

URBAN ROAD INFRASTRUCTURE: AN ECONOMIC ANALYSIS

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Abstract

The importance of road infrastructure for an economy cannot be overstated. It cannot be denied that romanian road infrastructure is in crisis, despite many solutions that have been advanced to cure this problem. This analysis shows that private investments in human capital are possible and profitable on a free market. State intervention in providing public roads is responsible for the systematic misallocation of resources and the plethora of problems that affect our road infrastructure.

Keywords

Road infrastructure, free market, property rights, public goods, electronic road pricing

Introduction

Recently there has been a lot of discussion about the importance of infrastructure for the coherent development of a city or a country.

Two views can be discerned on the issue of property rights of the roads. On the one hand are those who argue that roads must necessarily be part of the public domain, built from taxpayers' money and equally open to all individuals. They consider roads as a clear example of public goods. On the other hand there are those who advocate the privatization of roads. In their opinion, streets are not different from any other usual goods and their construction and maintenance should be left to market forces.

This paper examines the issue of road infrastructure from an economic perspective and argues that the road problem is not a management (or engineering) problem but a property right problem. It discusses how the present road crisis can be alleviated if a proper reform is implemented.

Road infrastructure and property rights

Building roads is not inherently a difficult business, as experience seems to imply. At a closer reflection, the sensible economist has to acknowledge that the

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negative facts commonly associated with road infrastructure are not as much the result of peculiar failure of public policy as the outcome of a particular institutional framework encompassing the production of roads.

The public infrastructure system establishes in fact an institutionalized separation of ownership and control in the production of roads. Roads are financed *via* taxes raised by the central authorities but the government has no control over the allocation of resources. Thus, a waste of resources and many different problems result systematically whenever suppliers of funds cannot decide over the allocation of the road infrastructure they produce.

Various proposals have been advanced to mitigate the deep problems affecting our road infrastructure. The basic idea is that the socialization of road infrastructure should be expanded into a even more comprehensive socialization. The state should not only build new avenues, passages and bridges. It should discretionary establish new rules for using the roads. Parking in downtown area should be to a large extent forbidden. The government should build special parking areas outside the city, compelling all non-residents to leave their cars there and use only public (mass) transportation for visiting the city. Delocalization of certain institutions (universities, hospitals, courts) outside the city to reduce traffic congestion – represents another policy proposals. None of the above-mentioned policies brought positive results, mainly because they did not target the root of the phenomenon. They are technological solutions for what is essentially an economic problem.

The conventional economics of road infrastructure

The crucial point in the public good theory of roads is that free market will under-invest in the production of roads because of the existence of free-riders. Therefore, the amount of infrastructure will be lower than the social optimum, and the state is invited to close the gap by collecting money from all inhabitants and spending them to produce the “right” infrastructure.

As in other economic areas, public ownership in the field of road construction creates incentives for individuals to follow their personal interests to the detriment of the group. Municipalities who are lobbying more effectively for government financial resources are consequently more successful in developing a better road network. At the opposite corner are municipalities governed by people without political ties with (or even worse, opposed to) the ruling party. In these regions, road are brought to ruin.

It is nevertheless true that road transportation plays a critical role in enhancing the productivity of individuals. But the process of building streets is costly, as any other investment. This cost reflects the value of labor force and materials used in the building of roads. These resources are valuable because

they can be employed alternatively in the production of other goods demanded by the public.

The most important question the infrastructure building system has to answer is what type of roads, in what quantity and for what price it is needed in the economy. On the free market, entrepreneurs engage in the production of roads and start offering specific transportation venues if they judge individuals' demand for such projects is sufficiently intense. Competition among private suppliers of road services leads to the efficient use of society's scarce resources and challenges entrepreneurs to provide exactly the infrastructure people need. Of course, it does not mean that road building will be flawless on a free competitive market. Occasionally, even private providers of roads will fail to anticipate properly the magnitude and composition of infrastructure demanded by the public. Yet error is inescapable in human affairs. Competition among different entrepreneurs will eliminate the less able entrepreneurs and keep the number of such errors to a minimum.

At the present, road building is not considered an ordinary economic investment. Because roads are considered a public good, governments have socialized the provision of roads throughout the world. The process runs as follows. Each of us pays taxes. The state uses a part of the money collected through taxation to subsidize infrastructure building. In principle, the system should provide the society with the proper road infrastructure for increasing the productivity, so that to increase the future income in order to offset the effort of taxpayers. In reality, the system malfunctions are obvious. The inferiority of government controlled road infrastructure results from several problems.

The fundamental problem with public infrastructure derives from the impossibility of calculation in a public property system. Following Mises (1990), Rothbard (1970, p. 825-828) pointed out that any punctual decision to socialize production introduces an island of calculational chaos in the market economy. Under public property of resources employed in road building, meaningful prices cannot emerge and individuals' preferences for acquiring roads cannot be rationally fulfilled. State intervention on infrastructure falsifies the true cost and return of various infrastructure services. In a socialized system of road building, one cannot know what precise investment in roads is profitable or not. As a consequence, the question in which exact direction road investments need to be channeled cannot be answered accurately.

A second problem with public infrastructure is that government bureaucracy has poor incentives to adjust the provision of infrastructure according to the market participants' preferences. Put it differently, this system does not encourage good transportation network. Innovation and improvement in quality will not be the main priority of public officials. Rather, the directors of government-owned (or sponsored) agencies will pursue their own objectives and seek to satisfy the political demands of education policymakers.

In practice, public infrastructure building lead to excessive costs, overuse of resources and misallocation of roads. This process has nothing in common with economic efficiency and welfare maximization, because, as Rothbard (1970, p. 820) observed, “since there is no pricing, and therefore no exclusion of submarginal uses, there is no way that the government, even if it wanted to, could allocate its services to their most important uses and to the most eager buyers. All buyers, al uses, are artificially kept on the same plane. As a result, the most important uses will be slighted”.

First-best option to reform: road infrastructure and the private property regime

When we speak of a free market, we mean that property rights can be easily defined and enforced on all existing economic resources (including roads) and that each property owner has the unhampered right to use his property as he sees fit.

In the absence of an institutionalist (property rights-based) analysis of road building, it is difficult to explain why private organizations (such as commercial halls) do not face the same shortage of roads as the state does. The best example is provided by malls or residential parks. The entrepreneur who undertakes the construction of a condominium or a mall is careful to provide its customers with the necessary infrastructure: streets, corridors, stairs, passages, elevators, ways of access, points of exit, and (last but not the least) parking areas.

The optimal amount of road network can only be reached if each individual paid the full cost for using infrastructure, that is, if roads fall entirely into the realm of private enterprise.

“The earliest roads, we must never forget, were private turnpikes. Tollgates collected on the basis of the weight of the wagon, the number of axels, the number of horses and the width of the wheels. Thin-wheeled vehicles could go faster, but would create ruts in the road, and were therefore charged more. Thick-wheeled ones would serve something of the function of a steam-roller, flattening out the road and making it more passable for others, and were thus charged less.” (Block 2003, p. 5)

Entrepreneurs will be encouraged to supply roads in the quantity and of the quality customers are eager to use.

“The reason a company or individual would want to build or buy an already existing road would be the same as in any other business-to earn a profit. The necessary funds would be raised in a similar manner-by floating an issue of stock, by borrowing, or from past savings of the owner. The risks would be the same-attracting customers and prospering, or failing to do so and going bankrupt. Likewise for the pricing policy; just as private enterprise rarely gives burgers away for free, use of road space would require payment. A road enterprise would

face virtually all of the problems shared by other businesses: attracting a labor force, subcontracting, keeping customers satisfied, meeting the price of competitors, innovating, borrowing money, expanding, etc. Thus, a highway or street owner would be a businessman as any other, with much the same problems, opportunities, and risks.” (Block 1979, p. 215)

Private suppliers of infrastructure are able to mitigate the problems which plague the present situation: poor quality service, congestion, crashes etc.

Secondly, private investors in infrastructure will be adequately stimulated to find the most effective contractual solutions in order to retain control over their investment. Only private economic agents are stimulated to discover the most fitted contractual solutions, which benefit both sides of the contract, that is, allow each part to fulfil its own interests. Put it shortly, investment in infrastructure under a private property regime is profitable because it is profit-oriented.

“There is an approach to the problem of traffic congestion-the economic approach-which offers a rational and practical solution. . . . The first step is to recognize that road space is a scarce resource. The second, to apply to it the economic principles that we find helpful in the manufacture and distribution of other scarce resources, such as electricity or motor cars or petrol. There is nothing new or unusual about these principles, nor are they particularly difficult. What is difficult is to apply them to roads, probably because we have all been brought up to regard roads as community assets freely available to all comers. The difficulty does not lie so much in the technicalities of the matter, but rather in the idea that roads can usefully be regarded as chunks of real estate.” (Roth, 1967, p. 16.)

On a free road market, entrepreneurs will utilize electronic road pricing to charge automobilists for using major streets and avenues.

Good maintenance of roads would also be encouraged if roads will be under private property. It is a well-known fact that, at the present, in the winter season, motorists are heavily affected whenever meteorological conditions get worse. If snow strikes hard enough, circulation is practically prevented completely, and this happens despite the progress of forecasting techniques which have made possible to predict with accuracy the details of the weather conditions with days in advance. In a free market situation, road blockage as a result of natural conditions (as in the case of Valea Oltului) will incur heavy losses on roads’ owners. Each hour of blockage means the road owner loses the income he would have obtained if motorists used his road and paid him taxes. Therefore, road owners will have adequate incentives to make the necessary preparations for keeping the road open under difficult weather conditions.

Moreover, road owners will be interested in conserving the value of their property, and therefore, will not use corrosive materials or inappropriate machines for removing snow and ice. It is highly improbable that under a private

property regime we will see the crater-like holes in the road we are accustomed to see every spring as a result of the inept maintenance of the road during the winter season.

A private property regime on roads will improve also the whole set of regulations known as the “Circulation Code”. Because roads will be private, traffic will be regulated as the road owner sees fit. There will be no nation-scale debates about speed limits, although entrepreneurs will be mostly interested in establishing the most appropriate rules for the particular road they manage. The decision concerning the speed limit will not result from the interest of the road owner, who prevails in the bureaucratic struggle, but from the interest of the road owner, who is stimulated to issue traffic regulations that guarantee a fluent circulation. Minimizing the number and gravity of car accidents will be a clear intermediary goal of these regulations.

Traffic congestion is one of the major problems that plague circulation on the public roads. Congestion imposes a plethora of negative consequences not only on motorists, but also on society at large. The time spent waiting in line or advancing with 5km/h is a waste for all those involved. The absence of fast transportation prevents a smooth allocation and employment of resources. Moreover, it increases the costs of transportation, because fuel consumption is much higher than in normal traffic conditions. In addition, agglomeration is one of the main reasons for the increased pollution in the big cities. And this is not the end of story. Traffic congestion makes the vehicle to deteriorate at a much faster rate than in normal conditions, especially if it happens in extreme weather condition (hot temperatures).

Although many commentators have provided various solutions to this problem, their explanation usually misses a fundamental feature of most traffic jams. This defining characteristic of congestion is that most traffic jams happen in the so-called “peak hour” or “rush hour”. There is little traffic congestion at night, in the weekend, or even in the working days around noon. Motorists start to agglomerate in the morning (when everybody goes to work) and in the evening (when people go home).

In a private property regime, road owners are interested in eliminating traffic congestion. At the root of this assertion is the proposition that any entrepreneur is not interested in serving as many customers as possible, but in obtaining maximum profit. Since the costs of a road are to a large extent of a long-term nature, it can be said that road entrepreneurs will be interested in maximizing their revenue – which is given by the number of cars passing on the road multiplied by price. Because the number of cars using the road is a function of price, it means that road owners can relatively easy obtain the maximum profit by setting the price. Given that demand for using the road changes in a 24 hours period, the road owner is expected to increase its profit by varying the price from a low level when traffic is less intense (during the night,

for instance) to a high level during the peak hours. Thus, road companies will adopt a policy similar to that implemented by phone companies, for example, which charge their customers differently depending on the moment the call is made.

Another thing to point out is that we will probably not experience situations when roads are blocked by union strikers, as it sometimes happen in the present situation. In fact, no such case has ever occurred on a private property.

Second-best option: electronic road pricing

Electronic road pricing (ERP) is essentially an attempt to imitate the functioning of a free market in road building, without implementing a reform on property rights regime. It approaches the road problem from a managerial perspective. In what follows we will analyze more closely this policy.

ERP has been implemented in several major cities, and the results have been more or less spectacular. Singapore in 1975 was the first city to adopt a form of congestion pricing based on area licensing; in 1998 it has been the first major city to adopt a comprehensive ERP plan. London has implemented ERP for the first time in 2003 on a 8 square mile area (25 square km.), and four years later it decided to double the size of ERP zone. A congestion tax is also imposed on vehicles driving into and out of the Stockholm inner city zone. Road authorities in Dubai have imposed an ERP area (called “Salik”) on July 2007. Milan is currently experiencing a road-pricing scheme for an area of 3 square miles (8 square km.). New York City Mayor Michael Bloomberg has proposed a traffic congestion fee for vehicles traveling into or within the Manhattan central business district of New York City.

Road taxes can be differentiated according to engine capacity, fuel type, type of vehicle (car, motorcycle). ERP is differentiated according to time of day, traffic zones and type of vehicle. The effects of ERP’s introduction have been noteworthy. Thus, in Singapore, road pricing has had a strong impact on the mode of transportation: public transport share rose from 46% in 1974 to over 60% today. The ERP system experienced in Trondheim (Finland) has shown that a significant number of people decided to walk or use bicycles instead of cars, which had an equal important effect on decreasing pollution. Among other consequences, it has been reported fewer waiting hours for public transport because of reduced traffic congestion and fewer delays in transport of goods. In London, the ERP scheme has reduced traffic levels and cut carbon dioxide emissions by almost a fifth.

Road pricing system – characteristics and results

<i>Features</i>	<i>Effects</i>
• Cameras and electronic gates installed on the roads which communicate with electronic devices installed on vehicles • Differentiated fees, discriminating between: 1. Residents and non-residents 2. Personal or commercial cars and public or emergency vehicles 3. Weekdays and weekends / day and night / normal and rush hours 4. Small and big vehicles (SUVs and MPVs)	• Reduced traffic jams • Public transportation rises • Waiting time for public transportation declines • Faster delivery of goods • Change in the transportation mode: use of bicycles rises, more frequent walking • Less pollution • Increased revenue for municipality

However, ERP cannot solve definitively the road crisis. Being a state policy, it incurs all the difficulties public activities have in general: impossibility of calculation and lack of appropriate incentives. Many questions remain unanswered. For example, how does the road authority know what is the “right” level of the price to be paid for using a street?

Conclusions

This paper intended to provide an alternative perspective on the problem of road infrastructure. It argues that only a deep reform can solve the present crisis. This reform should consist in a complete privatization of road infrastructure. Second best solutions, like ERP, can be of help, but may also generate additional problems.

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