The Suburbanization of Urban Development:

How Regulations on Urban Development Hurt Their Own Goals

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Abstract

This policy paper analyzes the unintended consequences of policies which promote suburban development, even when communities are looking to create livable, urban environments. Recommendations include regulations which cap green space in new developments, encourage off-site stormwater management, reduce the impact of homeowners on the planning process, and change how congestion is measured to better allocate street space.

Keywords: Suburbanization, New Urbanism, Stormwater Management, NIMBYism, Congestion Pricing

The 1811 grid of Manhattan was created by blasting mountain sides, covering over rivers, and landfilling marshes (Ballon, 2012). Today it would be labeled an ecological disaster. Developments now must go through environmental review, work around stream riparian buffers, and complete traffic studies to ensure cars will not be slowed by new congestion. And yet, Manhattan has one of the lowest carbon emission levels per capita in the country (Florida, 2012).

In the twentieth century two inventions: automobiles and zoning; changed how cities had been planned for millennia. Cities were built at the scale of the human stride until the urban railroad in the early- to mid-1800s. Land value fell quickly as distance increased from the core because that distance manifested in a longer walk. Suburbanization began with the rich, who could afford carriages and train rides to country homes. Urban elevated railways and later subways let lower-income city dwellers live or play outside the city center with five cent fares, but this development was focused on a limited supply of transit stations so density was still relatively high (Ballon, 2012). Distribution of the automobile to lower-income people significantly intensified suburbanization and decreased density because the supply of land with fast mobility options surged and land with similar mobility options as before became much cheaper (Ballon, 2012).

At the same time, zoning regulations limited the amount and type of buildings allowed in certain neighborhoods which drove further suburbanization. Zoning was created when whites moved out of city centers to exclude others, including African Americans, from moving to their neighborhoods in order to keep property values high (Madrigal, 2014). Today, although zoning is not explicitly racist, it sometimes aims to keep neighbors above a certain income level and to keep supply of houses low to increase property values.

Recently cities have begun to move away from suburban models of development, but half a century of almost exclusively anti-urban, low density development has led to attempts at urban development which try to compromise between short-term benefits of suburbs and cities and fail at both. Suburbs continue to be built because the direct effects of suburban development: green space, community input, and decongestion; seem better for the environment and for citizens, even though the indirect effects of suburban development: lower densities; outweigh the initial benefits.

According to the monocentric model of the city, green space in cities should not exist. Because green space has similar physical characteristics to rural and wilderness areas, the willingness to pay for the land should fall on the rural or wilderness price curve rather than the urban curve, meaning green space would only make economic sense a certain distance from the center of cities. However, the benefits of green space extend to the parcels surrounding it, so any increase in the willingness to pay for those surrounding properties can be added to the willingness to pay for the green space itself. This is accounted for in the model of the city which combines the monocentric and sorting models. Green space creates a small peak in land prices for the properties surrounding it. The first green space to be created in a city will provide high increases in willingness to pay for the surrounding properties because there is very little supply of green space-adjacent land. The effect will decrease as more green space is created until there is almost no willingness to pay increase, and the decrease in population density would lower the agglomeration effect which creates the city in the first place.

Many studies have shown the benefits of green space and parks on cities, but few have analyzed how much green space is optimal. A review of 30 studies on benefits of green space

showed an impact of 20 percent on properties abutting open green space and an impact of ten percent on properties within a few blocks of active recreation parks (Crompton, 2017). A study of Pennypacker Park in Philadelphia found property values increased by $3,391,000 surrounding the 1300-acre park (Hammer et al., 1974). Another study analyzed benefits of green space using travel cost models, contingent valuation, and hedonic pricing. It found the first two methods could not easily account for the external, or non-use benefits, of parks (More et al., 1988). For example, the effects of lower air pollution on surrounding land, the existence value of some world-famous parks, and the option values of families moving to the neighborhood who could use the park when their kids grow. Hedonic pricing, however, could account for external effects and found a net benefit of $40,000 to $140,000 per park at four parks near Worcester, Massachusetts (More et al., 1988). All these studies show benefits from green space on property values, but none account for the opportunity cost of using land for parks. For example, Pennypacker Park had an economic benefit of less than six cents per square foot. Therefore, if there were development proposals which would generate more than that, they should be built if economic efficiency is the goal. Of course, the marginal benefits of each square foot of park would increase as more and more was developed into urban landscape, so the optimal park size might be a fraction of what is currently there.

More research is necessary on the optimal amount of park space per urban unit, accounting for both societal benefit of green space through hedonic pricing and opportunity cost of green space rather than development. Lowering suburban green space density might not be the desired result of a citizenry. Communities should decide if they would like to increase park density past equilibrium, therefore lowering economic efficiency, for environmental justice or

health reasons. Of course, these policies will also be politically unpopular because they encourage new development for new families—who do not live in the community yet and therefore have no voice—while at the same time lowering property values for current residents. Some concessions on the optimal percentage of parks might be necessary for political or moral reasons. However, to increase societal benefit, new development should be planned with the optimal amount of park land to increase property values, which is a measure of societal benefit, without using too much land for parks with high opportunity costs. Zoning regulations which designate the percentage of property that must be maintained as green space can enforce this optimal amount.

Many of the regulations which support suburban planning protect natural areas and green space for environmental reasons at the expense of true urban development. Often zoning requirements include stormwater regulations. These are usually in the form of impervious surface and runoff percentages. Their effect is developments which have relatively dense neighborhoods or commercial centers surrounded by or adjacent to green space devoted to stormwater detention basins. These basins cut overall density to a fraction of what it would be and they cut off what could be walkable and transit-friendly connections between developments. The value of land devoted to runoff is much higher than onsite stormwater detention is worth, according to the bid rent curve. Coping with stormwater is no easier or less efficient offsite, except for the cost of infrastructure to transport the water.

Allowing for land to be occupied for its highest valued use will more than compensate for the infrastructure costs of stormwater management and will increase densities which will increase the agglomeration effect of the city, creating a virtuous cycle. A higher agglomeration

effect means higher land prices, which means higher densities are more economically efficient, leading to less impervious surface area per capita. There should be little public disapproval of this policy, except on environmental grounds. Any environmental concerns can be addressed with the analysis discussed previously. Infrastructure for moving and treating stormwater offsite will need to be built to handle the additional stormwater capacity necessary, but this can be built using the additional tax revenue brought by increased densities.

When green space in new suburban developments is not meant for stormwater management, it is often labeled as habitat for animals. People are generally loss averse, so they protest losing natural land until they see what is created, as long as the new development is well designed and inviting. For example, Manhattan was a diverse ecosystem before the city of New York was built, but today not many people would argue that a natural ecosystem should replace Midtown and Greenwich Village. What is not clear to citizens when a development proposes to keep a plot of natural land: more development will locate farther from the central business district (CBD) and take natural land there.

This is the opposite of what is economically efficient. Of course, urban development values land closer to the CBD because of the associated increase in access, and with greater development, greater agglomeration effects bring higher densities, which mean less pressure on natural areas around the city. But natural land also enjoys benefits when it is farther from development. Whereas every other land use has a negative slope on the bid rent curve: retail land value drops steeply as it gets farther from the CBD and agricultural land slowly loses value farther and farther away, natural habitat *gains* land value as it leaves the city. Less human interaction means less littering and less air, water, light, and noise pollution. Case studies in

Spanish and Finnish cities found the biggest parks in cities contained most of the bird species in those cities, and human disturbance—even pedestrians—could hurt bird populations (Fernández-Juricic and Jokimäki, 2001). Another study about urban coyotes and bobcats in Los Angeles found boundaries of fragmented natural areas often determined the extent of a female's territory and found often the animals cross roads at street level rather than using culverts, leading to vehicle collisions which account for 50 percent of mortality (Tigas, 2002).

Green space should be separated from city as much as possible. Instead of saving small natural areas surrounded by development, cities should look to save wilderness areas far from any development so ecosystems can thrive away from humans. This might be politically unpopular because citizens enjoy recreating in the parks close to home and would need to travel farther to access natural areas, but this would be good for the ecosystems of the natural areas. Even if use values were lower for natural areas farther from people, non-use values would be higher because the ecosystem would thrive, producing more pollution reduction and better wilderness for future generations. Initiatives which entice or mandate developers to buy wilderness land and give it to the city for conservation would encourage environmental sustainability and might increase public support for the policy. Only the highest-valued natural features, like marshes, should be maintained as natural areas because of their high ecological value and since they cannot be transplanted. Otherwise, no more than the green space necessary to increase property values in developments should be planned for.

When density is proposed in a new development, often it is forced into compromise by local residents. Whereas future residents hope for lower prices for buying a home or renting and therefore want increases in the supply of housing stock, current homeowners have the incentive

of their own property values to keep housing stock as low as possible. Often these residents are called NIMBYs (Not In My BackYard) because they oppose any new development. Communities often choose to listen to the loudest NIMBYs and refuse to allow more density in their zoning codes. Other times, they locate new, often higher density development in less desirable places: near highways, away from transit, and far from the CBD. This means the development is less economically efficient because the higher densities should be where there are higher land values, generally closer to the CBD according to the monocentric model of the city. Planning for increased property values produces the externality that new people have trouble moving to the city, which can lead to companies who are not able to find workers and which can hurt the economy, let alone the effects of a city without diversity of incomes.

Communities should listen to new and future residents as well as current homeowners so urban development can occur in the most efficient places and at the more efficient scale. Because current residents are the only ones who can impact local politics, policies might be more likely coming from state or federal governments. For instance, California does not have enough housing stock for its demand so there are bills in the state senate which would mandate increased densities around transit stations (Chandler, 2018). Public perceptions of a bill like this would probably be poor because it seems as though the state government is taking control of local laws. However, eventually with greater housing stock the public would realize the benefits of systematically raising densities in zoning regulations and public perceptions might improve. To combat bad public perception, some problems with suburban development like induced demand on roads and environmental impacts might be better understood with education campaigns for citizens. Additionally, although current homeowners might never like these policies, they could

be more politically popular if externalities like diversity of incomes and the suburbanization of poverty were displayed as the main issues, emphasizing moral societal behavior rather than economic efficiency.

Much of the reason communities are against new development is congestion increases, and much of what creates suburban development are congestion regulations. New developments require traffic impact studies, which analyze the increased vehicle traffic from the development and propose mitigation strategies to reduce negative impacts. Level of service is used to calculate congestion, which accounts only for the amount of time cars spend traveling through a corridor or intersection (Schmitt, 2013). This leads to proposals for more lanes, traffic lights with longer cycles, wider turning radii, and using less road space for bus lanes, bike lanes, and sidewalks. All of these reduce congestion and lower vehicle emissions in the short term, but they produce terrible walking and biking environments as an externality and do not take into account buses which transport ten or more times the number of people as cars. They even fail at remove congestion: the theory of induced demand states increased road capacity will lead to more cars on the road at similar congestion levels as before (Litman, 2018). Roads are always a tragedy of the commons problem, unless they are tolled. And because level of service encourages suburban development, even if these plans increase mobility, or where residents can go, they often do not increase accessibility, or which places residents want to go and can reach (Barter).

Instead of a measure of congestion rooted in suburban planning, new developments and city governments should evaluate roads by determining the percentage welfare benefit each mode of transportation nets to society. This requires the calculation of externalities related to each mode. These include pollution, safety risks associated with crashes, health risks associated

with sedentary lifestyles, and congestion impacting car and bus travel times. Each mode could get approximately the same percentage of street space as they produce welfare. Because the car has so many negative externalities especially when the value of statistical life is accounted for, its allotted road space would drop significantly. Taking road space from drivers is never popular with driving constituents but having the justification of societal welfare would encourage cooperation. As bikes lanes, bike lanes, and sidewalks became bigger, constituents would drive less leading to less negative public perceptions of taking car lanes away. Rather than having drivers and bus riders pay for congestion in wasted time, decongestion pricing plans could be implemented as a type of pigovian tax (Walker, 2018). Rather than treating roads as a common resource, where it makes sense for each individual to enter the highway but together traffic makes all trips slower, decongestion pricing would allow for people to pay according to demand. Generally, these tolls have little public support before implementation but are much more popular when they have been implemented and the benefits are clear (Jaffe, 2013). Trial runs can be helpful in convincing the public because there is less loss aversion to the old system. Other pigovian taxes like gas taxes or taxes on new vehicles could decrease deadweight loss from other externalities like health and safety effects.

Zoning and automobiles are not the only reason suburban planning persists today. Subsidies encourage people to buy houses rather than rent with mortgage interest deductions and encourage people to drive rather than taking transit because highways are subsidized with more money than gas taxes make up, especially when the externalities of driving like pollution and congestion are accounted for (Persky and Kurban, 2003). However, it is in the interests of cities who want to become more sustainable, livable, and economically efficient to remove barriers to

urban development like onsite stormwater management, excessive green space, NIMBY opposition, and bad congestion management. It is important for cities to implement policies to house more stormwater management offsite, provide the optimal amount of green space for societal welfare benefits, account for the externalities of constituencies made up only of current homeowners, and reallocate street space to the uses which provide the most marginal social benefit so the process of urbanizing suburbia can begin.

References

Ballon, Hillary. (2012). *The Greatest Grid: The Master Plan of Manhattan, 1811-2011.* Museum of the City of New York. New York, NY: Columbia University Press.

This book discusses the development of New York City in relation to the 1811 plan for its famous grid. It starts by talking about the city before the grid, discusses how the grid was laid out and enforced, and how the city grew around it.

Barter, Paul. (n.d.). Distinguishing between accessibility and mobility. The Global Development Research Center.

This piece identifies the basic difference between accessibility, or the ability to reach what someone wants to reach, versus mobility, or the ability to move around.

Chandler, Jenna. (2018). Proposal to add density near transit stations quickly rejected in California senate. Curbed Los Angeles. Vox Media.

This article explains what the California bill to add density around transit stations entails and examines why the bill was killed quickly in the state senate.

Crompton, John L. (2017). The Impact of Parks on Property Values: A Review of the Empirical Evidence. Journal of Leisure Research, 33:1, 1-31. https://doi.org/10.1080/00222216.2001.11949928

This study analyzes 30 studies about the value of green space on surrounding property values. It finds a significant bump in property values adjacent to open space parks and a less significant bump in the blocks surrounding active use parks.

Fernández-Juricic, E. & J. Jokimäki. (2001). A habitat island approach to conserving birds in urban landscapes: case studies from southern and northern Europe. Biodiversity and Conservation 10: 2023. https://doi.org/10.1023/A:1013133308987

This study is a combination of two case studies from Europe about the effects of urban landscapes on birds. It analyzes the types and sizes of parks which encourage bird species to locate in them and analyzes other things that affect bird populations, like pedestrians.

Florida, Richard, Kevin Stolarick, Charlotta Mellander, José Lobo. (2012). Which Cities Tend to Be the Greenest? The Answer May Surprise You. Citylab. The Atlantic Monthly Group.

This analysis shows which US cities are the greenest based on multiple categories with data from Project Vulcan.

Hammer, T. T., R. Coughltn, and E. Horn. (1974). The effect of a large urban park on real estate value. Journal of the American Institute of Planning, July: 374-277.

This study analyzes Pennypacker Park near Philadelphia and the increases in property values associated with the park's presence.

Jaffe, Eric. (2013). Congestion Pricing's Enduring Public Perception Problem. Citylab. The Atlantic Monthly Group.

This article addresses some of the reasons the public seems to not want congestion pricing, even if it might help the majority of them.

Litman, Todd. (2018). Generated Traffic and Induced Travel: Implications for Transport Planning. Victoria Transport Policy Institute.

This paper assesses the impact of induced demand on road capacity. It finds road congestion will not subside if more lanes are built.

Madrigal, Alexis C. (2014). The Racist Housing Policy That Made Your Neighborhood. The Atlantic Monthly Group.

This article examines the practice of redlining in the twentieth century. It shows how zoning was created to exclude people from certain neighborhoods.

More, Thomas A., Thomas Stevens and P. Geoffrey Allen. (1988). Valuation of Urban Parks.

Landscape and Urban Planning, 15 139-152. https://doi.org/10.1016/0169-2046(88)90022-9

This study analyzes the impact of four parks in Worcester, Massachusetts. It analyzes the use of travel cost analysis, contingent valuation, and hedonic pricing models.

Persky, Joseph, and Haydar Kurban. (2003). Do federal spending and tax policies build cities or promote sprawl? Regional Science and Urban Economics Volume 33, Issue 3, May 2003, Pages 361-378. https://doi.org/10.1016/S0166-0462(02)00033-9

This study analyzes the use of public funds to subsidize the city of Chicago and its suburbs. It finds the benefits of the subsidies of the city outweigh the others.

Schmitt, Angie. (2013). Beyond "Level of Service" — New Methods for Evaluating Streets. Streetsblog USA.

This article enumerates the problems with level of service when analyzing how a street is used and what its future capacity should be.

Tigas, Lourraine A., Dirk H. Van Vuren, Raymond M.Sauvajot. (2002). Behavioral responses of bobcats and coyotes to habitat fragmentation and corridors in an urban environment. Biological Conservation. Volume 108, Issue 3, December 2002, Pages 299-306. https://doi.org/10.1016/S0006-3207(02)00120-9

This study analyzes the behavioral patterns of animals living in fragmented natural areas in Los Angeles. It finds problems with the mixing of animals and human development.

Walker, Jarrett. (2018). What If We Called it "Decongestion Pricing"? Human Transit.

This article lists the benefits of calling congestion pricing "decongestion pricing" to fight the public perception problem.