galloway and Landis (1986) found that cities are more likely to undertake annexations "when state law places its annexation decisions exclusively in the hands of local governments" and less likely to undertake annexations when state law requires popular approval of annexation proposals. Levine (1999), in a study of 490 California cities and counties, found that local growth-management measures "significantly displaced new construction, particularly rental housing, possibly exacerbating the expansion of the metropolitan areas into the interiors of the state. Knaap (2000), after a thorough review of the relevant literature, contends that "[i]nterventions by local and metropolitan governments—for better or for worse—usually affect property values. The preponderance of this evidence suggests that this…results in a reasonably appropriate separation and mix of land uses, but a density of residential development that is excessively low and housing prices and rents that are excessively high". Knaap (2000) further cites studies by planners and economists that "suggest that zoning and other land-use regulations, especially when adopted and enforced at the local level, tend to result in lower overall urban densities and encourage urban sprawl". This article seeks to add to the existing sprawl literature by establishing a solid theoretical link between a municipality's governance structure and its rate of sprawl.

5.1. The Sprawl Bias

Public choice theory views political decisions as being made at the level of the rational, self-interested individual (see for example Buchanan and Tullock, 1962). The individual of primary interest is the policymaker, and, in the current context, the policymaker who makes or contributes to decisions regarding land-use change policy. Breton (1974) suggested that such an individual "can be characterized by a utility function defined for a probability of reelection (or election) variable and for

variables such as personal pecuniary gains, personal power, his own image in history, the pursuit of lofty personal ideals, his personal view of the common good, and others which are peculiar to each politician". Following Breton (1974), a policymaker's utility may be expressed as

$$(4) \quad U_P = U_P(\pi, v)$$

where,

U_p = the utility of the policymaker

π = the subjective probability of election or reelection

v's = the other variables such as personal pecuniary gains, personal view of the common good, etc.

Stevens (1993) notes that equation (4) "is a very broad and general formulation…and it is consistent with many types of behavior; these range from maximizing legal and illegal wealth, on one hand, to being a sacrificial lamb for a lost political cause, on the other. If either extreme is followed, however, there will be a reduction in the probability of reelection". For the purposes of the current context, equation (4) may be construed as including policymakers who are appointed rather than elected, and thus π would be interpreted as the subjective probability or appointment of reappointment.

Clearly land-use policy can be viewed as a type of government regulation of the market for land. One of the earliest modern theories of regulation was advanced by George Stigler (1971), who contended that "regulation is acquired by the industry and is designed and operated primarily for its benefit". Stigler's model examines producers *vis-à-vis* consumers, and concludes that producers have definite advantage over consumers in affecting the political process. Producers are usually fewer in number than are consumers in a given market, and thus it is less costly for them to organize. Also, firms within a given industry are generally more homogenous than their consumers and are likely to already be organized to some extent (trade associations are one form such organization may take). Because they are fewer in number, producers experience higher per capita gains than the per capita losses that would be imposed on consumers from a given political mandate. For these reasons, as Stevens (1993) notes of policymakers, "[they] are usually ready to cooperate with the producers if it means political support, campaign contributions, future employment, or, for some, bribes. As self-interested individuals, [policymakers] respond to those demands that surface in the strongest and most coherent form. These are the demands of producers because of their small numbers, their superior organization, and their high per capita gains".

Mancur Olson (1965) cites similar difficulties facing large groups in attempting to undertake collective action, and additionally considers the problem of free riders in matters of group cooperation. Olson

(1965) is referring largely to special interest groups when he postulates that "a rational individual will not incur the cost and trouble of supporting an organization formed to pursue some jointly beneficial goal, in circumstances in which his own contribution will make a negligible difference to the result and he can enjoy any eventual benefits without contribution".

These concepts advanced by Stigler and Olson, and later expanded upon by others, may be applied to the issue of government involvement in the land-use change process. If we replace the term "producers" in Stigler's model with the term "land developers," and the term "consumers" with the term "citizens," then the application becomes straightforward. Land developers, or commercial interests, would constitute one type of special interest group in the land-use change process. Citizens' or grass roots-type organizations would represent another type of special interest in the land-use change process, typically assumed to be in opposition to the policies advocated by the commercial interests. Land developers would seek to consume land to the point where profit is maximized, without regards for any externalities generated by their consumption of land. To the extent that their consumption of land generates externalities they will over-consume land.

Land developers in a given locality may not be able to consume the quantity consistent with profit-maximization without government consent—e.g., in the form of zoning variances. Developers tend to be better organized and more "in tune" with local political processes than opposing citizens' groups. The citizens' perspective will most certainly be underrepresented in the political decision-making process due to the free rider problem cited by Olson. Even in the absence of free riders, a citizens group would be comparatively more costly to organize and operate. Even a well-meaning policymaker will find himself more influenced by commercial interests, because, to reiterate a previously-mentioned point made by Stevens (1993), "As self-interested individuals, [policymakers] respond to those demand that surface in the strongest and most coherent form". Thus, even in a political system that is free of corruption, wherein policy decisions are made by rational individuals, there exists an inherent, institutional bias in favor of sprawling development.

The bias towards sprawl becomes even graver when corruption enters the system. Consider the comments of noted public choice economist Gordon Tullock, who likens government involvement in the land-use change process in the United States to the corrupt operations of local government in China. Tullock (1989) asserts, "The zoning system had been adopted by most American cities in the first World War…the value of many plots depended heavily on more or less arbitrary decisions by officials of the zoning board. Even if the zoning board were completely clean in the sense that no outside influence occurred and it made the best possible decisions based on a thorough knowledge of locational

economics, the individual would have suffered essentially arbitrary decisions…Further, it was certainly true that the real estate industry rapidly developed specialists in manipulating the zoning boards. It also developed corrupt zoning boards".

Tullock is not basing his remarks on an empirical study of zoning boards in the United States; yet his point is worth considering. To the extent the v's in equation (4) represent illegal or unethical pecuniary benefits for a given individual, the policymaker is even more likely to decide in favor of commercial interests, who are more able and willing (because they are better organized and have a greater per capita incentive) to offer such pecuniary benefits. Therefore, the more corrupt a zoning board is, the greater will be its tendency to favor sprawling development.

The assertion that there exists an institutional or governmental bias towards sprawl is a fairly bold one. It implies that less sprawl would exist if there were no government involvement in the land-use change process whatsoever, which at first blush may seem counterintuitive. It could be argued that the very purpose of zoning regulations is to maintain reasonable growth boundaries and to prevent certain types of locational externalities. However, it cannot be denied that zoning regulations affect land values. Certain zoning regulations suppress land values, particularly for land that is not zoned for residential or commercial development. Land developers may acquire land at artificially suppressed values and then, through the political process, receive variances or changes in zoning laws that increase the land values. If initially there had not been any government restrictions on the land, its value, or price, might have been high enough to prevent a developer from purchasing it for development. In other words, the expected net return would have been too low for the developer to consider purchasing the given parcel; government involvement increases the expected net return. So, indeed, zoning regulations, along with a political system that favors commercial interests, work in tandem to increase sprawl beyond the level that would exist if there were no government involvement in the land-use change process whatsoever. Further compounding this situation are other pro-sprawl policies, which may be separate and aside from zoning regulations and variances. For example, a local government may increase the rate of sprawl in its locality by providing subsidized infrastructure, or by offering tax incentives to particular developers, or by creating a transportation system that is conducive to sprawling development.

As outlined earlier in this section, previous research suggests that there is indeed an institutional bias towards sprawl (although the authors of those works have refrained from referring to it as a bias outright). Part of the sprawl bias hypothesis may be tested by searching newspaper articles and/or court documents related to cases in which proposed developments were contested by citizens' groups. Such a search would reveal whether the majority of such cases were won by commercial interests or by the

citizen's groups contesting the development. Anecdotal evidence suggests that commercial interests prevail in contested cases regarding land development more frequently than do citizens' or grass roots-type interests.

If it is true that local governments have some bearing on the level of sprawl in their localities, as has been asserted here, then there undoubtedly exists some variation across governments and localities. Not all governments likely contribute to sprawl in their given localities to the same degree. Such variation could exist due to varying degrees of government failure—or inbuilt bias towards sprawl—and the varying manner in which land-use externalities are addressed. It is also plausible that governance structure makes a difference. For example, it is possible that localities with elected policymakers tend to exhibit lower rates of sprawl than localities where policymakers are appointed. This elected-versus-appointed hypothesis is supported to an extent by a previously mentioned study of how state law affects a city's annexation decisions. To reiterate the point, the study authors, Galloway and Landis (1986), found that cities are more likely to undertake annexations "when state law places in annexation decisions exclusively in the hands of local governments," and less likely to undertake annexations when state law requires popular approval of annexation proposals. The Galloway-Landis study suggests a divergence between citizens' desires and political outcomes—at least in terms of annexation decisions—when such decisions are made less democratically.

6. CONCLUSIONS

Many authors have acknowledged the importance of political institutional factors in the land-use change process, yet the literature has been lacking a theoretical framework for analyzing those factors. This article combines existing land-use change modeling theory with some applications of public choice theory to create such a framework. Several political institutional determinants of land-use change are identified, and a conceptual model of land-use change is developed that incorporates these determinants. The conceptual model developed herein is used to analyze local government's contribution to sprawl. The argument is made that an institutional bias toward sprawling development exists, and that in fact sprawl is magnified by government involvement in the land-use change process.

Empirical work should be done to validate the model. Several propositions are made for testing various aspects of the proposed conceptual model and its derivative hypotheses. If the hypothesis regarding an institutional bias towards sprawl is borne out, there are important public policy implications. Although previous empirical research seems to indicate that the sprawl bias is real, the conceptual model developed here sheds light on the institutional mechanism responsible for generating the bias.

It bears noting that the degree of the institutional bias towards sprawl is dependent to some extent on the availability of information. In an information rich environment, citizens will better understand the true costs of the negative externalities imposed on them by sprawling development, and thus will have a greater incentive to express their views politically. Therefore, it is not a forgone conclusion that commercial interests will always win a political wrestling match over proposed land developments. One could imagine a scenario in which great number of citizens would choose to become politically involved. For instance, suppose a commercial developer proposed building a toxic waste dump in close proximity to a city park. Such a proposal would stand little chance of seeing the light of day. Citizens have some information, real and imagined, regarding the externalities associated with a toxic waste dump. On the contrary, the externalities associated with most proposed developments are largely invisible to the average citizen. This lack of information thus contributes to the institutional bias towards sprawl. A full treatment of the informational aspects of the framework presented here is well beyond the scope of this article; however, such an analysis is warranted, and would be necessary in arriving at a complete theory of the political institutional dimensions of land-use change.

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