# THE EFFECT OF URBAN SPRAWL ON BUSINESS ENVIRONMENT

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**ABSTRACT**
This paper will analyze the effect of urban sprawl on business environment. Generally, urban sprawl is defined as an excessive conversion of rural land into urban or as an excessive extension of the city beyond city limits. It became a problem firstly in the U.S., where cities normally have tendency to spread out. While urban sprawl was a hot topic predominantly in U.S., recently it has become a serious issue in the European countries, including Bulgaria. We will discuss the essence of urban sprawl and then look at the reasons for it, answering the main question: What caused the urban sprawl? We will look at the effect of urban sprawl on business environment. How does business cope with an excessive urbanization? These are some of the questions that we will answer in our study. Finally, we will discuss the measures against urban sprawl provided by the local government and their impact on the city size and business environment. Our paper will be organized as follows: Section 1 – Introduction, Section 2 - Reasons for Urban Sprawl, Section 3 - Analysis of The Impact of Urban Sprawl on Business Environment, Section 4 - Measures against Urban Sprawl and Section 5 - Conclusion.

**Key words:** excessive urbanization, rural land, restraint, control
JEL: R1, R4, O1

## INTRODUCTION
In general, economists distinguish two types of statements. *Positive* statements are descriptive. They describe the world the way it is. *Normative* statements are prescriptive. They make a claim about the way the world ought to be. In the urban economics literature, we find both positive and normative definitions of urban sprawl. According to the normative definition, urban sprawl is the *excessive* decentralization of population and employment from the central city to the suburbs (Mills, 1999; Brueckner, 2000). According to the positive definition, urban sprawl is simply the decentralization of population and employment from the central city to the suburbs. This process is also called decentralization and suburbanization (Mills and Hamilton, 1994, p. 81).

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There are other definitions of urban sprawl in the urban economics literature as well. Glaser and Kahn (2004) view urban sprawl as relatively low-populated residential and employment areas combined with low-density suburbanization in the urban fringe. Nechyba and Walsh (2004) interpret urban sprawl as planned communities that have their own downtowns near a lake or a park, or as interspersed residents among rural areas. Over the years, urban sprawl has generated a great deal of criticism from economists and planners. According to British urban planning advocate, John Osborn, as discussed in Williams, Burton, and Jenks (2000), urban sprawl has two downsides: it is economically wasteful and socially disadvantageous. It is economically wasteful because transportation improvements have allowed city residents to move farther from the city center, at the expense of long and costly daily commutes, as opposed to the situation in more compact cities. Economists argue that this problem is caused by congestion externalities and subsidization of the auto (for a review of auto externalities, see Parry, Walls and

Harrington, 2007). Urban sprawl is socially disadvantageous because movement of city residents to the suburbs worsens local community life by making access to the countryside more difficult for those people who are left in the central city (see also Nechyba and Walsh, 2004).

Others criticize sprawl on different grounds. For example, Brueckner (2000) names three major drawbacks of urban sprawl: loss of open space, traffic congestion, and racial segregation. As a result of sprawl, open space is gradually replaced by urban structure. Recent studies in urban economics (Geoghegan, Wainger, and Bockstael, 1997; O'Sullivan, 2006) find that the market price of a house increases at a decreasing rate with the amount of open space. Therefore, open space is most valued in direct proximity to the house and less valued farther from the house. Acharyi and Bennett (2001) show theoretically that in suburban residential areas, the price of housing increases as the amount of open space surrounding the house increases. Therefore, households value open space, and the loss of open space is a negative consequence of urban sprawl.

Another consequence of urban sprawl is that people live farther out and drive more often and for longer distances. By using their automobiles more frequently, residents of the urban area create traffic congestion (Kahn, 2000).

Finally, sprawl exacerbates income segregation because different income groups cannot travel equal distances. Low income groups live in areas closer to downtown which is served by public transportation. Higher income groups live in areas farther from downtown which are only accessible by the automobile. This income segregation exacerbates racial segregation because lower income groups are predominately black.

Bertaud (2004) claims that urban sprawl is a reason for inadequate transportation systems. He examines the issue of providing mass transit in low density cities. Bertaud compares Barcelona, Spain, to Atlanta, Georgia—two cities almost equal in population but highly different in their concentration of people (Barcelona has a population density of 171 people per hectare compared to 6 people per hectare for Atlanta). According to him, "to duplicate the accessibility

and ridership of the Barcelona system, Atlanta would have to build an additional 3,400 kilometers of metro tracks and 2,800 stations," while "in contrast, the Barcelona system has just 99 kilometers of tracks and 136 stations" (O'Sullivan, 2006, p. 149). Bertaud's conviction is that urban sprawl makes it impossible to create a well-functioning mass transportation system.

**REASONS FOR URBAN SPRAWL**
Economists identify market and government failures as contributing sources of urban sprawl. The following is a brief discussion of them.

*Failure to Account for the Social Costs of Road Congestion* (Brueckner, 2001). Auto commuters pay the private cost of operating and maintaining their cars, and they pay partial costs of road use through taxes. They do not, however, pay the full cost of congestion. That induces households to occupy residences farther from the CBD than they would if they paid the full costs of commuting, which leads to excessive spatial expansion of urban areas.

*Failure to Account for the Social Value of Open Space* (Brueckner, 2001). As already noted, households value open space, but open space, such as parks within urban areas and rural land outside of urban areas, is a public good, and, as such, exhibits the free-rider problem. Thus, a household chooses to live at the urban fringe, causing a conversion of open space to urban use, and does not consider the effects of its action. Consequently, too much open space is converted to urban use.

*Failure to Account Fully for the Infrastructure Costs of New Development* (Brueckner, 2001). When a new residential area is developed, the cost of public infrastructure, such as roads, sewer systems, schools, and recreation centers, is mostly paid through the property tax. This results in a government failure because developers and home buyers do not bear the full cost of converting the open space into land available for urban use. The infrastructure cost imposed on home owners by local governments through the property tax generally does not cover the marginal infrastructure cost but the average, which is generally less than the marginal. Homeowners with equal assessed values pay the same tax regardless of whether the house is located in newly developed areas or in already developed areas. As a result, developers would

bid higher prices for undeveloped land than normally, which leads to converting more rural land into urban use. Thus, people living in high density, already developed areas subsidize residents living in low-density, suburban areas. This is an argument for impact fees, which have become more prevalent as well as higher in recent years (Brueckner, 1997).

*Transportation Subsidies* (Brueckner, 2005). Brueckner points out that for transportation and location decisions to be efficient, residents should pay the full cost of transportation. In reality, however, individuals do not bear the full cost of transportation because of transportation subsidies. The fact that residents underpay the cost of traveling allows residents to commute longer distances and seek living in city suburbs, thus contributing to sprawl. Su and Desalvo (2008) empirically test the effect of transportation subsidies on urban sprawl, showing that the urban area contracts with public transit subsidies and expands with auto-subsidies.

*Mortgage Subsidies*. Mortgage interest is deductible from income for the purpose of federal and state income taxes, which lowers the cost of home ownership, and which, for reasons discussed above, encourages people to locate in the suburbs of urban areas. Williams, Burton, and Jenks (2000) argues that, through their generous mortgage insurance and loan programs, both the Federal Housing Administration (FHA) and the Veterans Administration (VA) create incentives for urban sprawl. For example, the FHA provides federal guarantees to private mortgage lenders by lowering the minimum down payment to just 10 percent and extending the pay-back period from 20 to 30 years. The VA offers low-interest mortgages without down payment to all qualified veterans.

*The Property Tax*. Brueckner and Kim (2003) advance the idea that the property tax is a source of sprawl. Property taxes are usually lower in the suburbs than in their central cities. Therefore, land in the suburbs is developed less intensively than land in the central city, which contributes to the spatial expansion of the city. Brueckner and Kim provide numerical examples that confirm the suggestion that the property tax may encourage urban sprawl. O'Sullivan (1985) analyzes the spatial effect of property taxes using a model including both business and residential

property, finding that an increase in property taxes reduces employment in both central and suburban sectors causing the urban area to shrink in size. Arnott and MacKinnon (1997) use general equilibrium simulation of the spatial effects of the property tax and find that an increase in the property tax shrinks the size of the urban area. The results are disputed by Pasha and Ghaus (1995) who note that they might not hold in a more general model. Most recently Song and Zenou (2006) and Su and DeSalvo (2008) find empirically that property taxes contracts the urban area.

*Federal Spending*. Persky and Kurban (2003) contend that spatially dispersed federal spending could lead to urban sprawl. In Chicago, they find that government spending to alleviate poverty and support the elderly affects residential location decisions. In fact, they show that land use in the outer fringe of Chicago increased by 20 percent because of federal spending.

*Land-Use Controls*. Cities and counties employ a variety of land-use controls, including minimum lot-size zoning, maximum lot-size zoning, population density controls, rent control, building height restrictions, urban land-use boundaries, land-use management districts, watershed protection policies, land-purchase programs, differential property tax assessments, transferable property rights, etc. These land-use controls are intended to achieve various, and sometimes conflicting, goals, such as reducing or eliminating urban sprawl (e.g., urban land-use boundaries, maximum lot-size zoning, population density controls), ensuring adequate housing for the poor (e.g., rent control), aesthetics (e.g., building height restrictions), environmental improvement (e.g., watershed protection), etc. As will be discussed later, many empirical studies have been performed on the effect of land-use controls on housing prices, but no study has examined their effect on urban sprawl. This dissertation therefore makes a unique contribution to the literature on urban sprawl by documenting the effect of land-use policies on the spatial size of the urban area. Such information should be useful to urban planners who are trying to curb sprawl.

In addition, this dissertation tests theoretical hypotheses on the effect of land-use controls on the spatial size of urban areas. These theoretical hypotheses have not previously been empirically

tested. As such, this dissertation adds to the positive literature on urban economics. Finally, the data set on land-use controls should be of great use to urban researchers.

## ANALYSIS OF THE IMPACT OF URBAN SPRAWL ON BUSINESS ENVIRONMENT IN BULGARIA

Even though urban sprawl first appeared in the U.S., it became a serious problem in the recent years for the European countries including Bulgaria. The excessive conversion of rural land into urban land not only reduced the amount of agricultural land, but also affected the business environment in the sprawled cities. The capital of Bulgaria Sofia can be considered a clear example of modern sprawled city. The urban sprawl of Sofia has been especially significant in the last ten years when a new urban living districts literary emerged and covered a vast amount of agricultural land as well as exhausted a large amount of open land. The lack of well-defined and strict growth controls as well as a well-defined urban growth boundary has enhanced the process of urban sprawl of the city. The emerging of the new living districts in Sofia has caused a dramatic increase in the population of the capital. That has led to various kinds of problems for both the residents of the city and the business environment. As a first problem we could point road congestion. Despite recent constructions and road widening, the existing infrastructure of Sofia has been completely unable to accommodate the significant increase of traffic, which has caused and still is causing enormous road congestions. The road congestions have brought about delays of workers to their working places and in many cases workers arrive to work already exhausted and frustrated, which affects their productivity and negatively affects business in the city.

As a second problem of the urban sprawl we could mention the lack of parking space. The large number of cars and relatively low amount of parking places present a grave problem for the commuters. Now they have to cope not only with road congestions, but also with finding place to park. This is another reason for increased delays of the workers on their way to work. On the other hand for the same reason – the lack of parking space, business has started losing customers, because customers have problem reaching the respective business facility.

Another issue worth mentioning is the fact that as a result of road congestion business has experienced difficulties with supplies of resources as well as distribution of final products to the market. The loss of open space on the other hand presents an obstacle for the physical expansion of businesses when they increase their scale, i.e. as a result of loss of open space there is not enough acreage for businesses to build facilities on when they expand.

Finally, as a positive point of the urban sprawl and the growth of population we could mention the increase in number of the potential customers, which could lead to an increase in profits for the existing businesses and entice new ones.

## MEASURES AGAINST URBAN SPRAWL

Local government introduces various kinds of land-use controls such as minimum lot-size zoning, maximum lot-size zoning, population density controls, urban growth boundary etc. as an effective measure against excessive decentralization. A brief discussion of land-use controls follows below:

*Minimum Lot-Size Zoning.* As Bates and Santerre (1994, pp. 253–254) note, "there are two contrasting theories regarding why communities adopt zoning requirements. According to the public interest theory, zoning laws are implemented to reduce or eliminate the impact of negative externalities. Alternatively, the special interest group theory argues that zoning laws are designed to promote the fiscal and exclusionary objectives of the entrenched residents of a community." By the public-interest theory, minimum lot-size zoning would reduce population density, thereby mitigating negative externalities thought to be associated with high density, such as disease, fire, crime, and traffic congestion. By the special-interest theory, minimum lot-size zoning, as well as other population-density restrictions, as Mills (2005, p. 572) puts it, "may be intended to exclude low-income and/or minority people from high-income suburbs." Both of these views imply that the urban area expands under minimum lot-size zoning, but that is an empirical question.

Pasha (1992) discusses minimum lot-size zoning as a type of land-use control and analyzes two cases. In the first case, the central city is regulated, but the suburbs are not. In the second case, the central city is not regulated, but the

suburbs are. This theoretical paper, to be discussed thoroughly in the next chapter, produces mixed results. In one version of his model, Pasha finds that the urban area expands under minimum lot-size zoning. In another version, the result is ambiguous. In a later paper, in which minimum lot-size zoning was binding on the rich but not on the poor, Pasha (1996) finds that minimum lot-size zoning expands the urban area. According to Pasha, this finding indicates that implementing minimum lot-size controls in suburbs might be a major factor contributing to urban sprawl.

*Maximum Lot-Size Zoning.* Maximum lot-size zoning is used to minimize the amount of land used for urban infrastructure in the city (Pasha, 1992). Developing countries use maximum lot-size zoning to keep the price of land low in certain areas of the city so that the poor can afford to live there. If binding, maximum lot-size zoning makes lots smaller than otherwise, and a smaller lot, other things equal, is a cheaper lot. Pasha (1992) studies maximum lot-size zoning in a model in which maximum lot-size restrictions are not binding on the poor but are binding on the rich. Under these conditions, he finds that no matter whether the rich live in the suburbs and the poor live in the central city, which is the case in most developed countries, or the rich live in the central city and the poor live in the suburbs, which is the case in most developing countries, applying maximum lot-size restrictions leads to a contraction of the spatial size of the urban area.

*Building-Height Limitations.* Local governments introduce building-height limitations for several reasons. One reason is to achieve a smooth and aesthetic skyline. Another reason is to prevent tall buildings from blocking the view of shorter buildings and the sunlight from reaching them. Thus, building-height restrictions protect shorter buildings from being overshadowed by taller buildings. Like minimum lot-size restrictions, building-height limitations may lower population density, which could lead to expansion of the urban area. On the other hand, as noted by Brueckner and Kim (2003) in discussing the effect of the property tax on the spatial size of urban areas, building-height limitations may reduce the size of dwelling units in a building, possibly increasing population density.

The first theoretical work on building-height limitations is that of Arnott and MacKinnon (1997). The authors use a model designed to simulate Toronto. They demonstrate that, in the presence of building-height limitations, residential land rent at the urban-rural boundary is higher than it would be without building-height restrictions. In the context of standard urban spatial models, that finding implies that building-height restrictions increase the spatial size of the urban area. The major drawback of Arnott and MacKinnon's analysis is the use of a simulation model with specific functional forms and parameters, which limit the model's generality.

Recently, Bertaud and Brueckner (2005) obtain the same results as those of Arnott and MacKinnon in a more general model. Instead of building-height limitations, Bertaud and Brueckner use the floor-area ratio, which is the ratio of the floor area of the building to the land area on which building is located. Generally, the greater the floor-area ratio, the taller the building is. In other words, a restriction on the floor-area ratio means a restriction on building height.

*Population-Density Restrictions.* Another form of land-use control is population density restrictions. Maximum population density restrictions may be used to avoid the negative externalities discussed above in the context of minimum lot-size zoning. Also, as noted there, they may also be used as exclusionary devices. Although not necessarily the purpose, maximum population density restrictions might cause an urban area to expand relative to an urban area without density controls. Minimum population density restrictions, on the other hand, are intended to avoid excessive spread of population over the urban area.

As already discussed, most urban economists working on the relation between density controls and sprawl have modeled population density indirectly in terms of lot-size and building-height restrictions in general equilibrium models. Peiser (1989) and Heikkila and Peiser (1992) explicate the differences in population density resulting from continuous vs. discontinuous (or leapfrogging) development. Peiser (1989) concludes that policies that restrict discontinuous development may reduce efficiency in the land market and lead to lower, rather than higher, urban density. Heikkila and Peiser (1992) find

that if the planner opts for a continuous, rather than discontinuous, development pattern, the result is lower densities but higher property values. The researchers conclude that planning efforts to limit sprawl are more consistent with tax-base considerations than with concerns over density. These articles show how population density may be affected by continuous vs. discontinuous development, but they do not explicitly address the effect of population density restrictions on urban sprawl.

*Impact Fees and In-Kind Exactions.* When an urban area expands in both spatial and population size and when a new development takes place within the urban area, local governments provide public services, such as roads, rights of way to electricity and telephone companies, water mains, sewers, etc. Historically, local governments make capital expenditures that are usually supported by bond sales. The carrying cost of the bonds is covered by property taxes imposed on existing and future residents. In other words, old residents contribute to the cost of development for new residents.

Considering this policy inequitable, some local governments place the additional capital cost on developers. This additional cost may be in the form of in-kind exactions on the developers, who are expected to provide parks, roads, and schools, along with other necessary local infrastructure. This additional cost may also be in the form of impact fees on developers to pay for additional infrastructure (Brueckner, 1997).

In-kind exactions and impact fees raise the direct cost of development, which may postpone development and slow the spatial and population growth of the urban area. Brueckner (1997) claims this to be an important reason for the increasing use of in-kind exactions and impact fees by local governments. In a theoretical model, Brueckner finds that the effect of impact fees on new development depends strongly on the time needed to implement the impact fees and on how development costs and infrastructure costs vary with the urban area population. Brueckner shows that under usually assumed cost conditions the timing of the shift from bond financing to impact fees affects the timing of development and the rate of growth of the spatial size and population of the urban area. In some cases, the urban area will continue to develop the

same way with or without impact fees, but impact fees cause urban expansion gradually to slow down. In other cases, the imposition of impact fees causes an immediate slow-down of development in the areas that are affected by impact fees. Brueckner's conclusion is that impact fees on balance cause a slowdown in the expansion of urban spatial size and of urban population.

Although Brueckner's article is insightful and informative, it does not provide the kind of comparative static model we seek. In fact, we have been unable to find such a model. For this reason, in Chapter 2, we will present the model of Song and Zenou (2006). Although a model of the property tax, it is nevertheless useful for our purpose.

*Urban Growth Boundary.* Local government imposes an urban growth boundary (UGB) by establishing a radius around the city and outlawing any development beyond the radius. The urban growth boundary was first implemented in 1958 in Kentucky. Since then the use of urban growth boundaries has grown rapidly. By its nature, the urban growth boundary restricts the spatial size of the urbanized area. In a theoretical model, to be discussed more fully in the next chapter, Quigley (2007) and Quigley and Swoboda (2007) show that, in the presence of a binding urban growth boundary, the spatial size of the urban area is lower than otherwise. In reality, however, cities with UGB's may expand the radius of the UGB to accommodate development, so it is unclear what effect UGB's have on urban sprawl empirically.

*Population-Growth Limitations.* Another type of land-use control used by local governments is the population-growth limitation. Population-growth limitations include direct population caps, building-permit limitations, and maximum density restrictions. The purpose of population-growth limitations is to prevent growth, which is associated with overcrowding and sprawl. Maximum population density restrictions were discussed earlier, and their likely effect to slow population growth was noted. So far, no U.S. city has adopted direct population caps although some California cities are considering them (Groening, 2008). Most U.S. cities use building-permit limitations to control population growth. Local governments issue a fixed number of

building permits per year. If the number of permits issued is less than the number demanded, the result may be to restrict the amount of new development that would otherwise take place. The restriction on the number of new buildings may therefore retard growth in the spatial size of the urban area. On the other hand, if building permits do not impose a minimum lot-size, it is conceivable that the urban area could expand spatially. No theoretical or empirical research showing the effect of building-permit limitations on the spatial size of the urban area has as yet been done.

*Square-Footage Limitations.* Local governments adopt both minimum and maximum square-footage limitations on the size of offices and apartments in urban buildings. In the presence of binding minimum square-footage limitations, offices and apartments would be larger than otherwise, and if the urban population and employment were unchanged, fewer buildings would be necessary to accommodate the population and employees, in which case it is likely the urban area would be smaller than otherwise. In the presence of binding maximum square-footage limitations, buildings would be smaller than otherwise, and if the urban population and employment were unchanged, more buildings would be necessary to accommodate the population and employees, in which case it is likely the urban area would be larger than otherwise.

In a theoretical paper, to be discussed thoroughly in the next chapter, Bertaud and Brueckner (2005) investigate the effect of square-footage limitations on the size of an urban area and show that they have the effects described above. No empirical studies have been performed to test these theoretical predictions.

*Rent Control.* Rent control is another land-use control adopted by local governments. Rent control is a price ceiling established on apartment rents. The main purpose of rent control is to ensure affordable housing for the poor, but it may also induce low-income households to live in the city, which might limit spatial expansion of the urban area. On the other hand, it might contribute to sprawl if rich and middle-income households move to the suburbs to avoid the poor.

Rent control was imposed firstly in the United States just after the U.S. entered World War II, the first city with rent control being New York. The war required massive relocation of labor, with consequent pressure on many local housing markets. The type of rent control imposed at that time was called first-generation rent control. First-generation rent control was a rent freeze. Later, local governments allowed some provisions in the mechanism of setting rents, which led to second-generation rent control.

Second-generation rent control was more flexible than first-generation rent control. For example, second-generation rent control commonly permitted the landlord to increase rent each year, with the percentage increase equal to the annual inflation rate. The local government could also allow the landlord to justify rent increases based on cost increases other than inflation. An example is a cost-through provision, which permits the landlord to apply for a rent increase above the inflation rate when the landlord has a justifiable cost increase associated with the apartment. Another type of allowable increase is called a hardship provision, which allows discretionary increases to assure that the landlord does not have a cash-flow problem. Finally, there is a rate-of-return provision, which permits discretionary increases in rent to ensure that the landlord receives a reasonable return. In some jurisdictions, second-generation rent control permits vacancy decontrol, i.e., the unit becomes decontrolled once it is vacated. Other local governments apply inter-tenancy decontrol, in which rent control is imposed during a given tenancy with an allowable rent increase during the inter-tenancy period. Another type of second-generation rent control is rent-level-decontrol. In this case the apartment is decontrolled but becomes re-controlled if rent exceeds a certain level.

Although much theoretical and empirical research has been performed on rent control (for a summary, see Roistacher, 1992; Arnott, 1995, and Ho, 1992), only one study deals with the effect of rent control on urban sprawl (Skelly, 1998), which finds that the imposition of rent control contracts the urban area. Pasha (1995) develops a model of rent control but draws no conclusion as to its effect on the spatial size of the urban area.

## CONCLUSION

Urban sprawl represents a serious issue for business. Excessive decentralization combined with overpopulation creates serious problems such as: road congestion, pollution, lack of open space, traffic etc, which presents a problem with supply of inputs as well as with distribution of final product. In addition we could mention constant delays of workers caused by heavy traffic. Even though local government applies some measures to restrict excessive decentralization; business has to be prepared and very proactive in dealing with the new challenges in business environment.

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