

# How Can Increased Tax Improve a City's Development

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**Abstract.** Taxation is a huge help in the development of city; however, the help is not always apparently visible. In this article, the benefits of taxation have brought to urban development will be analyzed in detail. The purpose of this paper is to reveal in what aspects can tax revenue help cities to better develop. To further address the topic, this article examines the benefits of higher taxes for urban development in three parts: The first part focuses on how higher taxes can reduce urban overcrowding and, by doing so, mitigate the social problems associated with urban overcrowding. The second part examines how raising government-owned or private transportation taxes can help reduce the cost of maintaining roads and provide valuable funding for basic infrastructure, which also helps reducing the crime rate of the city. The third part describes how higher environmental taxes have stimulated the generation of clean energy, reduced transportation costs and inputs for cleaning up urban pollution. The final part focuses on how tax revenue can provide the cities with capital to survive and recover from unpredictable economic and natural crisis. This paper demonstrates that tax revenue has been successfully improving cities' development in the four aspects discussed above by reviewing previous studies on the subject, and presenting data related to the development of various cities.

**Keywords:** Tax revenue; urban development; overcrowding; transportation tax; environmental tax.

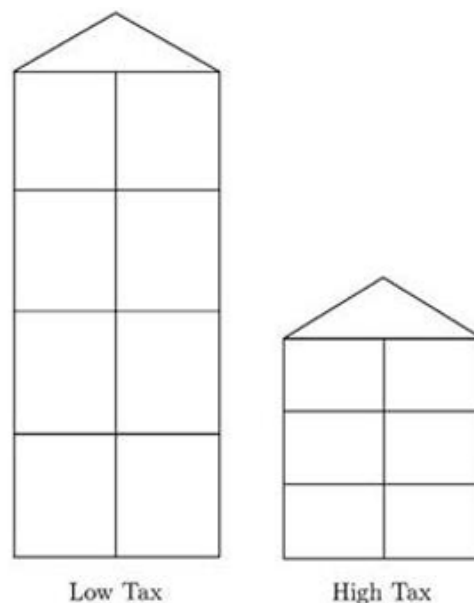
## 1. Introduction

Many governments impose a variety of taxes on their citizens, such as environmental taxes and property taxes. Although governments utilize the tax to improve urban development, few people are aware of the advantages of doing so. When looking through studies and articles on taxation, we can see that the majority of the related articles concentrate on ways to encourage people to pay their taxes while very little on the advantages that tax payment can have for the general population and urban development. This essay will cover three different ways in which taxation might aid urban construction in order to address the research blank on this topic. This essay will examine how taxes aids in urban development using the method of a literature review, and will describe the beneficial effects of taxation on urban development through a survey of the relevant literature, as well as introducing readers to the research context of previous papers. The expected outcome of this paper's use of the literature review research methodology is that by imposing property taxes, environmental taxes, and other related taxes on the public, the government can promote more efficient land use, acquire funds for building infrastructure, reduce the annual economic benefits lost due to traffic congestions, mitigate environmental issues like the greenhouse effect and the heat island effect, and obtain enough capital to deal with potential emergencies or problems. In detail, the first part of this article will introduce the negative impact of the heat island effect on the city, as well as the reasons for the formation of the heat island effect, and explain how property taxes can help alleviate the urban heat island effect; The second part of this article will introduce how governments obtain capital to build infrastructure through tolls and property tax, and how these infrastructures contribute to urban development; The third part of this article will focus on how the existence of gasoline and environmental taxes can help reduce greenhouse gas emissions, and how it can help governments save valuable funds that should have been used for restoring environment, and use it for other urban developments; The final section of this article will illustrate how taxes can help the government cope with difficult times, or emergencies, and introduce how the Haitian government used taxes to ensure job opportunities and the well-being of its citizens after experiencing natural disaster to support this conclusion.

## 2. The Impact of Tax on the Development of City

### 2.1 Property Tax Encourages Efficient Use of Land

With increased population growth and more modernization since the turn of the century, more and more individuals have been moving to urban areas. Around the world, people are recognizing this tendency. As an example, one in two Americans now reside in cities [1]. Urban housing is needed for the growing population. Land, on the other hand, is a limited resource, therefore keeping the same city size will not be sufficient to cover the housing demands of the entire urban population, let alone additional urban living requirements like public spaces for businesses, industry, and recreational amenities. Cities started to swiftly grow into rural areas to accommodate the urban population's need for land. Urban sprawl is the term for this quick expansion. While "urban sprawl" has been successful in solving the lack of urban land available, its expansion into rural regions has led to other issues, including the urban heat island effect, resident mental health, and air pollution. More so than the advantages it can offer city dwellers, urban sprawl has a detrimental impact on these issues. In fact, excessive, rapid urban sprawl must be limited to avoid further harmful effects. Urban sprawl can be stopped with the use of property taxes [2]. Urban sprawl is reduced by higher property tax rates because landowners prefer to construct more residences and rooms on small area of land. As property taxes stimulate higher densities of rooms, they can be a useful tool for preventing urban sprawl when their design is thoroughly thought out.

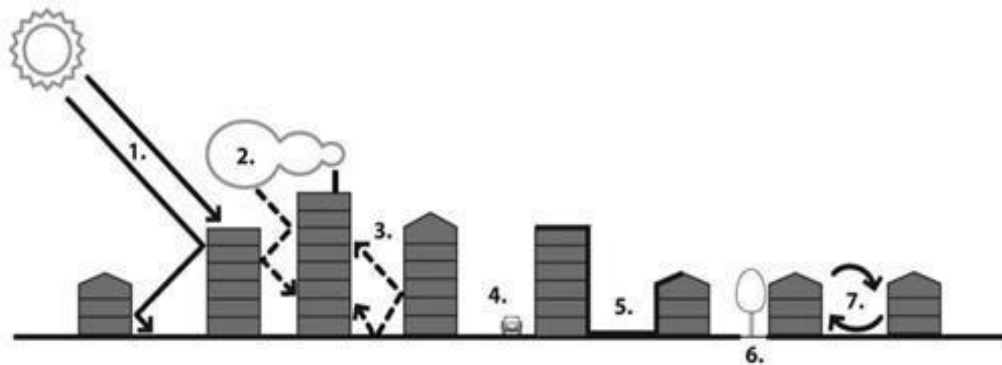


**Fig 1.** Dwelling-Size Effect of Increasing Property Tax.

(Retrieved from Property tax as a policy against urban sprawl. Land Use Policy)

As Taranu, V., and Verbeeck, G. mentioned in their work: Property tax as a policy against urban sprawl. Land Use Policy, 122, 106335., While the tax's negative effect on renovations lowers population density and encourages the spatial growth of cities, a countervailing effect from smaller homes may prevail, increasing household densities and shrinking cities' size in total [3].

Higher taxes not only encourage people to construct buildings in smaller sizes, allowing for more efficient use of land, but also reduce the heat island effect and a series of negative effects of urbanization. The urban heat island effect is when urban areas are 6–8°F warmer than their surroundings on warm days. The heat island effect generally occurs in and around urban centers and is mainly caused by surfaces that can absorb heat, such as roads and building roofs, absorbing heat from sunlight and reflecting it back into the atmosphere as thermal infrared radiation, raising the temperature of the atmosphere. The diagram below is a good illustration of how city temperatures are raised due to the heat island effect.



**Fig 2.** How the surfaces of roads and buildings absorb and reflect sunlight. (Retrieved from Property tax as a policy against urban sprawl. Land Use Policy).

As shown in the figure above, the surfaces of buildings can absorb and reflect sunlight, raising the temperature of a city to a level unfit for living. High temperatures will in turn have many negative effects on urban development: residents will use a lot of the limited energy available for cooling. As the use of energy is accompanied with the release of greenhouse gases that traps heat within the city, the city would continue to have high temperatures, which will be detrimental to the survival of vegetation in the city. The production of energy and the loss of vegetation will further increase the percentage of greenhouse gases contained in the atmosphere, which will continue to increase the temperature [3].

Fortunately, as Frumkin, H. described in *Urban sprawl and public health*, reducing the size of buildings is an effective way to reduce the heat island effect. When property taxes increase, people will choose to build on as small a lot as possible and use the space in buildings efficiently in order to reduce their taxes. Houses built in this context will be small and high-rise, meaning there would be less house area and surface of buildings to absorb and reflect sunlight, thus keeping urban temperatures at optimal level that is suitable for living, and reducing the amount of energy wasted for cooling.

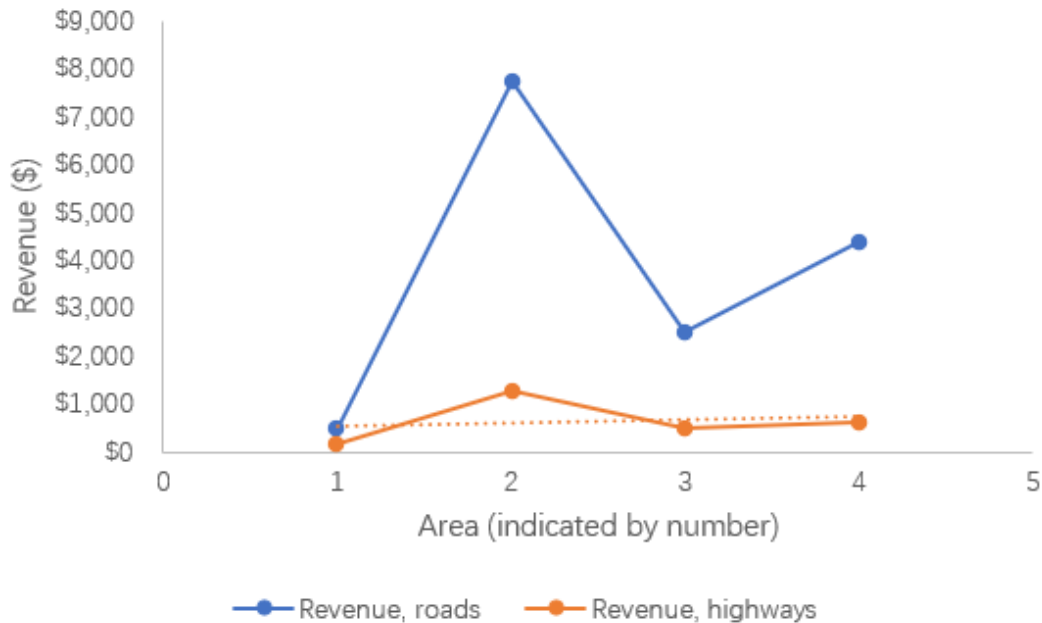
By constructing buildings with high efficiency land use, more land in cities would become available, and thus can be used for facilities other than housing, such as building city parks and other recreational facilities. Recreational facilities in cities offer more than aesthetic advances: they are good for mental and physical health. Enjoying natural sceneries can help reducing a person's stress and even alleviate stress-related health problems. As Raimi MD points out in *once there were green fields: how urban sprawl is undermining America's environment, economy and social fabric*, the presence of parks in cities can help relieve residents of back pain, cardiovascular disease, and self-stress caused by long commutes [4].

## 2.2 Tax on Private Road Owners Enables Infrastructure

Unlike in the past, today there are few privately operated roads, and most are limited to bridges. Recently, however, road privatization has emerged as an alternative option to road ownership and is being hotly debated recently. This is because privately operated roads offer many advantages: the private operator has the ability to keep the cost of operating the road down and contribute income taxes to the local government to build infrastructure. As Junge, J., and Levinson, D. discussed in *Property tax on privatized roads: Virginia's Dulles Greenway and Orange County in California's State Route 91*. The benefits which tax on private road owners can provide to government are enormous: taxing private road owners gives the government more flexibility to invest in constructing needed infrastructure, reduces property taxes on other businesses, and allows roads and highways to be maintained at a low cost because the pressure of maintenance is shifted from the local government to private businesses [5].

In their study, Junge, J., and Levinson, D., by combining the revenue each city receives from property taxes, land use, and the number of roads in the city, the property taxes that could be collected by some cities through road privatization are derived.

Figure 3 indicates that the tax revenue generated by roads in all five areas are greater than that of the tax revenue generated by highways. Specifically, the tax revenue generated in location 2 peaked, reaching about \$8,000.



**Fig 3.** Tax revenue created by roads and highways in Anoka, Arden Hills, Bloomington, Brooklyn Center and Brooklyn Park. (Derived From Property Tax on Privatized Roads. Research in Transportation Business & Management)

According to Junge, J., and Levinson, D., taxing private-owned roads and highways provides the local government great tax revenues. Specifically, in all locations listed in the table above, the tax revenue generated by roads are generally higher than the tax revenue generated by highways in the same area. For instance, the tax revenue created by roads in Brooklyn Center was \$2507, while the tax revenue generated by highways in Brooklyn Center was \$522, which is significantly lower.

Even if only the busiest highways were subject to taxes, which, the researchers believe, is the more likely case, the local government could still profit significantly, and invest its profit into building infrastructure. This is also supported by the data presented in Table 1: One km<sup>2</sup> of highways in Bloomington can generate \$382.06 tax revenue for the local government. Local road privatization would also aid in lowering maintenance costs from city budgets, freeing up money for other services. In fact, using the tax revenue generated from roads and highways to improve infrastructure is a great way to improve the city: the improvements on infrastructure ensures social stability and security. Crime rates frequently increase during the times when the difference between financial status of the rich and the poor are significant. During these times of frequent crimes, the daily lives of city residents and their personal safety are negatively affected. Fortunately, this problem could be addressed by the availability of infrastructure: the local governments use tax revenue to offer housing and other necessities to people in need. A great example could be found in four Chinese autonomous municipalities. As

the difference between the rich and the poor in these four autonomous municipalities are being kept at an acceptable level and the needs of people are satisfied, the crime rate will be decreased to a safe level that is acceptable to the majority of the public. In this way, the city's residence can continue living under a peaceful and stable social environment, without worrying about whether they would be potentially harmed by criminals that are unsatisfied with their lives in the city [6].

**Table 1.** Potential Land Value and Tax Revenue Generated by Roads and Highways in Anoka, Arden Hills, Bloomington, Brooklyn Center and Brooklyn Park.

City	Land value of road area (\$ per km <sup>2</sup> )	Land value of highway area (\$ per km <sup>2</sup> )	Tax revenue of road area (\$ per km <sup>2</sup> )	Tax value of highway area (\$ per km <sup>2</sup> )
Anoka	\$63,702.77	\$28,822.27	\$472.32	\$215.64
Arden Hills	\$41,202.88	\$29,170.60	\$161.60	\$114.83
Bloomington	\$77,630.87	\$58,063.12	\$510.80	\$382.06
Brooklyn Center	\$56,952.89	\$34,691.85	\$504.73	\$308.15
Brooklyn Park	\$47,909.71	\$25,512.93	\$337.87	\$180.15

Derived From *Property Tax on Privatized Roads. Research in Transportation Business & Management*

### 2.3 Gasoline Tax Addresses the Problem of Traffic Congestion, and Reduces Amount of Greenhouse Gases Emitted

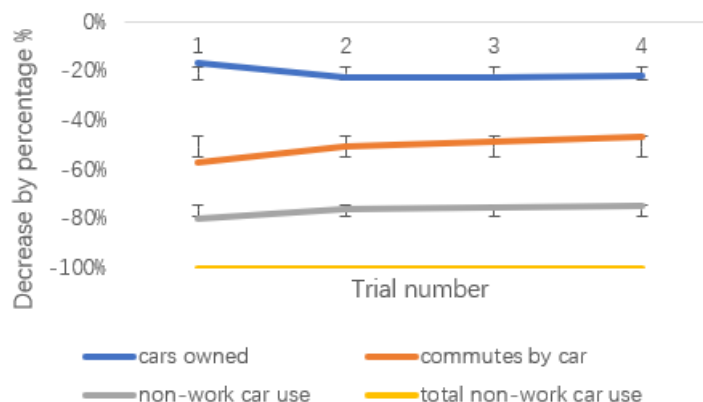
In practically all cities, traffic congestion is a relatively common occurrence. Extreme levels of traffic congestion have been caused by rapid and ongoing urbanization, particularly in densely populated cities. According to Osman, the annual national economic loss due to traffic congestion in Bangladesh in 1997 was \$79 million and the city lost more than 80 million work hours per day. In addition to this, the government has to bear the burden of increased pollutant gas emissions when cleaning traffic jams. The economic and productivity losses caused by traffic congestion are too much for cities to bear.

Fortunately, cities are already experimenting with increased environmental taxes to ease traffic congestion. As Potter, S. mentioned in Using environmental taxation for transport demand management, purchase, circulation and fuel taxes can promote lower emissions and reduce traffic congestion [7]. His view is also supported by other studies in the same field. As Anas, A., Timilsina, G. R., and Zheng, S. presented in an analysis of various policy instruments to reduce congestion, fuel consumption and CO<sub>2</sub> emissions in Beijing, a nested multinomial logit model was used to explore the impact of different taxation policies on traffic congestion in Beijing. With the model, they calculated the impact of the fuel tax and congestion toll on numerous aspects, including the amount of commutes by car [8]. They concluded that both congestion toll and fuel tax can significantly reduce traffic congestion. Among them, fuel tax has a greater effect on reducing gasoline use and greenhouse gas emissions than congestion toll. The detailed findings of this model are shown in the tables 2. Both the commutes by car and non-work car trips decreased significantly as toll, and especially fuel tax, were being applied. Specifically, when Quintile f is 3 and fuel tax was applied, the commutes by car decreased by 63%, and the total non-work trips decreased by 59%. This greatly reduced amounts of commutes and non-work trips significantly help addressing the problem of traffic congestion in Beijing, as Zheng, S later claimed.

**Table 2.** Effects of the fuel tax on the margins of adjustment.

	1	2	3	4
cars owned	-42%	-60%	-54%	-44%
commutes by car	-100%	-75%	-63%	-50%
non-work car use	-57%	-68%	-64%	-56%
total non-work car use	-50%	-63%	-59%	-51%

Derived From *An analysis of various policy instruments to reduce congestion, fuel consumption and CO<sub>2</sub> emissions in Beijing.*



**Fig 4.** Decrease of cars owned, commutes by car, non-work car use and total non-work car use by percentage with the gasoline tax. (Derived From An analysis of various policy instruments to reduce congestion, fuel consumption and CO2 emissions in Beijing.)

Further, they also investigated the impact of fuel tax on greenhouse gas emissions. The results of their investigation are shown below in Table 3. The gasoline tax greatly decreased Beijing's overall fuel use and carbon dioxide emissions, as indicated in the table. Among them, there has been a 33.8% decrease in overall fuel use and a roughly 40% decrease in carbon dioxide emissions. The lowered overall fuel use is due to the fact that people want to avoid paying gasoline tax. This has also stimulated more people to travel by public transportations, and encouraged private companies to develop more efficient private transport and cleaner energies.

The gasoline tax has significant advantages for the Beijing government in addition to lowering energy consumption and greenhouse gas emissions: it helps generating daily tax income, which peaks at 44,510,000 RMB. With the help of such increased tax revenue, the local government can create more effective transportation systems and improve the efficiency of vehicles. In fact, Anas, A., Timilsina, G. R., and Zheng, S concluded that using more efficient modes of transportation is a more cost-effective way to reduce urban traffic congestion than collecting gasoline taxes and congestion tolls, as people's well-being and social welfares are also being protected: people no longer need to pay additional for tax and toll when more efficient vehicles are available [9].

**Table 3.** Effects of gas taxes and vehicle efficiency improvements while lowering CO2 emissions.

	% changes from base
Auto round trip time (hrs/trip)	11,103
Number of vehicles per day	2,204,100 (-15.9%)
Total kilometers traveled per day	34,040,000 (-22.0%)
Total fuel consumption (lit./day)	3,366,900 (-33.8%)
Total CO2 emissions per day (g x10 <sup>3</sup> )	11,342,000 (-36.0%)
Daily tax revenue (RMB generated per day)	44,510,000

Derived From *An analysis of various policy instruments to reduce congestion, fuel consumption and CO2 emissions in Beijing.*

### 2.4 Tax Revenue Enables Cities to Survive and Recover from Crisis

In addition to the benefits that taxation provides in day-to-day urban development, it also gives cities the ability to respond to and recover from crises. In times of economic difficulty, taxes that governments have collected during periods of stability may be helpful. In fact, various governments

frequently use taxes previously collected as a buffer: they can use the tax revenue to improve cities' development (as Part 2 states, using taxes to create infrastructure and ensure the well-being of the public), or they can use tax revenue to find solutions to issues that the cities are facing at times of crises. A great example of such use of tax can be found in Tax policy and the COVID-19 crisis by Collier, R. and Pirlot, A. As Collier, R. mentioned, the tax that government has collected from previous years helped many countries get through the times of their economies devastated by the spread of COVID-19 around the world: with taxes, governments were able to provide their people unemployed with jobs, and places to live temporarily [10]. Taxes can help cities not only to survive the economic crisis, but also recover from unpredictable natural disasters: Haitian government used tax revenue from previous years to recover from 2021 floods and earthquakes. Specifically, Haiti government used its tax revenue to provide people with temporary shelter and guarantee their livelihoods required items. In addition, according to Renwick, W., and Balthazar, S. L., the Haiti government also used the tax collected the following year to restore the natural environment damaged by the previous disasters. For one, they invested in the reconstruction of dams, and improved the durability of the dams in order to ensure these dams can last if floods were to happen again in the future. For another, they imported trees of species that are capable of reaching maturity rapidly, and plant these trees on the lands cleared during flooding to create "protection forest", namely, the forest that can form within a short period of time and are strong enough to withstand any future natural disasters. The examples of COVID-19 and the Haitian government clearly shows that, in addition to helping cities in terms of their day-to-day developments, taxes can also provide cities with the capital to respond to emergencies or crisis. With available tax revenue, cities have the potential to recover from unpredictable events [11].

### 3. Summary

This essay explores and explains how taxation can help urban development from four aspects. Firstly, property tax helps reducing the city sprawling, encouraging more efficient land use, as well as providing urban population with recreational space which ensures their physical health. Secondly, taxes on roads and highways can reduce government spending on road and highway maintenance and provide funds to create or improve infrastructure. Thirdly, gasoline taxes and environmental taxes help effectively reduce traffic congestion in cities, while preventing further economic loss due to the traffic congestion, as well as reducing the greenhouse gas emissions. Finally, tax revenues increase cities' chance to survive from unpredictable economic crises and natural disasters and provide the capital to perform follow-up maintenance or restoration of the environment. As taxation can provide multiple benefits to city development, including the four benefits mentioned above, the government should continue to consider how to use of taxation wisely to achieve the ultimate goal - to encourage the development of the city and ensure the well-being of their people.

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