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PUBLIC-PRIVATE PARTNERSHIPS:
Why the Private Sector Can Pave the Way to Success

by Nick Tuszynski



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Abstract:

In this essay, I will outline how markets are theoretically better equipped than the public sector to solve the road development problem. While there is certainly merit in debating the anarcho-capitalist view that a fully private system would be the most desirable system, this essay focuses on the policy-application side of the debate. Due to the present political and fiscal environment, full privatization is not currently an alternative. Fortunately, there is a politically acceptable option currently available that would allow for more private sector involvement, while still allowing the government to exercise some minimal control—public-private partnerships. Combining the economic theory about how economic calculation fails with the application of innovative financing techniques such as public-private partnerships, I will explain how P3s will allow the private sector to reenter the domestic road-development arena. Building on this foundation, I will explain how P3s can help cover the financial shortfall needed to improve American transportation infrastructure, and how both politicians and private actors can benefit from this arrangement.

Author Bio:

Nick Tuszynski was born and raised in Dallas, Texas. After high-school, he received a basketball scholarship at Loyola University of New Orleans. At Loyola, Nick graduated magna cum laude and was the recipient of the Dean's Honor Award in the Joseph A. Butt School of Business. During his tenure at Loyola, he took classes with Dr. Walter Block and Dr. Dan D'Amico which led to his interest in free-market ideas. In the summer of 2009, Nick interned as a Koch summer fellow, which inspired him to become more involved in economics and public policy. Nick also interned at the Department of Transportation in the Office of the Secretary as a policy analyst. He was accepted into the Presidential Management Fellows program and is currently a financial analyst in the Export-Import Bank of the United States.

Committee Members:

Virgil Henry Storr (chair), director of Graduate Student Programs, Mercatus Center

Jason Fichtner, senior research fellow, Mercatus Center

Matt Mitchell, senior research fellow, Mercatus Center

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INTRODUCTION

“Picture the building of a new railroad. Should it be built at all, and if so, which out of a number of conceivable roads should be built. In a competitive and monetary economy, this question would be answered by monetary calculation.” —Ludwig von Mises

The Current State of the American Road System

No one questions the importance of roads. From ancient Rome to modern-day New York City, roads have been the catalysts for trade, settlement, and economic growth. However, while a well-kept-up transportation system can bring prosperity, an inferior system can stymie both potential growth and further development. In the United States, road development is quickly approaching an unprecedented crisis (Lomax and Schrank 2011, Poole 2010); indeed, the American Society of Civil Engineers (ASCE) gave the American road system a “D-minus” in its latest report (ASCE 2009). Funding to both maintain and extend the American road system is continually deficient (Lomax and Schrank 2011),¹ and most of the cost overruns fall on businesses and taxpayers. Due to the current fiscal situation in the United States, coupled with increasing levels of congestion, both new financing and funding mechanisms are needed to maintain and enhance the American road system.

Traffic congestion is something everyone endures and reluctantly accepts, but this state of affairs could be improved. Unfortunately, given the current political trend of excluding private firms (foreign or domestic) from entering the transportation market, congestion is going to continue to increase. For example, the Texas Transportation Institute (TTI) found that the average yearly delay per commuter has increased by 143 percent over the last 30 years and will

¹ Every year, the Texas Transportation Institute files a report on the status of the American road system. For the full report please visit <http://mobility.tamu.edu/ums/report/>. The report found the following: “In general, traffic congestion is worse in the larger urban areas than in the smaller ones. Traffic congestion levels have increased in every area since 1982. Congestion extends to more time of the day, more roads, affects more of the travel and creates more extra travel time than in the past. And congestion levels have risen in all size categories, indicating that even the smaller areas are not able to keep pace with rising demand.”

continue to increase at an increasing rate (Lomax and Schrank 2011). Since time is our most precious resource, the increased delays come at a high cost. TTI estimates that the yearly cost of traffic in time, wasted fuel, and lost productivity is roughly \$750 per *average* commuter in the United States. In larger urban areas such as New York City and Washington, DC, this amount rises to over \$1,500 (Lomax and Schrank 2011). Unfortunately, neither politicians nor policy makers challenge the prevailing structure. Having a government monopoly on the road system is the only option most people know, and few even consider that there could be a more efficient private system. Of course, this is due to rational ignorance; that is to say, most individuals are not yet so upset with the current system that it is worth their time to investigate alternatives. People are busy living their own lives, and though they would benefit from a better road system, it is perfectly rational for them to begrudgingly accept the current system. Because they have other priorities (work, family, etc.), most individuals are unaware of the high unseen costs of “free” roads: the cost of the system is simply one of many that people pay in their taxes. It is not as if someone were stealing \$750 from everyone’s bank account each year. Additionally, people are not fully aware of the cost of the road system because they generally use it as a means to another end. Transportation is a *derived demand*, which means that very few users actually utilize it for pleasure—they utilize it in order to consume another good or service. For example, chances are high that within the last few days you have used the road system to pick up groceries, go see a movie, or—most likely of all—travel to your place of work. The road is only utilized in order to achieve another goal. Yet if transportation is vital to the achievement of other ends, it follows that without adequate transportation infrastructure, a society’s production and growth will be seriously diminished.

Additional problems arise when one considers that the American population is expected to increase from 300 million to 400 million over the next three decades. This means that more people will likely be driving to and from work, and there will be greater need for the transportation of goods and services. Due to the importance of roads in the American economy (Lomax and Schrank 2011), it should be asked: What is the current state of the American road system under a government monopoly? Politicians claim the good news is that the government is going to spend an estimated \$380.5 billion over the next five years to repair and enhance the road system. While this may sound like an impressive number, it is actually quite misleading. Unfortunately, the estimated cost of the repairs and improvements needed over the next five years is \$930 billion, meaning there will be a \$549.5 billion shortfall. It is time to admit that the government alone cannot meet the market demand for transportation infrastructure, and that the private sector could be a solution to the problem. The ASCE agrees, recommending that the federal government should

reform the federal highway program to emphasize performance management, cost-benefit analysis, and accountability. . . . Challenges imposed by our highway infrastructure require a large increase in capital investment on the part of all levels of government and other sources as well. The failure to adequately invest in the nation's highways and roads will lead to increased congestion and delays for motorists and the further deterioration of pavement conditions and will pose increased safety concerns. An overstressed infrastructure will also slow freight delivery, create unpredictability in supply chains, diminish the competitiveness of U.S. businesses, and increase the cost of consumer goods. There must also be a significant change in the way we manage the system, which should include the use of emerging technologies and innovative operational strategies.”²

² Emphasis added. It should be noted that the ASCE has a strong incentive to exaggerate the amount of funding truly needed. However, in this quote, the ASCE is not advocating for increased funding, but rather highlighting the need for new strategies for improving transportation infrastructure because the current trend is unsustainable. Instead of attempting to rent-seek as much money as possible from the federal government, the ASCE is challenging the status quo and advocating for a new system.

While the ASCE recommends more government spending, it also advocates using “other sources” of investment as well. All levels of government are under tight fiscal constraints, and the global private capital markets are beginning to see profit opportunities in transportation systems, specifically in congestion pricing.³ In the United States, the current road system more closely resembles a 1989 Soviet bread line than a functioning transportation system in a modern-day capitalist society. Every morning during peak commuting times, commuters sit in lines and wait for their turn to use the road system. There is no price mechanism to signal scarcity. This causes all citizens, no matter how much they value their time, to wait in queues. No other sector of the economy functions this way. If a person wants better-quality food, he can pay a higher price at a grocery store or restaurant. If an individual wants a nicer vehicle, he can sell his Ford and buy a Mercedes. Having options allows people to express their preferences through price signals; having only one choice stymies important market signals. Congestion pricing, whether it is implemented by the government or by private actors, can help solve these problems. The price system transmits massive amounts of information between suppliers and consumers; unfortunately, this mechanism is absent in the current domestic road system (Hayek 1945). When a good is underpriced (such as zero-priced roads) it becomes overused—hence the increasingly excessive traffic in the United States.

After nearly 150 years of dominance over all major road systems, the government monopoly on road ownership is failing. In a fiscal environment in which government leaders are asking agencies to do more with less, the problem will only be exacerbated. Absent a profit and loss system, how can government bureaucracies at the local, state, or federal level adequately address the needs of citizens? How can resources be allocated to their most efficient uses? The

³ Congestion pricing may be implemented by either a private firm or a government agency. I will go into more detail about this later.

United States is the beacon for capitalism, but the road system still suffers from the problems inherent in central planning. Politicians and government actors currently argue that the road system is a natural monopoly, one in which multiple firms would be inefficient; hence, they argue, one “super-firm”—that is, a natural monopoly—is most efficient. Yet since it was one super-firm that got the United States into this dilemma, how can we expect the same system to get us out?

Outline of the Paper

In this essay, I will outline how markets are theoretically better equipped than the public sector to solve the road development problem. While there is certainly merit in debating the anarcho-capitalist view that a fully private system would be the most desirable system, this essay focuses on the policy-application side of the debate. Due to the present political and fiscal environment, full privatization is not currently an alternative. I am also not arguing that zero government involvement in infrastructure would create a flawless system; I am simply claiming that the government continually forces out private actors. The burden of proof falls on both policy makers and private firms to demonstrate how the private sector could be more efficient than the government monopoly. Fortunately, there is a politically acceptable option currently available that would allow for more private sector involvement, while still allowing the government to exercise some minimal control. This option makes use of institutions known as public-private partnerships (P3s). Combining the economic theory about how economic calculation fails with the application of innovative financing techniques such as public-private partnerships, I will explain how P3s will allow the private sector to reenter the domestic road-development arena. Building on this foundation, I will explain how P3s can help cover the

financial shortfall needed to improve American transportation infrastructure, and how both politicians and private actors can benefit from this arrangement.

First, I will briefly outline the history of the role of the government in American road development. This is essential, since the American road system was not always a government monopoly, and was able to function without government oversight for 150 years. In fact, until the Civil War, most roads were privately owned, operated, and managed. By observing both the economic and political history of the American road system, one can gain a better understanding of how a government monopoly evolved, and apply the lessons of privatization to modern road development. Second, I will define and outline different forms of public-private partnerships. In this section, I will also discuss the private sector's role both in increasing the supply of roads and in road management. I will utilize a case study to outline the uses and benefits of congestion pricing and how the private sector can assist in increasing the supply of roads, thereby further alleviating the congestion problem.⁴ In the third section, I will outline the economic theory that roads should be categorized as private goods rather than public goods.

Are Roads a Natural Monopoly?

Before going any further, I need to at least address the most common argument for why roads should be provided by the government. The classic argument for why roads should be under government control is that roads are classified as a natural monopoly. A natural monopoly can be defined as

⁴ As is seen through numerous case studies, the private sector is better equipped to implement congestion pricing as a form of road management than the public sector is. This is essential: while the supply of roads is certainly a major problem, the management of our road system is much worse; indeed, it is more socialist than capitalist. This problem can be solved by implementing congestion pricing through a private party rather than a rent-seeking public agency.

a type of monopoly that exists in a particular market if a single firm can serve that market at a lower cost than any combination of two or more firms. Generally speaking, natural monopolies are characterized by steeply declining long-run average and marginal-cost curves such that there is room for only one firm to fully exploit economies of scale and supply the market (OECD 1993).

One of the most important characteristics of a natural monopoly is that the initial upfront costs (i.e., fixed costs or capital costs) are so extremely high that they act as a barrier to the entrance of other firms. Therefore, it is more efficient to have one firm operate the monopoly. The government either regulates the monopoly or owns it, ensuring that customers are subject to fair pricing schemes. According to this argument, if one private firm had monopoly power without government involvement or regulation, the firm could charge unnecessarily high prices, hurting the consumers. Since road usage is relatively inelastic, one firm could invoke monopoly pricing, thus capturing excessive profits. But, assume a firm did charge excessive prices. If a monopolistic firm continued to charge excessive prices, there would be an incentive for another firm to enter the market, despite the high capital costs. There are firms willing to spend billions of dollars to earn profit. This is not just a theory—there have been multiple real-world examples, such as those seen recently in Spain, England, and Germany. Private firms are willing to risk capital costs in order to enter new markets.

On the surface, roads definitely share some characteristics with natural monopolies. There are very high up-front capital costs, allowing only a few firms to enter the market. Roads can cost up to \$10 million per mile, meaning the initial investment must be substantial. Furthermore, with excessive competition, there may be less incentive for private companies to enter the market. If Firm A spends hundreds of millions of dollars building a road, and Firm B enters the market with a “better road” (i.e., it undercuts the price or offers better quality, a better route, etc.), then Firm A will be forced into bankruptcy. With multiple firms entering the market, prices will be driven down toward marginal cost (perhaps Firm C enters the market and tries to

undercut Firm B's price). This will cause a problem for any firm. Obviously a private firm is not a charity, and needs to earn a profit to remain in business. With prices being driven down toward marginal cost, a firm in a competitive market will not be profitable; marginal-cost pricing is simply not enough. If an industry is a true natural monopoly, it will be unstable as long as there is frequent competition.

In natural monopolies, the marginal cost of allowing one more consumer to utilize the service is quite low. For road owners, once the fixed costs are allocated, the cost of allowing the marginal car to use the road is quite small. Furthermore, with the costs so low, the firm would need a large number of consumers to be profitable. From an economic standpoint, roads appear to be natural monopolies. In fact, according to this theory a competitive market with multiple firms may not be sustainable. However, there is an interesting caveat to this economic story. While the *building* of roads appears to be a natural monopoly in the 21st century, this does not mean the *management* of the system has to be run by one firm. Even if government is the most efficient at building roads, this does not mean it is the most efficient at managing them. Moreover, one has to consider the restrictions roads are subject to.

A road is limited by its geographic location, as well as its spatial constraints. A road in Miami is not competing with a road in Houston; the service is fixed in its location. There is no arbitrage opportunity in that scenario. Therefore, competition becomes geographical or regional. Furthermore, the building of roads is rivalrous in terms of space utilized. If there is one road, perhaps another road may be built to compete with the original road. However, it is frivolous to argue that there could be five or six parallel roads competing with one another. No firm would be that irrational. There can be some level of competition, but due to spatial restrictions, competition will of course be limited. Say there is a handful of firms operating the roads in

Miami, and a different series of firms managing the roads in Houston. Between the two cities, there is a multitude of firms managing the roads in unique ways. And perhaps traffic in Miami is well managed, and a company proves itself to be the most efficient firm. Perhaps in this case it is most efficient to have one firm operate the entire city. As long as that firm is not granted monopoly power by the government, there is some level of fear that if the firm does not constantly improve its services, another firm will enter the market to cut into the market share. The notion that one powerful company (i.e., the government) must manage *all* roads is false. This is not mere conjecture: this argument rests on hundreds of years of historical evidence. Historically, roads were not a natural monopoly, but rather a service provided by private citizens and numerous firms. Small, homogenous populations in the late 18th century were able to overcome the high fixed-cost problem by relying on social forces to entice people to provide the necessary capital to build and manage the much-needed infrastructure system.

Roads Before Government

In the early days of government involvement in road provision, politicians used the logic of John Stuart Mill to convince the public that it was not only efficient for the government to oversee the road system, but immoral for a few private firms to control it. In *Limits of The Province of Government*, Mill argues, “It is the part of the government, either to subject the business to reasonable conditions for the general advantage, or to retain such power over it, that the profits of the monopoly may at least be obtained by the public” (Mill 1865). Yet this is clearly a fallacy in the case of roads: From a historical perspective, roads are not a natural monopoly. Roads can compete, and indeed have competed, under normal market conditions. It is entirely feasible to shift roads from being public goods under a government monopoly to private

goods with private provision. This was actually the case from 1700 till 1865 in the United States. Politicians constantly argue that the United States needs more infrastructure spending, and they are absolutely correct—more private spending. In theory, not to mention in historical practice, allowing competitive markets to replace the government monopoly leads to more efficient road usage and helps alleviate traffic congestion (Samuel 1995).

It is not only efficient pricing and management of roads that is needed to combat congestion, but also new, efficient structural designs. Guided by the profit motive, private firms would have the incentive to find new ways to design and deliver road systems, and come up with new ideas to transport tremendous numbers of people in efficient ways. Through a market solution, the companies constructing and operating roads would compete for people using their roads; in turn, this competition would encourage a culture of continuous innovation among companies (Button 2001, Friedman 1973). If they operated in a truly competitive market, owners of roads would have an incentive to pave over potholes, remove traffic accidents as quickly as possible, and price the usage of the road for profit maximization (Rothbard 1973). Because of the government monopoly on roads, there is little to no incentive to increase service quality above the bare minimum. Moreover, if a government project is delayed or has unforeseen costs, those costs spill over onto the taxpayer. Certainly, while not all delays are foreseeable, a private firm would have a stronger motivation to mitigate these costs, since its own money is at stake. Also, when government departments contract out building phases to the private sector, there can be cash bonuses for early completion. A government agency can receive new funds at the taxpayers' expense, but a private firm must provide a marketable good or service in order to stay in business. And, when multiple firms are competing to sell the same goods and services, basic economic theory shows that quality increases, while costs decrease.

Since private involvement in infrastructure development is increasing in the United States, it is important to prove to state officials that such involvement is not only fiscally responsible, but has also proven successful for hundreds of years. Furthermore, due to recent increases in technology, the profit opportunity is higher than ever, since collecting tolls has never been easier. Outside the United States, many countries—including Sweden, England, Spain, Australia, and Germany—have embraced different levels of privatization in their transportation systems. With the costs of congestion increasing, the United States cannot afford to delay much longer. It is time for private roads to make a comeback.⁵

AMERICAN ROAD DEVELOPMENT: A BRIEF HISTORY

“The notion of private highways, which would seem fantastic to our parents, was commonplace to our great-great-grandparents. Initiated in the 1790s in the growing Republic, these roads stimulated commerce, settlement, and population. During the nineteenth century more than 2,000 private companies financed, built, and operated toll roads. States turned to private initiative for much the same reason they are doing so today: fiscal constraints and insufficient administrative manpower. Knowledge of our toll-road heritage may help encourage today’s budding toll-road movement.” —Professor Dan Klein

Are Private Roads Possible?

To understand the current state of American road development, one must have some basic historical understanding of how the United States arrived at its current institutional

⁵ Before moving further, a definition of the “American road system” is needed. From the 18th century to the 21st century, many different road classifications have emerged. When studying the history of the road system, it is important to have clear definitions of the different kinds of roads that have existed, and to understand which kinds were under private control. As transportation economist David Levinson (2004) highlights, there is currently a hierarchy within the American transportation infrastructure. Not all roads are created equal. The term “roads” should be clearly defined so all parties are on the same page. At the top of the hierarchy there are arterial roads, which connect major cities. Today these can be viewed as the Interstate system, while in the colonial times they would be called turnpikes. In the next stratum of the hierarchy are collector roads, which organize traffic within cities, and also connect to the arterial roads. These can be seen as major streets within cities. Lastly, there are local roads, which connect intercity streets and lead to residential areas.

structure of government dominance. The lessons learned from private roads over 250 years ago are becoming more relevant than ever, now that the American road system is no longer meeting travel demand. In this section, I will demonstrate how as recently as 150 years ago firms were willing to risk capital on extensive road projects. I will then lay the foundation that explains why firms were willing to accept such risk in the 18th century, and therefore why they would likely be willing to do it again in 2012. In fact, firms are already privately investing in infrastructure development. For example, in 2005 the 7.8-mile Chicago Skyway was leased to a private firm for \$1.83 billion; that firm now has the responsibility of maintaining that stretch of road until 2105 (Chicago Skyway). Right now, the United States has over 4 million miles of road, and it is time to begin to shift some of the management and new construction responsibilities away from government control and to private firms.

In 2012, there is only one completely private road in the United States: the Dulles Greenway; all other roads have some form of government involvement. Government involvement can come from the local, state, or federal level. Presently, both economic and political barriers prevent the existence of more private roads. These “roadblocks” did not appear overnight, but through excessive government pressure over the course of decades. While private road systems dominated the infrastructure system from colonial times until 1865, politicians after the Civil War began to advocate for public road provision, thereby preventing private actors from becoming involved in road development (Levinson 2004).

Private roads existed for over a century in the United States, until the government took over the vast majority of the country’s infrastructure system after the Civil War ended. While there has been continued debate about the efficiency and likely success of a private system today, there are certain lessons both the government and private actors can learn from this experiment.

One of the most important lessons is that the answer to the frequently asked question about who will build the roads if the government steps out of the picture is that private companies will.

While the private sector will never have the capital-raising abilities of a government taxing body, historical experience shows that, absent government involvement, individuals will still have the desire to make sure an adequate and organic road system exists.

The political argument today generally goes that private roads were simply too expensive to build and maintain, and due to the free-rider problem, were better left to be provided by the public sector (Klein 1992). The free-rider problem will be further discussed in the next chapter.⁶ However, the myth that the road system was too expensive for private actors can be disproven through a brief historical analysis. The political argument continues: While individuals in society know they will benefit from an extensive road system, there is a high incentive for each individual to avoid paying for his or her usage; it is essentially a prisoner's dilemma. The theory is that the transaction costs of enforcement (i.e., charging tolls) are so high that it is easier to tax people than to bargain with them. The main takeaway from this type of argument is that due to expense and risk-aversion, private firms have little incentive to build an adequate road system.

Yet historical analysis shows that this is simply not the case; before a government monopoly took over the roads in the mid-20th century, private actors were more than willing to invest in road systems (Klein 1990). In fact, in the early 19th century, there were more than 2,000 private companies that built, financed, or operated toll roads (Klein 1994). Having an adequate road system provided consumers with both direct and indirect benefits, and entrepreneurs saw the power and potential from both sides. Direct parties benefited from travel and trade on the turnpikes, and were willing to pay tolls to sell or buy new goods and services.

⁶ If too many people become free riders, by avoiding their share of the costs, it is argued, firms are not able to keep up with the high expenses for construction and maintenance.

Indirect parties, including farmers and landowners, welcomed the roads because they increased the value of their land, and allowed easier transport of livestock and crops (Klein 1990). By the time larger towns began to develop in the mid-18th century, there was a considerable demand for local roads.

However, the prosperity of the private road system began much earlier—in the mid-1700s. The historical records indicate that local roads existed in towns, and that such roads were private, not built or financed by a government body. Most roads at this time were local roads, and were quite simple; such roads were not meant for excessive use, but were rather routes for people to walk, and for traders to ride into town to place their goods in the proper markets. Most towns in the 1700s were self-sufficient and did not have the capital or knowledge to generate trade routes; this is why trade routes at that time were generally located along major bodies of water. While the roads were certainly not advanced, they met the minimal requirements for basic trade and transportation within the city. Most importantly, these roads developed organically rather than being planned by a government body, meaning they were developed in direct response to the needs of those individuals who would be using the roads. Before moving further into the historical context of road development, I will elaborate on what I mean by “organic growth,” since it is a term I will use frequently throughout the paper.

In 1800, the states were fairly new, and lacked the amount of established wealth that is available in 2012. In fact, during the turnpike development era in the early 19th century, no single firm owned more than 15 percent of an individual turnpike (DiLorenzo). This allowed for a more “bottom-up” or organic approach to road development, since several firms had to cooperate in order to produce roads that would be useful to the general populace. While there are certainly benefits to a government system, including lower transaction costs, there are many

other costs associated with such planning. Organic road growth can be defined as a process in which the people who will utilize the road system plan its layout—and government planning lacks this individual input, which therefore makes the process seem to be more like a guessing game. Organic road development was possible because in towns of 2,000 to 3,000 people, town-hall meetings could occur, allowing citizens to voice their concerns and expectations about the road. This bottom-up approach yielded numerous benefits, including the development of more densely populated areas.

Unfortunately, the government takeover of roads has allowed for the creation of urban sprawl. That is to say, because government planning of the roads lacks individual input, and because it is relatively less costly for the government to make mistakes in planning than it is for private entrepreneurs, government road systems have begun to spread farther and farther out into the suburbs. For example, compare the cities of ancient Rome and modern Dallas, Texas. Dallas has roughly the same population Rome had at its height; however, Rome utilized only 2 percent of the land area that Dallas does. Admittedly, these cities are quite difficult to compare. However, it is worth noting that citizens planned the road system in Rome, while state and local bureaucrats designed the road system in Dallas. The top-down approach in Dallas has led to increasing urban sprawl, and it is one of the cities with the worst congestion. Dallas has had to extensively expand its road system, and has some of the worst traffic in the country.

While it is difficult to compare the two cities in a vacuum, it is worth noting that urban sprawl is a growing problem in most large urban areas. With such sprawl comes more fuel usage, more pollution, longer commute times, and an increasing need for vehicles. For example, TTI has found that travel time has increased over the last 30 years, not only due to increased traffic, but also to longer commutes. Major urban areas are not growing “up” (like Rome), as in

becoming more dense, but growing “out” (like Dallas) by creating new suburbs. While there are certainly many reasons why this occurs, the *main* reason is government road planning. The urban sprawl we see today likely would not have occurred if the government had not gotten involved in the planning process. Allowing private parties to discuss the most valuable routes for their purposes allows for a discovery process that cannot occur with central planning.

The small local roads that characterized early American infrastructure did not quickly lead to advanced development, and there certainly was no advanced pricing system. Examining the historical records about these roads, the smaller the road, the more likely it was to be financed and maintained by private parties. In fact, most roads in the 18th century can be defined as local roads. While some turnpikes developed in the 1790s, massive turnpike development did not begin until the early 19th century. It eventually became apparent to most towns that self-sufficiency was the road to poverty, and that turnpikes could create mutually beneficial wealth on both the micro and macro level. On the micro level, individuals would have access to more goods in other towns. By buying goods from other cities, individuals could open up opportunities for specialization, creating new opportunities for citizens to allocate their skills and capital to a variety of areas. Trade allowed more people to become entrepreneurial. On the macro level, turnpikes created a new network of trade, generating economic growth. In some towns with private roads, traders would be charged a small fee, but with such infrequent trips, this was by no means a way to pay for a larger road system. Without adequate ridership, how could a private road be financed? The interesting question must be asked: Without developed corporate wealth or government funds, how were the roads in the 18th and 19th centuries financed? The answer is that they were financed through voluntary mechanisms. During this time period, voluntary associations were the building blocks for private road development.

Who Pays for Private Roads?

The power of voluntary association is well documented in the academic literature. Daniel Klein, a professor of economics at George Mason University, points out that absent government involvement in fields such as lighthouse provision,⁷ bee pollination, and education, voluntary exchanges have been successful. A similar argument can be made in the case of road development. In the early 19th century, turnpikes in New York, New England, New Jersey, and Maryland were financed by private stock. Some states, including Pennsylvania, did begin to subsidize road development, but the state government owned at most only 30 percent of the stock (Fielding and Klein 1992). The turnpikes were essentially toll roads, equivalent to modern-day arterial roads, making them the most expensive roads. If private firms in the 18th and 19th centuries were willing to risk so much capital, the argument that roads have to be government-run natural monopolies due to their high fixed costs and capital expenses begins to disintegrate. Of course, some of this was due to the low-hanging fruit of expansion. The market for road development had not yet been saturated, so first-movers connecting successful markets were able to capture some level of profit.

In the smaller outer towns, there was no tax system that took funds and reallocated them to build the road system. Citizens did not wait for roads to be built by a government, but rather decided to organize the development of road systems themselves. The people who would actually use the roads designed them. There were town-hall meetings to discuss where local roads should be placed, not to benefit any individual citizen, but rather the community as a whole. That is not to say this was a social utopia where politics were not in play. Certainly politicians played some role in community development, but not nearly to the same extent as in

⁷ See Ronald Coase.

2012. Most towns used social institutions, such as the newspapers, to encourage (or shame) individuals into investing in local roads. Shame was a powerful mechanism to give individuals an incentive to pay for their part of the town road system. One did not want to become a social pariah by not paying a fair share. Most papers would list the names of individuals who invested in the local road system, and thus it shamed citizens who did not purchase turnpike stock, and socially elevated those who did. Newspapers were the focal point of communication in small towns, and were able to persuade most individuals to buy stock. This might sound overly altruistic and simplified in 2012, but in smaller communities where generations of people lived, societal ties were of paramount importance. Such towns did not have populations in the tens of thousands, but rather had 2,000 to 3,000 people. This is crucial. The transaction costs of organizing and discussing the needed roads were small enough that Coasian bargaining replaced any idea of a tax system. The local roads were easy to maintain, due to the simplicity of the financing system. Furthermore, if a road became unused, it would not be continually subsidized as it is in 2012, but rather reallocated to a more highly valued use. Since private involvement in road development happened in the past, it is not absurd to think that it could happen again.

The first private turnpike was established in 1794, and consisted of 70 miles of road connecting Philadelphia and Lancaster (Fielding and Klein 1992). This turnpike was extremely important because it was the first to actually connect two major cities. Before 1794, most private roads were either within cities or connected two nearby towns. This turnpike proved to be successful, and provided benefits to both direct and indirect parties. The private stockholders were able to post profit, and the farmers and traders were able to send their goods and services to new places.

Within six years, 69 new companies entered the market for turnpike development in the United States. These were private firms, with no government subsidies (Levinson 2004). The history of these roads further debases the claim that roads are prohibitively expensive, and therefore can only be supplied by the government. With continual pressure from traders, citizens, and even government officials, more turnpikes came into fruition during the early 19th century, but utilized a primitive pay-as-you-go financing method. Bonds were eventually developed, but used to a lesser extent during the early 1800s. This financial method used funds that were currently available in order to finance the development and maintenance of roads, rather than borrowing funds from a government body. While simple, it promoted responsible spending, because roads would only be built where they were perceived to be profitable. If a road was found not to be profitable, the road's development would be abandoned. Most early turnpikes connecting medium to large cities were profitable due to the amount of trading that they facilitated, and due to the relative lack of competition from other roads.

Still, in the early 18th century, the American macro-road system was extremely disorganized (Klein 1990). Most external roads that made up trade networks were in excessively poor condition, and many lacked basic cobblestone or wood-plank surfacing. In fact, most roads were only dust paths, loosely connecting cities, and traders had to cut down brush and trees to make their way to their destinations. When it rained, these paths turned to mud, making trading during wet times prohibitively difficult. Yet it is important to recognize that at this time, most trade was done internally; that is to say, individuals traded primarily within their communities. Citizens simply had not begun to explore external trade options (Button 2001). In fact, trade between different communities did not occur in most cities until the beginning of the 19th century (Klein 1990). Furthermore, the public budgets of towns during this period were quite

meager, meaning the maintenance of roads fell to the private sector. Once larger cities began to develop, it became apparent that if a city were to prosper, it would need to be connected to another major city by either roads or a canal system. At this time, government agencies such as the Department of Transportation and the Federal Highway Administration did not exist. Instead, private firms and citizens collected the money needed to build trade routes to connect cities.

While this sounds like an idyllic setup, the private turnpike experiment actually faced a plethora of problems. Since road development was a new industry, and settlements were continually spreading, finding the needed trade routes seemed to be more of a guessing game than a science. Unlike the case with the community roads, it was virtually impossible to get all affected parties into one room to discuss the best option for where to place a road. With uncertainty comes some level of loss, and early road investment seemed to be a poor venture in comparison to other potential investments. For example, in the early 19th century, textile factories in New England returned anywhere from 6.5 percent to 12.8 percent on investments. Returns in road infrastructure investment at most returned a measly 3 percent, and usually were 0 percent. Frequently, returns were negative. This paltry return on investment was due to a small traffic volume and limited enforcement of toll collection. Most travelers during the 19th century were traders, and since trips were high in costs (especially time), they naturally limited the number of trips they took. Furthermore, some toll collectors would not charge individuals who were traveling for religious purposes. The idea of variable or dynamic pricing did not exist, and all parties were charged the same toll.

The direct investment benefits of road financing were meager at best. Nonetheless, while returns on investment continued to decline, there was still sufficient investment in roads. It is generally assumed that people do not make repeated errors; indeed, if a stock continually fails, a

person should invest in something else. That is the market sending a signal. Did investors in early road-development continually ignore the market signals? Actually, the situation is quite the opposite: investors knew that direct investment might bring a loss, but over the long run, they assumed the indirect benefits of trade and network expansion would help create and sustain long-term wealth. The importance of community development helped finance many turnpikes and collector roads. Citizens understood that in order for their communities to prosper, traders would need access to their goods and services. The more routes that were established, the more opportunities there would be to trade goods and services. Furthermore, individual investors were often involved in other businesses that relied on trade in order to be successful, so the extension of trade routes helped make them more successful in these other ventures.

Roads can be seen as a form of “network effect,” meaning the good becomes more valuable as more people use it. Additionally, while one road connecting two cities can create benefits, three roads connecting three cities can generate even more wealth. By connecting more individuals, more trade and specialization can occur. 18th century American politician Henry Clay noted: “I think it very possible that the capitalist who should invest his money in [roads] might not be reimbursed three percent annually upon it; and yet society in various forms, might actually reap fifteen or twenty percent.” Pro-government advocates argue that if this statement is true, there is reason for the government to subsidize and invest in road development. Since the direct benefits are so low, in theory there could be underinvestment from the private sector.

Indeed, during the 19th century the federal government subsidized canal and railway expansion, giving firms even less incentive to invest in the road system. Since private actors necessarily have to allocate scarce resources, given the new incentive structure of government subsidization, it would have been foolish for them to invest in a road system with less revenue

and higher costs. Rather, they should have exploited the government subsidies in canals or railroads for easier profit. While it cannot be proven that a completely private system would have been efficient, it can be claimed that government actions perverted the incentive structure for private actors, which did not allow a level playing field. Since individuals during the 1800s who were investing in railway and canal development received higher returns due to subsidization, in order to encourage commensurate investment in roads, the government had to offer the same incentives to investors in roads. Of course, in an ideal world, none of these would be subsidized; however, this explains why individuals involved in the propagation of roads began calling for subsidies.

A few publicly owned and operated turnpikes were opened in Virginia, Maryland, and Rhode Island in the early 18th century, but were quickly shut down due to citizens fervently resisting taxes for the roads. It became obvious that the government did not appreciate being forced out of the market. Dan Klein notes:

Legislators, often suspicious of corporate motives, wrote extensive restrictions into company charters. Charters specified organizing procedures, capitalization, and par value of stock. . . . Charters specified details for construction, maintenance, state inspection, and toll rates and toll collection (Fielding and Klein 1992, 325).

Based on this experience, it seems the modern-day fear of corporate control of something so vital to the economy is unfounded; food is vital and is provided by multiple large corporations, in addition to many smaller corporations. The idea that an infrastructure firm will set prices so high that it will stagnate trade is clearly disproven by historical evidence. During the 19th century, road development was in a primal stage—if a private firm had set prices too high, there would have been an incentive for another firm to enter the market, build a new road, and undercut the market. But not all people shared this free-market viewpoint. The *laissez-faire* viewpoint that

supported allowing private actors to engage in voluntary trade lasted for nearly half a century, until the mid-1800s, when government involvement in infrastructure development became a national issue.

Gallatin's Report and the End of Private Roads

In 1806 Albert Gallatin, the Secretary of the Treasury, wrote a report entitled the *Report on the Subject of Public Roads and Canals*, in which he outlined the societal benefits of a national (i.e., federal) public transportation system. He claimed that the canal system and road system should become the government's major priorities, and that there were major problems associated with not having government control of these systems. The main problems Gallatin cited included the likely high cost of roads under a private system and the fact that society would prosper with more roads due to a network effect. According to his report, the social benefit of having multiple roads in every town would be immense. He claimed, "The General Government can alone remove these obstacles . . . with the early and efficient aid of the federal government." He pushed for a 10-year plan in which government would be the sole financier of projects; this program, he thought, would begin the transition toward a national system. Though he was not granted the plan, his report sparked the beginning of the internal improvements debate of the 19th century.

The internal improvements debate of the 19th century was focused on whether the government or private actors should provide infrastructure services such as roads, turnpikes, canals, and harbors. While there have been books written on the topic, I want to provide just a brief historical context, so readers may better understand how the government took control of the system, and how many of the problems proved to be more myth than fact.

Before moving on, there is something worth addressing. The War of 1812 proved that America's infrastructure was deficient for military logistics. While having traders arrive a day late may anger consumers, having supplies or soldiers arrive late can be the difference between victory and defeat. It is here that I openly concede that there is a major benefit to government control of the road system during times of war. Having troops and supplies move easily is essential for national defense, and a private system is not built for that purpose. However, the road system has only been inadequate during times of war twice throughout American history, a point that should be considered by anyone using that as the sole justification for a national system. My paper will not further address this issue, but it is worth alerting the reader that these problems (i.e., national defense logistics) do indeed exist.

In Gallatin's report, he pushed for more government-sponsored internal improvements, but did not seem to consider the poor incentive structure this system would inevitably create. The states, however, were acutely aware of these incentive problems; indeed, during the internal improvements movement, over 20 states outlawed government-sponsored infrastructure projects. Due to past experiences, policy makers in the states knew these projects were infamous for cost overruns, financial losses, and corruption. Furthermore, Gallatin's theory that there was a "scarcity of private capital" was, as we have seen, blatantly untrue. As shown throughout the paper, private actors had come together to build, finance, and manage road systems since the founding of the republic. Certainly, there was not the level of developed markets that exists today, but there was enough demand for roads that profit-motivated entrepreneurs willingly entered the market. Dozens of private turnpikes had been established (62 of them, in fact) before 1806, so the notion that there was a lack of private capital is simply not true. Dan Klein notes:

Over \$11 million was invested in turnpikes in New York, some \$6.5 million in New England, and over \$4.5 million in Pennsylvania. . . . Between 1794 and 1840, 238

private New England turnpike companies built and operated about 3,650 miles of road (Klein 1990, 797).

At the time of its release, the Gallatin report was ignored by most politicians, since the Jeffersonians who were in political control heavily favored private action over government intervention. However, this report did lay the foundation for government involvement during the 19th century, and was truly the beginning of the end for private roads in the United States. Just five years after this report was released, the National Roadways constructed a highway connecting Cumberland, Maryland, to Leesburg, Virginia. It was the first major improved highway in the United States that was sponsored by the federal government. Clearly, though Gallatin's report had not been well received initially, within a few short years its recommendations had become commonplace.

Gallatin's report was correct on one major issue—road construction was quite expensive. Yet while private firms understood that road-building was expensive, they knew that the relative lack of competition made the undertaking profitable. While prices certainly could be set above the social welfare prices, firms understood that by consistently gouging their customers, they would likely price themselves out of the market. Thus, the implicit threat of competition kept these companies from charging unnaturally high prices. As you can see below in Table 1, before Gallatin's report multiple turnpikes were being built, and competitive markets in this industry were booming:

Table 1: Number of Private Turnpikes per State⁸

State	1792-1800	1801-10	1811-20	1821-30	1831-40	1841-45	Total
New Hampshire	4	45	5	1	4	0	59
Vermont	9	19	15	7	4	3	57
Massachusetts	9	80	8	16	1	1	115
Rhode Island	3	13	8	13	3	1	41
Connecticut	23	37	16	24	13	0	113
New York	13	126	133	75	83	27	457
Pennsylvania	5	39	101	59	101	37	342
New Jersey	0	22	22	3	3	0	50
Virginia	0	6	7	8	25	0	46
Maryland	3	9	33	12	14	7	78
Ohio	0	2	14	12	114	62	204
Total	69	398	362	230	365	138	1552

From the beginning of America's founding through the 1840s, the majority of roads were heavily financed and maintained by the private sector. In fact, French political historian Alexis de Tocqueville stated in 1835,

In no country in the world do citizens make such exertions for the common weal. I know of no people who have established schools so numerous, places of public worship better suited to the wants of inhabitants, or roads kept in better repair (Tocqueville 1835).

Unfortunately, with a growing road system came growing complexity, and complexity is often used as an excuse for government involvement. While in 2012 it is common for government agencies to subsidize all road development, it was not this way in the early 19th century. In fact, many politicians warned that government-sponsored internal improvements would lead to corruption and theft. Unfortunately, they were exactly right. Politicians voted for roads to be built close to where they lived, even if this did not meet the needs of local communities. More roads closer to an individual's property meant the value of that property

⁸ Source: Klein 1994

would greatly increase. Historian John McMaster (1926, 628) notes that the internal improvements (roads, canals, railroads, etc.) were a giant failure: “In every state which had gone recklessly into internal improvements the financial situation was alarming. No works were finished; little or no income was derived from them; interest on the bonds increased day by day and no means of paying it save taxation remained.” But it was not just one or two states that found internal improvements to be a giant inefficiency. In fact, by 1861 15 states had added constitutional amendments to outlaw government-sponsored internal improvements. Only two states, Missouri and Massachusetts, allowed internal improvements to continue without any form of anti-government legislation. So not only was economic theory favoring free-market roads, but the attempt by the government to subsidize most internal improvements ended in financial turmoil (Levinson 2004).

If by 1861 most states had outlawed any form of government-financed internal improvements, then how did a government monopoly come to fruition? With the beginning of the Civil War, the Republicans, headed by Abraham Lincoln, saw an opportunity to push for more government control in the domestic infrastructure system. The Southern states overwhelmingly did not support internal improvements, so much so that in the Confederate Constitution stipulated: “[never] delegate power to the Congress to appropriate money for the internal improvements intended to facilitate commerce.” Today, many pro-government advocates note that this was for *federal* appropriations, and states were allowed to subsidize internal improvements. However, as noted earlier, all but a few states had already outlawed internal improvements at the state level as well. Before the Civil War, the majority of states did not want federal or state involvement in the infrastructure system. It was because of the North winning the Civil War, as well as Abraham Lincoln—who historically voted *very often* in favor

of government subsidies—that government subsidies for the roads flourished post-1865. With the dawn of the Reconstruction Era (1865–1877), it became clear that private roads could no longer compete with government-funded roads. Governments could both outprice private roads and force their own agents into the market.

With more westward expansion came even more government power over road development. In 1893, the federal government finally created an overarching entity responsible for road development and maintenance, called the Bureau of Public Roads. The bureau had a fairly limited role until World War I, when it became apparent that the existing railroad system was not sufficient for transporting military goods and troops in a timely manner. If a foreign power were to invade from one coast under the previous road system, it was estimated it could take a military convoy more than two months to reach the opposite coast. Obviously, this was a major concern for military leaders, and an opportunity for policy makers. This was a fitting time for the government to seize more power over road expansion. It was relatively easy to argue that the road infrastructure system was insufficient to meet military demands in the case of a foreign invasion, so in the name of protecting the United States from foreign powers, the government began planning to take control of the national highways and road system.

Shortly after the end of World War I, in 1921, the Bureau of Public Roads officially began planning to improve the road system, citing national defense issues as its justification. Private roads were deemed useful to solve micro-transportation problems; but, juxtaposed to the government's goal of connecting eight major cities to improve military logistics, private roads were deemed insufficient. It was assumed that both the transaction and search costs involved in finding firms to design, build, and maintain a national road system for profit would be too costly, and one super-firm (the government) could be more efficient with a top-down approach. No

private firm had yet developed a macro-transportation system, and the government considered this to be a market failure. After decades of political meetings and a lengthy design process, in 1956 Dwight Eisenhower implemented the Interstate Highway System. Construction for the project took over 35 years, and cost over \$455 billion. It is widely considered the largest public works project ever undertaken in the United States (Weingroff 1996), with the total length of the system spanning approximately 50,000 miles. While this project was monumental for its time, over the last 60 years there has been a lot of change in infrastructure needs, and it may be time for the private sector to enter the market.

Why We Need Public-Private Partnerships

From a historical perspective, it appears that government control of road development was a quick power grab after the Civil War, with a heightened grab after World War I. Companies are now willing to invest in the American infrastructure system, and are being crowded out by the government monopoly. After 150 years of monopoly power, the government has fallen into quite a fiscal mess, as explained in the introduction. However, the silver lining to this problem is that there is ample historical evidence that private firms are able and willing to get involved in domestic infrastructure development. In the previous section I outlined the historical narrative that explains how the private sector was pushed out of the infrastructure development industry. In the next section, I will outline the economic theory that explains why the private sector is better suited than government to solve the transportation crisis in America, and explain how real policy tools (public-private partnerships) can allow the private sector to get back into American transportation development.

The reason public-private partnerships, or P3s, have become more popular in the United States over the last decade is that currently the country is on the opposite side of the government control pendulum. *Too much* government control has crowded out private capital, widening infrastructure funding gaps. Since the federal government began crowding the private sector out of road development at the beginning of the 20th century, there has been a tragedy of the *anti-commons* among numerous federal, state, and local government entities (Heller 1998). That is to say, the lack of coordination due to too many bureaucratic agencies in the game has led to an undesirable social outcome. With the government as practically the sole supplier of roads, there is currently both a mismanagement of roads and a lack of adequate supply. It has become apparent that the public sector alone can no longer sustain the supply of roads due to both increasing travel demand and increasing populations. Furthermore, the public sector has continually struggled politically with road management, as allocating taxpayer dollars has been increasingly scrutinized.

The most important consequence of government intervention during the 20th century was a massive crowding out of both private capital and individual knowledge. Indeed, every government road that was built sent a signal to private investors that neither their money nor their expertise was needed or valued in road development and construction. Every government dollar used for roads means that a dollar cannot be used to finance another project. Even if a private firm were able to enter the “road market,” it is a *faux* market. The government can outcompete a private firm because it does not utilize a profit and loss system, but rather raises money through taxes to finance its projects. However, despite all these difficulties, corporations are still attempting to enter the infrastructure market, just as they were 250 years ago.

THEORY + APPLICATION: PUBLIC-PRIVATE PARTNERSHIPS

“I have to be very positive about the future of public-private partnerships. I don’t think they’re a panacea, I don’t think they’re a pot of gold, but I think there is a tremendous amount to be gained by government going through this process.” —Mayor George Spadoro, Edison, New Jersey

New Governance: Public + Private

In 2012, a once fully private system has turned into a government monopoly, with subpar service and the incentive to be fiscally irresponsible. However, public-private partnerships are part of a new governance structure designed to alter incentives and bring benefits from both the private and public sectors. The private sector brings a wealth of knowledge, including new, innovative technologies, the incentive to earn profit, and efficiency. The government brings knowledge gained from running the road system for the last 60 years, as well as the power to lower transaction costs. For example, if the government finds it to be efficient to build a new road, it may implement eminent domain to gather the necessary land area. The private sector does not have that power. With both parties bringing their most efficient tools, public-private partnerships can be seen as a form of new governance.

As discussed in the introduction, funding for transportation in the United States is quickly approaching a crisis, meaning the private sector is a readily available option for filling the infrastructure funding gap. The most recent surface transportation multi-year authorization, known as “SAFETEA-LU,”⁹ expired in September of 2009. For the last three years, there has been constant debate in Congress about how to fund America’s transportation infrastructure needs. As of the publication of this paper, no permanent multi-year surface transportation legislation has been enacted. Most recently, in 2011 Obama proposed a six-year \$550 billion

⁹ SAFETEA-LU stands for Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users. Signed into law by President Bush in August 2005, SAFETEA-LU represented the largest surface transportation investment in America’s history, guaranteeing \$244.1 billion for transportation projects throughout the nation.

surface transportation deal, but it did not pass. It appears the government is quickly realizing it cannot tax its way out of the infrastructure deficit problem. To make matters even more depressing, the other major source of federal funding, the Highway Trust Fund, is only estimated to accrue \$230 billion during the next six years. As noted earlier in the paper, with the funding needs for surface transportation reaching almost \$900 billion, there is clearly a massive funding gap—and it will only grow as the population continues to grow.

With all levels of government trying to scrape together funds to invest in the deficient infrastructure system, there is an opportunity for the private sector to fill the void. As explained in the historical section, private citizens have been willing to band together to help develop a transportation system in the past. However, the major motive for developing a better transportation system has changed during the last few centuries. Previously, entrepreneurs and communities were chasing the indirect benefits of road systems. But in 2012, with new tracking and scanning technology, there is a very high profit motive. Using congestion pricing, private firms can charge individuals based on their use of the road system. Congestion pricing, defined by transportation economist Kenneth Button, is “a form of road pricing where customers pay an additional fee during periods of high demand. Peak pricing is most frequently implemented by utility companies, who charge higher rates during times of the year when demand is the highest. The purpose of peak pricing is to regulate demand so that it stays within a manageable level of what can be supplied.”

Private firms can not only build new transportation systems, but also manage existing structures with congestion pricing. For example, if there is a heavily congested public road, the government can contract out road management responsibilities to a private firm. This can be beneficial because private firms face less “red tape” in order to price the road. A private firm also

has the ability to place road pricing closer to a profit-maximizing point than a federal agency can, since profit maximization is the goal of the firm. However, it is well documented that government agencies do place price ceilings on the fees private firms can charge for congestion pricing. Even though this may not be economically optimal due to public choice problems and constant political interference, it may be the best outcome. While government involvement in any capacity may not be optimal in a model, due to the political importance of the American infrastructure system, allowing the government to continue having some control over road policies may be a better alternative than allowing it to continue having total control. The fact that policymakers are beginning to argue for more congestion pricing is a monumental step toward deregulation; once some changes in a more free-market direction have been enacted, the debate can take the next step and argue that the price ceiling is distorting resource allocation. It is folly to argue that, given the current institutional environment, the road system can switch from full-monopoly status to full-private status overnight; but there is great merit in arguing for marginal steps in that direction.

Basic economic theory explains that a firm, motivated by profit and not social welfare, can utilize congestion pricing to minimize traffic. The question then becomes: Are citizens willing to pay for a better infrastructure system? Certainly, Americans pay dearly through taxes for the current infrastructure system; yet would they be willing to pay if it meant they felt the direct hit to their pocketbook each time they utilized the roads? A model that assumes congestion pricing is more efficient than a “free” road system, needs citizen buy-in and feedback. It will be useless to implement a system if there is no feedback “from the ground up.” According to recent studies, it appears citizens are more than willing to pay more for a better system. The American infrastructure system is failing, and citizens are beginning to notice. In fact, in 2009, 94 percent

of Americans claimed they were worried about the domestic infrastructure system (Ruggeri 2009). While this is certainly a step in the right direction, the survey took it one step further. It found that 81 percent would pay an extra 1 percent in federal income tax to improve the domestic infrastructure system. This is a key point. Americans have only known government control of infrastructure systems. If Americans are willing to pay more taxes (which are universally despised) for a better system, why not allow them the opportunity to show preference through action and have private firms compete for their funds? Public-private partnerships can allow this to happen.

The High Costs of Free Roads

Before exploring public-private partnerships further, we should establish a basic understanding of the current state of the American infrastructure system. As mentioned above, surface transportation in the United States is simply moving along an unsustainable path. From 1980 to 2006, the total number of miles traveled by automobiles increased by 97 percent and the miles traveled by trucks increased by 106 percent (Wells 2009). Unfortunately, highway lane miles have not kept pace with the increased demand for transportation. During the same time period, highway lane miles increased by a measly 4.4 percent. This should be cause for alarm. A sufficient road system is extremely important to economic activity within the United States.

While an increase in vehicle miles traveled (VMTs) is viewed positively because commuting promotes economic growth and trade, there are also significant consequences to this phenomenon. Specifically, traffic and congestion have become increasingly serious problems in larger urban areas, as they lead to severe economic losses. For example, the Urban Mobility Report (Lomax and Schrank 2011), produced by the Texas Transportation Institute (TTI),

estimated that the amount of annual delay endured by the average commuter was 34 hours in 2010, compared to 14 hours in 1982. How costly is this 143 percent increase? TTI estimated that the annual cost of congestion for the United States economy as a whole was more than \$100 billion per year, or roughly \$750 for every commuter in the United States; yet these aggregates hide the nuances of congestion in different cities. In very large urban areas like Washington, DC, congestion can cost up to \$1,500 per year for every commuter.

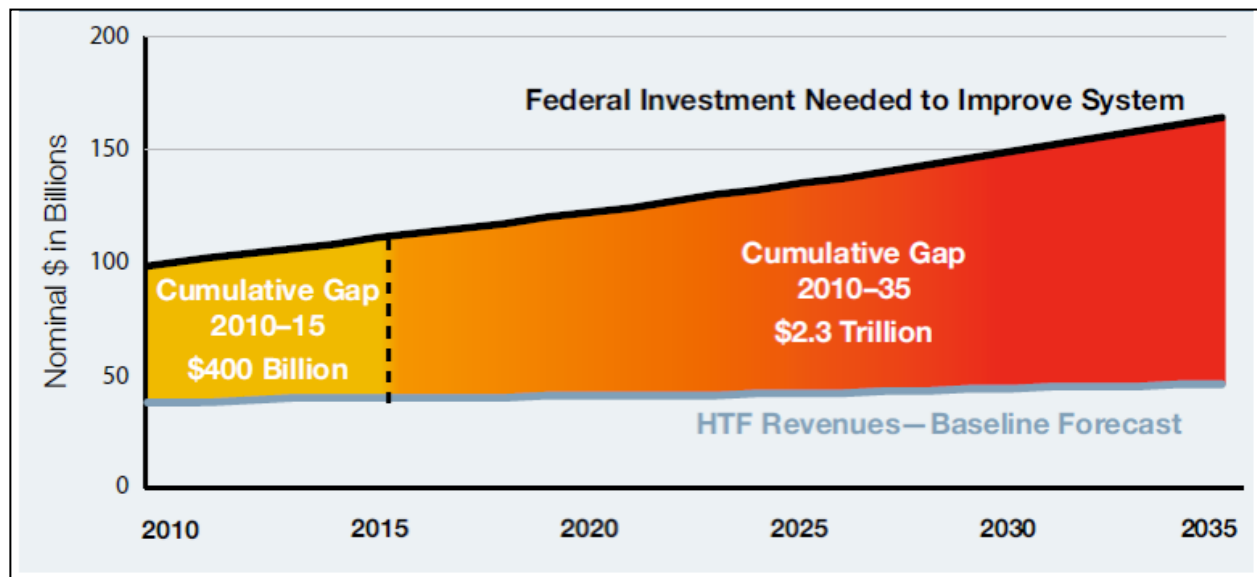
What is even more disturbing is that these figures are artificially low; the recent recession *lowered* total VMTs due to the triple threat of relatively low incomes, more expensive gas, and heightened unemployment (Klein 2010). Once economic growth returns to its pre-recession rates, TTI estimates that the average commuter will see a three-hour increase in delay by 2015, and seven additional hours by 2020 (Schrank 2011). With more hours come increased costs. By 2015 the cost of congestion will total \$133 billion, due to 2.5 billion gallons of wasted fuel coupled with millions of hours of wasted time in traffic. To make matters worse, massive federal budget cuts make it almost inevitable that government transportation funding will be limited to levels below what has prevailed in the past.

Additionally, the Highway Trust Fund (HTF), which is the main source of funding for the Interstate Highway System, is facing a funding dilemma of its own. Currently, there is a federal tax on gasoline of 18.4 cents per gallon (24.4 cents for diesel fuel). However, this amount has not changed since 1993, and with inflation, its value is debased every year, meaning highway funds are dwindling. While this is certainly a problem, there is another issue the Highway Trust Fund must face: fuel-efficient vehicles. Vehicles in the U.S. are becoming more fuel efficient, meaning individuals are purchasing less gas. While the option to purchase new fuel-efficient vehicles may

provide great benefits to consumers, it naturally means there is less revenue available to the HTF to fund roads.

In 2006, the Department of Transportation compiled a report regarding the increasingly widening gap of national infrastructure development provided by the Highway Trust Fund:

Table 2: Highway Trust Fund Projected Cumulative Funding Gap, 2010–2035¹⁰



The federal government, specifically the Department of Transportation, which has openly addressed the funding dilemma, is attempting to develop innovative financing techniques that will help meet the increasing demand for transportation infrastructure without burdening the fragile economy (FHWA 2008).¹¹ Since SAFETEA-LU expired on September 30, 2009, there has been increased debate about how the federal government will finance surface transportation development. Furthermore, states and localities find themselves increasingly unable to fund needed transportation projects from bonds and tax receipts (Poole and Samuel 2011). Since U.S.

¹⁰ Source: http://financecommission.dot.gov/Documents/NSTIF_Commission_Final_Report_Mar09FNL.pdf

¹¹ The Federal Highway Administration (FHWA) is the leader in innovative finance and project design.

infrastructure is already underdeveloped, further delays will stymie both economic transactions and growth. TTI Research Scientist David Ellis agrees: “Without additional transportation capacity, transportation costs will increase significantly. The result will be higher prices and lost jobs.” (Lomax 2011).

In the academic arena, there has been discussion about fully privatizing all transportation systems;¹² but due to the political difficulties involved in implementing a fully private system, policy makers have instead implemented a tool that allows private firms to partner with government actors to enhance transportation systems. However, the academic theories laid the foundation for allowing private firms to reenter the transportation sector, and demonstrated that profit is not a dirty word, but rather a powerful incentive tool. P3s for roads have existed in numerous forms in America for almost 200 years. In fact, the first public-private partnership was the Philadelphia and Lancaster Turnpike in 1792. Even though P3s have been around for centuries, public-private partnerships are still difficult to define, since the term covers a broad array of structures. Not all P3s are for roads; indeed, these partnerships can be found in a wide array of industries, such as health care, housing, schools, energy, and telecommunications. While multiple U.S. industries are beginning to utilize P3s, this paper focuses solely on P3s within infrastructure development projects, specifically domestic surface transportation.

¹²Anarcho-capitalist Walter Block recently wrote a book entitled *The Privatization of Roads and Highways*, focusing both on the academic theory and benefits of a private road system. Austrian economist Murray Rothbard has also pointed out the benefits of a private road system in lectures and short academic articles. The debate regarding the anarchist view of the road system is quite interesting, but not applicable to policy makers due to the current institutional structure.

A Clear Definition of Public-Private Partnerships

The name “public-private partnership” can be misleading, since many will assume the partnership is a joint effort between two separate entities sharing equal responsibility. A review of the literature on P3s shows there is a lack of general consensus regarding a definition. Indeed, Hodge and Greve (2007) state, “There is a need to reexamine the different meanings and definitions of [public-private partnerships].” However, while the specific diction of these partnerships continues to be debated, on a general level there is agreement that these long-term institutional agreements leverage both risk and financial responsibility. From this view, some development scholars hold that there is no need to codify a definition of P3s, since there is a baseline agreement that they are contracts between the public and private sectors. While both sides of the argument certainly have merit, for the purpose of this paper, a clear definition is needed to further understand the concepts, and the usefulness of these types of contracts within the surface transportation industry. The Federal Highway Administration (FHWA) defines P3s as “contractual agreements formed between a public agency and a private sector entity that allow for great private sector participation in the delivery and financing of transportation projects.”

It is important to highlight that P3s are not a “one size fits all” package, but are flexible agreements that can be utilized to best fit both private- and public-sector needs. There is much leeway on both the private and the public side concerning how to structure agreements. Depending on both the financial status of a government agency and its risk tolerance, there are a multitude of project options available. Below are some of the possible options. As seen from the

chart, the responsibility/risk breakdown between the public and private sectors depends on the project structure. These include, but are not limited to, the following:

Table 3: Different Forms of P3s and Associated Risk:



Public-Private Partnership Options			
New Build Facilities	<i>Design Build</i>	<i>Design Build Operate</i>	<i>Design Build Finance Operate</i>
Existing Facilities	<i>Operate & Maintain</i>		<i>Long Term Lease</i>
Hybrid			<i>Lease Develop Operate</i>

1. New Build Facilities¹³

- a. Design Build: A design build project typically combines two separate ideas (design phase plus building phase) into one contract. A private firm will typically design and build the infrastructure project for a fee agreed upon in the original contract. This method has the majority of the financial risk falling onto the public sector. The entity that designs and builds the facility assumes all risk and responsibility for construction and architectural design. Upon completion of the project, ownership, operations, and maintenance of the facility revert to the public sector.
- b. Design Build Operate Maintain (DBOM): Under this form of P3, private suppliers bid to design, construct, and operate a public facility (bridge, road, railroad, mass

¹³ These can also be referred to as “green-field projects.” They are projects in which a new road is built where no previous road existed.

transit line, port, or airport) for a set period, in return for a public subsidy, the amount of which is agreed to in advance. The private operator raises the necessary funding, manages construction, operates the facility, and (depending on the agreement) may retain any revenue. The winning bidder for a DBOM is the firm that agrees to construct and operate the facility for the smallest public subsidy over a set period or, in the case of profit-making facilities, pays the highest price for the franchise. Overall, there is an equal sharing of the risk in the majority of DBOMs. These contracts limit the state's liability for both construction cost overruns and any future escalation of operating costs, as the contractor commits to a fixed price for construction, maintenance, and operation over the term of the contract. A subsidy payment based on ridership is a form of shadow toll, and puts business risk on the operator rather than the state should ridership fall below forecasts.

- c. Design Build Finance Operate (DBFO): This form of P3 is similar to the “Design Build” form, except with the added responsibility of operation, as well as partial or full financial responsibility. Private firms hold the majority of the risk in these forms of projects. However, as in the majority of P3 projects, ownership reverts back to the public sector after a contracted amount of time. Within DBFO, there are multiple models available, such as Private DBFO Real Toll Franchises, Private DBFO Shadow Toll Franchises, and the Public Benefit Corporation Model.

2. Existing Facilities¹⁴

¹⁴ These can also be referred to as “brown-field projects.”

- a. Operations and Maintenance Concession: Public agencies transfer the responsibility for operating and maintaining the roads to a private firm. The public sector retains the majority of the financial responsibility; however, the private firm focuses on day-to-day operations and keeping the roads in good working order. These projects allow private firms to leverage and utilize their knowledge about how to implement innovative technological ideas in the operations process. Ideally, these projects promote increased levels of efficiency.
- b. Long-Term Lease: A long-term lease places the majority of the responsibility on the private sector, and is the closest P3 to full privatization. In the contract, there is a designated concession period, during which a firm has the ability to collect tolls and to operate and maintain the facility. In return, the public sector receives a lump-sum payment. The most famous long-term lease program is the Chicago Skyway, which was leased in 2006 to a private firm for 99 years for the amount of \$1.8 billion.

Participation of the private sector in these agreements encompasses a wide array of activities such as designing, engineering, building, operating, financing, generating traffic revenue, and maintaining infrastructure. There have been just under two dozen major P3s in the transportation sector within the United States in the past two decades (FHWA 2010). While this number may not appear to be significant, it is important to note that transportation P3s generally have a price range from a few hundred million dollars to many billions of dollars. Furthermore, it is important to highlight that private investment in infrastructure-related projects is projected to increase. J. P. Morgan has estimated there is over \$200 billion in private capital waiting to be allocated specifically for United States domestic infrastructure development (Cambridge

Systematics 2007). Due to all the above-highlighted problems with the current transportation regime, private involvement and investment in surface transportation is bound to play a significant role in domestic development during the next generation in order to help alleviate traffic congestion.

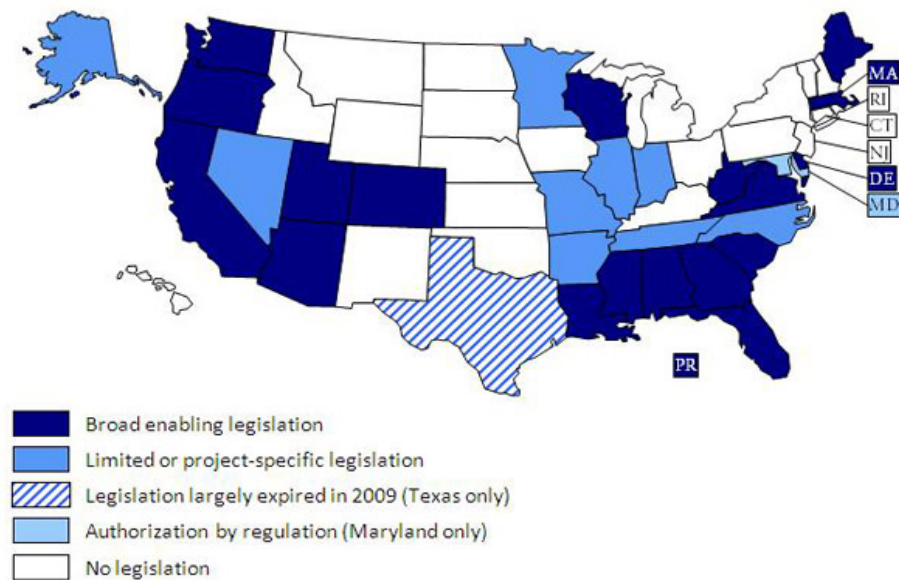
There are two schools of thought on how to combat the congestion issue. Primarily, scholars argue for an increase in the supply of roads. A second idea, which has been becoming increasingly popular within the academic community, is the need to better manage and price existing road systems. When a good is underpriced, it is overused; so an appropriately priced road system could perhaps lead to more appropriate road usage. Transportation scholar Tim Lomax agrees: “If you invest in roads and transit, you get better service and access to more jobs. Traffic management and demand management should be in the mix too.” (Lomax and Schrank 2011) Public-private partnerships have the ability to respond favorably to both the undersupply and overuse issues.

Furthermore, while the national funding gap is steep, some states are certainly worse off than others.¹⁵ For example, California needs an estimated \$16 billion *per year* to repair and maintain its surface transportation programs. However, California currently can supply only \$4

¹⁵ The FHWA explains how it allocates federal funds to states: “The FHWA and the states have developed a set of procedures for allocating Highway Account revenues to the highway users in each state. The attribution relies on state reports of the consumption of each type of motor fuel: gasoline, gasohol, special fuels (mostly diesel), and other alternative fuels. States report on fully taxed fuels, exempt sales, partially exempt sales, full and partial refunds, and fuels taxed at reduced rates. Attributions are made separately for gasoline and gasohol, based predominantly on the state reports. FHWA includes government use of gasoline in gasoline attributions, but excludes government use of diesel fuel in diesel attributions. There are federal fees assessed on heavy vehicles which are not fuel taxes. These include a tax of 12 percent on the retail prices of truck sales for vehicles with over 33,000 pounds gross vehicle weight, and for truck trailer sales of over 26,000 pounds gross vehicle weight; a graduated tax on heavy tires of 15 cents per pound over 40 pounds, plus 30 cents per pound over 70 pounds, plus 50 cents per pound over 90 pounds. A heavy vehicle use tax is applied to trucks of 55,000 pounds and over gross vehicle weight, at \$100 plus \$22 dollars per 1,000 pounds in excess of 55,000 pounds, with a maximum of \$550 per truck. These non-fuel based fees are attributed to the states in the same proportions as special fuels are attributed to the individual states.”

billion. It should come as no surprise that cities such as Los Angeles, San Jose, Oakland, and San Francisco have some of the worst congestion in the United States (Deloitte 2011). However, with the ability of all levels of government to fund infrastructure projects limited, this is an excellent opportunity for profit-seeking entrepreneurs to fill the transportation funding void, and to take some power out of the hands of all levels of government. In this context, it is important to distinguish that P3s are not a federal issue, but one that requires state legislation, as will be discussed below. Actors in the federal government, like the FHWA, can only advocate that states implement legislation to utilize these financing and procurement techniques. The state legislation regarding P3s can be seen below:

Map 1: States That Utilize Public-Private Partnerships¹⁶



As public-private partnerships begin to become more prevalent for infrastructure development, citizens and politicians will undoubtedly ask why private involvement is justified. While there is ample evidence the current transportation infrastructure is lacking, there is also

¹⁶ Source: <http://www.ncppp.org/>.

relevant economic theory that highlights why transportation could be better delivered by private actors. In fact, while the arguments for government involvement in the infrastructure system hinge on the claim that roads are public goods, major roads and highways really should be classified as private goods. A public good is one that is both non-excludable and non-rivalrous; yet roads meet neither of these conditions. The naive argument holds that it would be prohibitively difficult both to privately adequately fund roads and to exclude non-payers from using the road under a private system. However, economic analysis shows that this is simply untrue. In what follows, I will outline why roads should be classified as private goods, in order to build my argument that they can best be provided by the private sector. Previously we have analyzed historical examples detailing both how the government monopoly has failed and how roads have been privately provided in years past. Now we will enter a case study explaining public-private partnerships, and how they utilize the new governance structure to lead to a more efficient outcome.

Case Studies

The Pocahontas Parkway

The Pocahontas Parkway¹⁷ is a nine-mile, four-lane, limited-access toll road southeast of Richmond, the capital of the Commonwealth of Virginia. This P3 project would fall under the develop operate-type of project as mentioned earlier. The toll road connects Interstate 95 with Interstate 295 (a bypass route to the east of Richmond) and crosses several arterial highways. The largest physical feature of the Parkway is its two parallel high-level bridges crossing the James River, with sufficient clearance for oceangoing ship traffic to and from the Port of

¹⁷ In 1995 the Virginia legislature enacted the Public Private Transportation Act (PPTA).

Richmond. The project was originally planned to include a spur to the Richmond airport, but this was not included in the 1998 P3 concession (Freeman, Wei, and Gosling 2012). This public-private partnership is an excellent example of how both public and private parties utilized their special skill sets to accomplish a more efficient outcome than either the private or public sector alone could produce.

In early 1998, the Virginia Department of Transportation (VDOT) entered into an agreement to develop and operate the Route 895 Connector with FD/MK Limited Liability Company, a special-purpose company formed by two of the largest U.S. contractors, Fluor Daniel and Morrison Knudsen (now Washington Group International). Under this arrangement, FD/MK agreed to undertake the design, construction, financing, and operation of the project. Construction was under a design-build contract with FD/MK. The public sector, specifically VDOT, lacked the funds to design and build such a project. In the 1990s, traffic congestion in the area was increasing every year, but the public budget did not allow for this specific road to be built. Contracting out the project to a private firm was cheaper and more efficient. Furthermore, the public sector was able to provide land and zoning permits quickly because it had such a large stake in the project.

The Pocahontas Parkway opened for traffic in 2002, three months ahead of schedule, and was the first toll project in Virginia financed under the 1995 PPTA.¹⁸ The revenues for the project were sufficient, and continued to rise by roughly 42 percent by 2003. The project did not have cost overruns, and the private firm FD/MK¹⁹ had a strong incentive to keep costs under

¹⁸ The earlier Dulles Greenway project predated the PPTA and was regulated by the Virginia Corporation Commission.

¹⁹ Specific finances for the project: The PPTA issued an initial tranche of \$354 million in tax-exempt toll revenue bonds to private-sector investors. These bonds were secured solely by toll revenues generated by the project. In

control: The project's contract stipulated that all cost overruns would fall on the private sector, not the public. Furthermore, there were undisclosed financial incentives to complete the project ahead of schedule. The project was so successful that another private firm thought it could earn profit by controlling the road system.

In October 2004, Transurban (USA) Inc., a subsidiary of Australia's Transurban plc, together with DEPFA Bank, proposed refinancing the Pocahontas Parkway project in return for a 99-year concession agreement from VDOT. In 2005 VDOT agreed to negotiate with Transurban. VDOT's key objectives included payment in full of all outstanding PPTA bonds, repayment of operating and maintenance costs of the road incurred by VDOT, release of VDOT from any obligation for future operation and maintenance costs, and development of a financing strategy to carry out the planned spur to Richmond International Airport. The deal closed in late 2005. Transurban financed the transaction with \$475 million in senior and subordinated debt, \$141 million in equity, and a \$150 million Transportation Infrastructure Finance and Innovation Act (TIFIA) loan to pay for the airport spur. Toll increases over the life of the 99-year lease are limited to the annual rate of growth in gross domestic product. Further, if return on investment (ROI) exceeds 6.5 percent, VDOT is entitled to recover 40 percent of gross revenues as a "permit fee"; and if ROI exceeds 8 percent, 80 percent of revenues above that point will go to the state (Hodges 2007). There is a noncompeting clause requiring VDOT to compensate PPTA for lost toll revenues if a highway crossing of the James River is built within three miles of the Pocahontas Parkway bridges. However, if the parkway becomes congested, that requirement is

addition, VDOT's State Infrastructure Bank agreed to loan the association up to \$18 million on a subordinated basis to finance certain costs of the facility. Finally, FD/MK agreed to make up to \$5 million in deeply subordinated loans to the PPTA under a revolving line of credit. The PPTA was responsible for toll collection and for operation and maintenance of the parkway once construction was completed.

annulled. The Pocahontas Parkway is considered by many to be an overall success.²⁰ It reduces travel time, has higher-quality road service, saves consumers money by offering a shorter, more efficient route, and thereby allows consumers to use less gas. There is also some level of development benefit that has yet to be realized. The supply and quality of the road will support the growth of the capital region by allowing commercial and residential development to become more accessible and lucrative.

Chicago Parking Meters

Not every public-private partnership can be considered an instant success. The long-term lease of parking meters in Chicago to a private investor had an immediate political and media backlash due to poor execution, a lack of public engagement, and faulty strategic communication. While this project is not a road, it is part of the transportation infrastructure, and highlights the strengths and weaknesses of both the public sector and the private sector. The initial large increase in parking fees, combined with poor response to broken parking meters and issues with payment, generated a considerable public backlash. However, once the initial errors of the program were fixed, the P3 has shown promise, and other metropolitan areas are considering adopting similar systems.

In 2008, Chicago was facing an alarming budget deficit. To stave off major budget cuts, the city needed an immediate injection of funds from some source, and a system of P3s appeared to be the answer. In 2005 Chicago had leased the Chicago Skyway for a one-time payment of \$1.8 billion, and in 2006 it leased its downtown parking garages for \$563 million. Given the success of these arrangements, the city thought other assets could be sold to private investors to

²⁰ For more information, see NCCP.org.

earn instant profit. Under city government operation, the parking meters generated roughly \$23 million in revenue annually, at a cost of about \$4 million for meter maintenance and coin collection. Most street parking rates had not been increased for more than two decades due to stringent city regulations. The City of Chicago understood that a lump-sum payment from a private investor could possibly solve multiple issues with its system of metered parking, primarily the replacement of outdated parking meters, and could also provide immediate cash. The private sector (in the long term) was expected to be able to bring more capital investment, better efficiency, and overall better service to management of metered parking. Ideally, a private firm would be able to price the service appropriately and maximize profits. Chicago Parking Meters LLC, a subsidiary of Morgan Stanley, foresaw a significant profit opportunity under the right market conditions. In December 2008, Chicago Parking Meters LLC bid \$1.15 billion for a 75-year lease on Chicago's downtown parking meters.

Shifting from a public to a private use of capital is bound to have its challenges. The citizens of Chicago expected a flawless transition, but that was not what they received. There was no gradual transition from public to private, but rather a noticeable overnight change, including an immediate increase in parking fees. While this increase was based on a study of demand, citizens felt they were being gouged. There was no public outreach or explanation of the reasons for the increase (Moser 2009). While there are certainly economic benefits to pricing parking more appropriately, the lack of communication among all involved stakeholders led to a poor reception of the project.

There are economic benefits to raising prices for parking spaces, benefits that the layperson may not understand. Before 2009, 75 percent of the city's 36,000 parking meters had not seen a price increase in 20 years. Economic logic holds that when a good is underpriced it is

overused. In the case of parking spaces, this leads to congestion, more time spent in traffic, urban sprawl, and pollution. Having a higher rate gives drivers an incentive to spend less time in the spot, allowing for more turnover, which reduces congestion and benefits local businesses. When one person has a financial incentive to conduct his or her business more quickly, it allows another person to find a good parking spot, thereby increasing value to local businesses.

Unfortunately, due to a lack of transparency and public engagement, citizens did not observe these intangible benefits and felt betrayed by their public servants. Furthermore, as the prices increased, the meters continued to accept only quarter coins. While this may not appear to be an issue, it quickly became one as rates in some areas jumped to \$7.00—or 28 quarters—per hour. Many machines began malfunctioning. It was not only the machines breaking which became a public relations dilemma, but also the repair time. Initially it took the private sector eight days to fix a broken meter, compared to two days under public-sector management. The P3 was immediately labeled a catastrophe, and it continues to face negative public reviews.

While the initial stages of the implementation of this P3 were fraught with challenges, after a few months the program prospered. Meter repair time declined from eight days to under four hours. The jammed parking meters were replaced with newer, more versatile pay-and-display meters that accepted credit and debit cards in addition to coins. The new meters were also environmentally friendly, since they ran on solar power, saving the city 40,000 nine-volt lithium batteries per year. This is an excellent example of how a private firm can bring innovative ideas to an antiquated system.

Not only did the city receive better, technologically enhanced parking meters, but also \$1.15 billion. Some of the money was used for long-term capital investments in parks and other

facilities. However, \$400 million was applied to cover an operating budget deficit (Goldsmith 2010).

So far, the infusion of \$3.5 billion from leasing its public assets has allowed Chicago to:

- raise the city's credit rating its highest level in 25 years,
- greatly lower its borrowing costs, and
- balance the budget through 2012.

While the P3 system in place is not a panacea for Chicago's fiscal issues, it has allowed the city to recover somewhat from its financial crisis and to provide needed municipal services at a lower cost.

Are Roads Public or Private Goods?

Having citizens pay for any part of transportation infrastructure (through public-private partnerships) won't come without some level of push-back from lawmakers and citizens alike. Most individuals have only known a "free" road system, and will naturally question why the government can no longer provide the same service. It is important to highlight to drivers and nondrivers alike that they have in fact been paying for the roads all along in the form of different gas taxes. As mentioned earlier, the Highway Trust Fund is composed of a tax on every gallon of gasoline. There are also different state and local gas taxes, meaning roughly 14 percent of the cost of gas is due directly to government taxes. This notion that we have a "free" system is simply untrue. Furthermore, as mentioned earlier, traffic adds to the cost of the roads in the form of lost time, so the actual amount paid for road use by individuals is quite substantial. Since

roads are crucial for commerce and economic growth, it is commonly assumed that the government should provide the service. For the last century, the American people have known only government-funded roads. Since roads are a large part of a community, and are owned and operated by some level of government, people assume they are in fact public goods. The term “public good” is too often used to mean merely “a service that is provided by the government,” rather than the economic definition. It is crucial to understand the economic definition of a public good because it quickly becomes obvious that roads are not public goods, but rather private goods.

The fact that the public utilizes a service does not necessarily mean the service is a public good in the economic sense. Public goods are defined as follows:

In economics, a public good is a good that is non-rivalrous and non-excludable. This means that consumption of the good by one individual does not reduce availability of the good for consumption by others, and that no one can be effectively excluded from using the good (Lavoie and Boettke 2000).

But what does this actually mean, and how does it relate to a road system functioning in the 21st century? Without attempting to decipher the economic jargon, an easy example can highlight the economic definition. One example of a true public good is a fireworks display. Other people watching fireworks by no means take away from another person’s experience, meaning the show is *non-rivalrous*. Whether one person watches or 10,000 people watch, we all have the opportunity to enjoy the show equally. Secondly, the show can be seen from so many different distances and angles, it is quite difficult to limit who actually watches the show, meaning the show is *non-excludable*. Someone from a balcony a few miles away may be able to see it just as easily as someone a block away. It would be quite difficult to enforce who is able to watch the show. It would be quite easy for an

individual who did not pay for a ticket to watch the show. This is where the term “free rider” comes in:

In economics, the free rider problem refers to a situation where some individuals in a population either consume more than their fair share of a common resource, or pay less than their fair share of the cost of a common resource. . . . A commonly used example of the economic notion of the free rider problem is found in national defense. All citizens of a country benefit from being defended; however, individuals who evade taxes are still protected by the same common resource of national defense, even though they did not pay for their fair share of the resource (Investopedia 2012).

Using these economic definitions, I will show how roads are in fact both rivalrous and excludable, and how with recent trends in technology, the free-rider problem essentially no longer exists. Using both of the above definitions, in addition to the logic of what defines a public good, the idea that roads can be classified in this manner quickly begins to erode. Using the firework example as a baseline, and analyzing the common definition of a public good, I will apply it to roads.

Consider the following: Driver A is the only driver on a major road. There are four lanes and the speed limit is 60 miles per hour. Then Driver B joins Driver A on the road. With four lanes and only two drivers, both Driver A and Driver B can consume the road equally. There is no traffic. The addition of the marginal driver did not have an impact on Driver A; both drivers utilized the road at top speeds. From this oversimplified example, the argument can be made that in this instance, the road is non-rivalrous. However, this is merely an academic exercise. In the real world, this is not the way roads operate. If one driver is on a major road, and another driver is added, it will not substantially affect the road usage—both drivers will still be able to enjoy the road equally. But what happens when another driver is added, then another? Even without accidents, traffic occurs; it is inevitable. On some margin, one person’s usage of the road

impinges upon another person's usage. Even in the case above, the addition of Driver B could have an impact on Driver A's ability to use the road unencumbered: Driver B could be drunk and weaving in front of Driver A, hampering her safety, or Driver B could be a daredevil and could taunt Driver A, or a whole other range of possibilities. This erodes the argument—even for a very simple example—that roads are non-rivalrous. Additionally, not all drivers are created equal, and due to the variety of cultural norms, experience, and other variables that affect people's driving ability, everyone is a different driver. This affects traffic flow. Traffic levels also vary throughout the day; they are anything but constant. During peak commuting hours, when traffic is heaviest, roads are absolutely rivalrous. All other drivers using the road create excessive traffic, and force some drivers to use different routes. Harvard economist Greg Mankiw (2008, 234) agrees:

If a road is not congested, then one person's use does not affect anyone else. In this case, use is not a rival consumption, and the road is not a public good. Yet, if a road is congested, then use of the road yields a negative externality. When one person drives on the road, it becomes more crowded, and other people must drive slowly.

From this it is quite clear that roads are indeed rivalrous, especially during rush hour.

Considering that roads fall under the rivalrous category, roads must be considered either “common goods” or “private goods.” The question then becomes, are roads excludable?

Another factor that defines a public good is that it is non-excludable, meaning firms find it either too costly or impossible to exclude people from usage. This may have been true of roads in the 1800s, when people could more easily circumvent tollbooths and join the road without paying. In fact, this is where the term “free rider” originated. Instead of paying the fare, traders would find (or make) roads to go around tollbooths, so they could still enjoy the benefits of a road without paying the costs. However, in the 21st century electronic toll collection technology,

this is no longer a problem. The price to monitor who uses the roads has decreased dramatically over the last 20 years. RFID²¹ technology has become so advanced that commuters can purchase \$10 stickers and place them on their vehicles to electronically collect the tolls. These stickers will connect to the commuters' credit cards, and bill them monthly based on their road usage. But what about people who refuse to buy the sticker? High-speed cameras placed on tollbooths snap photos of license plates, and send a bill (or ticket depending on the state) to drivers who have attempted to avoid paying the toll. Only in academic exercises could a road be considered non-rivalrous. The notion that, in today's hyper-technologized world, private firms could not track individuals with technology is ignorant of the times.

Putting both of the previous arguments together, we see that roads are not public goods: they should be classified as private goods. Basic economic theory demonstrates that roads are private goods that are incorrectly priced. In fact, since roads are "free," they are extremely underpriced. A good that is underpriced becomes overused; hence excessive traffic congestion. Roads under a government monopoly have a fixed price of \$0 for direct use. The Highway Trust Fund and other taxes are used as a common funding source, but they are not directly applied to individual road systems. As soon as a highway or road institutes a toll, the good immediately becomes excludable. Unless a driver chooses to take an alternate route, there is essentially no way to circumvent a tollbooth in the 21st century, as there was in the 1800s. Roads have evolved, and now have exit and entrance ramps, electronic signaling, high-definition safety cameras, and other technological advancements that allow for better monitoring. If roads are indeed private goods, it is time for them to be supplied by private companies.

²¹ Radio frequency identification (RFID) is a generic term that is used to describe a system that transmits the identity (in the form of a unique serial number) of an object or person wirelessly, using radio waves. It's grouped under the broad category of automatic identification technologies.

But there is another aspect of public goods that needs to be discussed in order to better understand the nature of roads. Under the economic definition of public goods, government-funded roads would be the same as private roads. Don Boudreaux, professor of economics at George Mason University, makes an interesting point regarding public goods:

If the classic theory of public-goods provision is correct, government supplies public goods just as the private market would supply such goods *if* the private market were not infected with incentive problems that prevent the private market from doing its job in these situations. (2009)

Using this logic, the government is simply providing the same service the private sector would, but due to high costs and the free-rider problem, the private sector will not provide an adequate supply of roads. According to this theory, the government is supplying an optimal quantity of the demanded good—in this instance, roads. However, as highlighted throughout this paper, there is ample evidence to the contrary. Traffic levels have never been higher, and there is no sign of traffic lowering in the near future. In fact, traffic estimates for the near future are nothing short of frightening. Not only is the economic theory of roads as public goods a failure, but its application is lacking as well.

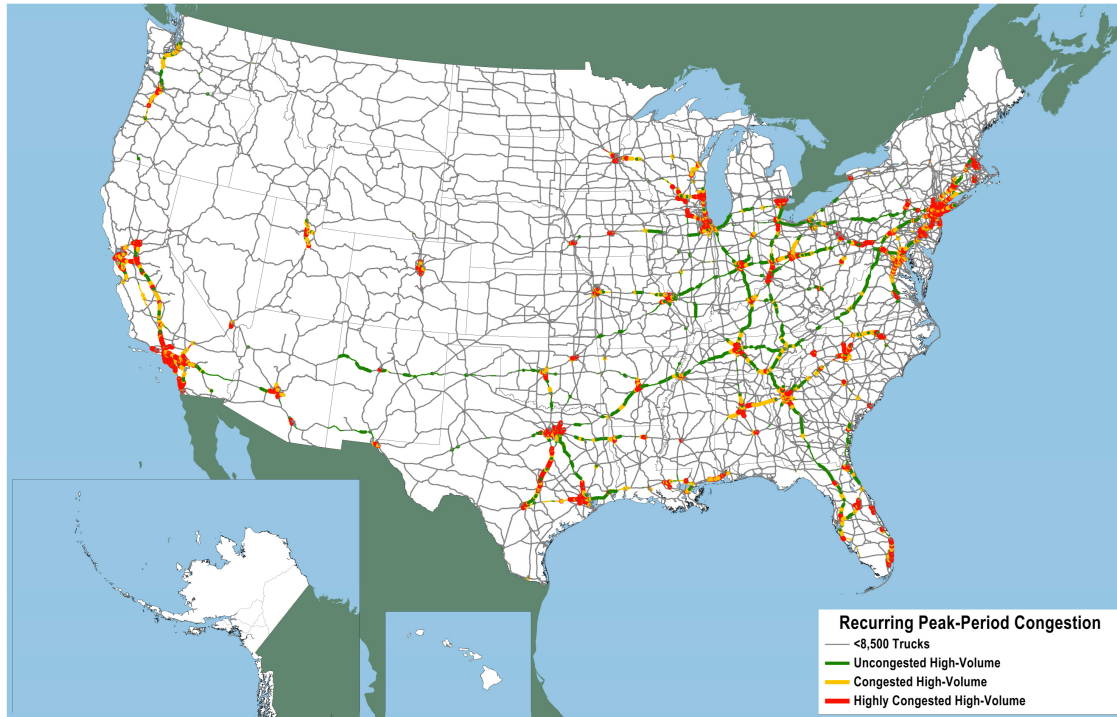
Don Boudreaux highlights more problems with the public goods model for transportation:

Now there are plenty of problems—theoretical and, especially, practical—with the classic theory of public goods. For example, it assumes too blithely that collective-decision-making procedures accurately discover the public's true demand for public goods; it overlooks the perverse incentives in the political arena that prompt government officials to act in ways that are inconsistent with the “public good”; and it turns a blind eye to the many creative ways that private persons have through the years organized themselves voluntarily to supply “public goods” that, allegedly, would never be supplied privately. And in the case of U.S. interstate highways especially, the notion that it is too difficult to exclude non-payers from traveling along them is incorrect. (2009)

Below are the traffic levels in 2007. Red represents high congestion during peak hours. The map shows that in larger cities—Dallas, New York, Los Angeles, etc.—traffic is already extremely high during peak hours.

Map 2: Peak Congestion 2007²²

Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2007



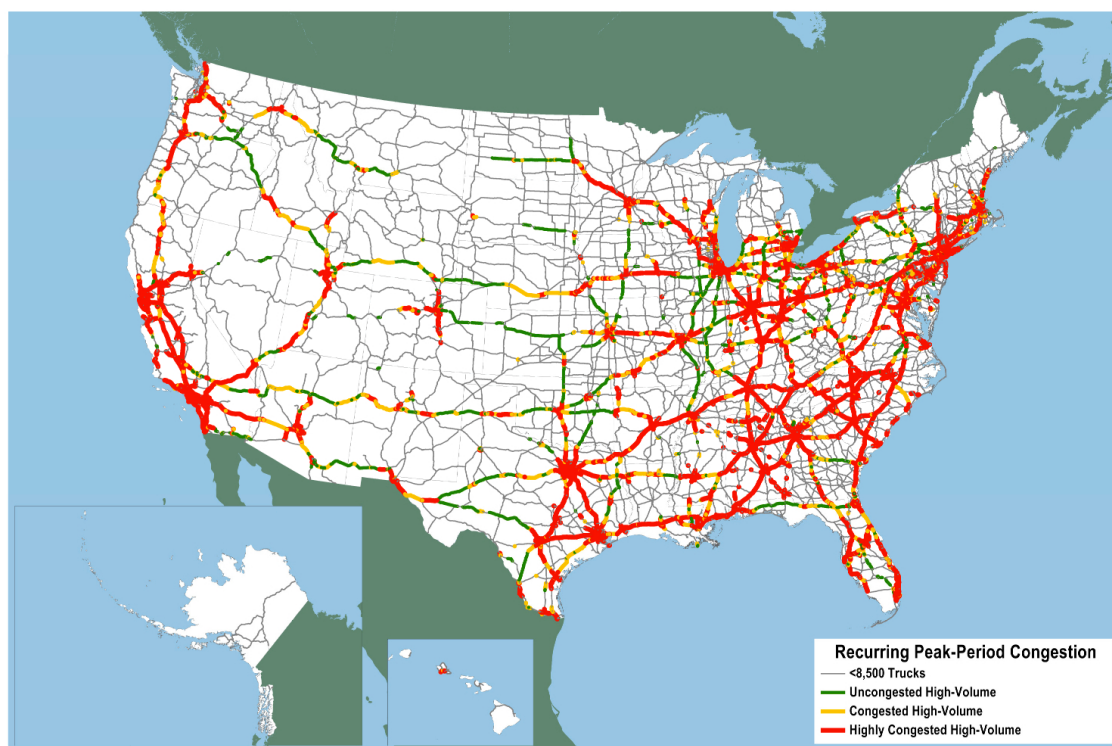
Notes: High-volume truck portions of the National Highway System carry more than 8,500 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95. The volume/service flow ratio is estimated using the procedures outlined in the HPMS Field Manual, Appendix N.
Source: U. S. Department of Transportation, Federal Highway Administration, Office of Highway Policy Information, Highway Performance Monitoring System, and Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2012

However, the U.S. Department of Transportation ran a simulation that shows what will happen by 2040 if road supply increases at its current rate and population continues to grow to its expected 400 million within the next few decades:

²² Source: http://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/nhsconghvtrk2007.htm

Map 3: Projected Peak Congestion 2040²³

Peak-Period Congestion on High-Volume Truck Portions of the National Highway System: 2040



Notes: High-volume truck portions of the National Highway System carry more than 8,500 trucks per day, including freight-hauling long-distance trucks, freight-hauling local trucks, and other trucks with six or more tires. Highly congested segments are stop-and-go conditions with volume/service flow ratios greater than 0.95. Congested segments have reduced traffic speeds with volume/service flow ratios between 0.75 and 0.95. The volume/service flow ratio is estimated using the procedures outlined in the HPMS Field Manual, Appendix N
Source: U. S. Department of Transportation, Federal Highway Administration, Office of Freight Management and Operations, Freight Analysis Framework, version 3.4, 2012

The current path is unsustainable, and borders on disaster. As noted earlier, there are two ways to combat congestion: by increasing the supply of the road system, or by managing the system through some pricing mechanism. Public-private partnerships have the ability to use both of these methods. Private firms can either manage existing government-owned facilities, or build new roads that are in actual demand. Depending on the level of public involvement, no private firm would construct a road that would not reap profits. Private firms can learn through the profit-and-loss feedback mechanism what roads are truly needed by society. Absent that mechanism, the United States will continually fall further into a transportation crisis. As seen

²³ Source: http://ops.fhwa.dot.gov/freight/freight_analysis/nat_freight_stats/nhsconghvtrk2040.htm

from the maps above, doing nothing and relying on the government to fix the problem may not be the wisest option. Instead of raising more taxes, or asking for more money from Congress, the Department of Transportation should further encourage private involvement in infrastructure development. The Department of Transportation has claimed that it is possible the U.S. does not have an adequate road supply, or perhaps the supply is not being efficiently managed.

Government wants the ability to fix its own problems. But in this case government is not the solution—government is the problem. Having a government monopoly does not allow entrepreneurs to enter the market and find out which roads are more valuable than others. As noted earlier, all roads are priced equally, and this road socialism leads to suboptimal results. How can the government know how to efficiently allocate resources when there is no proper feedback mechanism? Throughout the world, in Great Britain, Australia, Germany, Hong Kong, and other places, public-private partnerships have replaced government infrastructure with astounding results.²⁴ Not only have they built new road systems that have been amazingly efficient, private firms have also been able to find the way to properly price the roads and earn a positive return on investments. Even though private firms in these countries have continually found success and embraced congestion pricing through public-private partnerships, the same story does not apply within the United States. In fact, there has been little done by the United States government to implement congestion pricing. While many embraced the planned economy of the American road system provided through the Interstate Highway System in 1956, the system has become so complex over the last decade that the government (at all levels) has not been able to adequately fund projects, or discover innovative ways to enhance the existing infrastructure. And why should it? What is the government's incentive? Government agencies are not fueled by profit and loss, and here lies the problem. Profit and loss is the foundation for

²⁴ For more information, see NCPMP.org.

entrepreneurs, and without it, the economic system will crumble. Furthermore, economic theory can help explain why the central planning of the American road system is failing.

Why the Government Fails

When citizens treat roads as public goods, there are dismal results. There are two reasons for this. First, public goods are historically underpriced. As mentioned throughout this paper, the management of the road system is a primary reason for excessive congestion, and believing roads are neither non-rivalrous nor non-excludable is false. When a service is underpriced, it becomes overused; hence there is disproportionate traffic. Over the last 60 years, it has become more apparent that roads are no longer economically categorized as public goods, but rather as private ones. When the government extensively plans a private good, and crowds out private effort, it leads to inferior products and services. Ludwig von Mises highlighted in 1920 that there are major flaws with central economic planning of private goods, and the same lessons can be applied to the American road system nearly a century later. How can the government allocate scarce resources without a price system? Without profits, the government is blind to what individuals truly need and value. Without a pricing system, consumers cannot show their preferences through action, and reward services that provide high levels of utility. The government has tried to distribute an adequate road system, but it has failed.

So much has changed since 1956 that the old domestic infrastructure has been outpaced by technological advances and an increasingly growing society. Mises makes a terrific point when he notices that “economic calculation makes it possible for businesses to adjust production to the demands of the consumers” (Mises 1944). This quote, while over half a century old, still applies in 2012. The government construction of the road system has led to urban sprawl,

increasing congestion, and budget deficits. The cure for this problem is not more money, but rather less government. Private firms are motivated by profit. Firms that succeed reap rewards, while firms that fail are sent a powerful message—that they are doing something incorrectly (specifically, using resources in the wrong manner). Poorly performing firms must either attempt to fix the situation or leave the market. Government does not face the same incentives. Government lacks the very important feedback mechanism of profit and loss. Its incentive structure is radically different.

Consider the following: A 1989 report by the Federal Highway Administration asserted that traffic forecasts are typically greatly overstated, while the costs of a project are understated. This means two things. First, the government wants to make the case that a project is truly needed, so it can rent-seek and try to grab more funds. However, in reality, it is likely that the situation is not as dire as it appears. Second, the government “lowballs” its proposed project cost, so the project seems desirable, but once the project starts, the real costs appear. But who must pay for these cost overruns? The U.S. taxpayer. This incentive structure is greatly altered for a private firm. Government agencies are not attempting to earn a profit, but rather to push for projects that give them more authority and power. Private firms have more incentives (not least of which is the fear of bankruptcy) to allocate more time and funds to research and carrying out due diligence. As seen by more recent private involvement in highways, private firms have an incentive to implement more cost-efficient strategies and technologies to lower costs in order to earn a higher return on investments. These are real economic forces that really do operate in the real world. For example, the government of India in 1998 decided it wanted to extend its arterial highway system. It used both a public and a private financing system. The results were astonishing. On average, private projects were completed one month ahead of schedule.

Compare this to the publicly financed roads, which were 16 months behind schedule and had construction costs which were 30 percent higher than those of the privately financed roads. From these examples, it is illogical not to allow roads to compete for profit, especially when both consumers and government can benefit.

It is no mere academic exercise to argue for private roads, but in application the results speak for themselves. Competition among firms has led to unimaginable increases in consumer utility for multiple industries; a similar outcome can be expected in road development. Firms should be able to enter or leave a market as they see fit, but current government red tape does not allow true markets to emerge. Allowing entrepreneurs to enter a market threatens central planners' power and authority. Since most citizens have only known a government monopoly in many industries, they deem it normal and appropriate. Citizens seem to tolerate the status quo, and never question the current system. In reality, however, government monopolies are about as far from optimal as it is possible to get.

As noted earlier, when a good is underpriced, it becomes overused. The pricing system allows users to internalize their social externalities (contributing to traffic), and causes excess demand to decrease (helping eliminate deadweight loss). Private firms attempt to maximize profits, and they set rates accordingly. Mises' economic calculation problem—that is, how does a society allocate resources rationally—applies directly to roads. For example, Shunso Tsukada (2005) found that the Dulles Greenway, which is operated by a private firm, was observing low ridership when the toll was priced at \$1.77. Dulles Greenway lowered its toll from \$1.77 to \$1.00, and saw ridership increase by 140 percent. The private firm responded to the pricing system, and made the needed

adjustments. The government cannot respond the same way, because it refuses to properly price its roads.

Private firms, motivated by profit, have an incentive to compete to earn a greater percentage of the market share. The companies that are constructing and operating roads would compete for people to utilize their roads; this competition would encourage a culture of continuous innovation among companies. If it were truly a competitive market, the owners of roads would have an incentive to pave over potholes, remove traffic accidents as quickly as possible, and price the usage of the road for profit maximization. With a government monopoly on roads, there is little to no incentive to increase service quality above the bare minimum.

While public-private partnerships do not represent a real market, it is beneficial to have a market-like environment. It is a marginal step toward adding markets to the American road system. Would competitive markets be optimal? Absolutely. But there have to be marginal steps, and public-private partnerships offer evidence to policy makers and citizens that having more capitalism in transportation is beneficial. Moreover, if a government project is delayed or has unforeseen costs, those costs spill over onto the taxpayer. Certainly, while not all delays are foreseeable, the private firm has more motivation to mitigate these costs.

As Hayek points out, markets can be the solution for the American transportation system. While public-private partnerships are not the ideal outcome of full privatization, there are benefits to injecting market-like environments into a government monopoly. In theory, consumers can show their preferences through action with private partnerships. If government roads are indeed heavily congested during peak hours, there are individuals

who would be willing to pay a premium (i.e., congestion pricing) to utilize a road that is less congested. Citizens do not value their time equally, so why should all individuals be required to suffer through an underpriced road system that leads to wasted time? People's decisions about how they value their time act as a powerful signaling mechanism that is absent in a government monopoly. Currently, people are taxed against their will, and roads are forcibly designed and implemented without stakeholder consent. With a price system, firms would have an incentive to construct roads that would be utilized and enjoyed by the public.

Public-private partnerships are essentially competing against government monopolies, and do not have a social safety net—if their plans fail, the companies will go bankrupt. Private firms will do everything in their power to attract the optimal amount of commuters to their roads. If citizens truly value the private roads, they will willingly give them their money, and a mutually beneficial exchange will occur. The amount of profit the private firm earns is another powerful signal that must be considered. If there are lucrative profits to be made, the private firm knows to allocate more resources to road development, and recognizes that there is currently a road shortage in that area. If profits are meager, then there is no incentive to continually invest in a failing project. Private firms see shortages or surpluses, and adjust business models to ever-changing dynamics in the market; but government cannot react the same way. Mises and Hayek both went as far to say that a planned economy could never function, and to some extent they are correct. As shown throughout the paper, the government cannot manage the system; it has become too complex, and has too many negative externalities on commuters.

Austrian economist Israel Kirzner is an important figure when it comes to 20th century literature on entrepreneurship. According to Kirzner, entrepreneurs have a discovery role in the economy. They are gap-fillers in the marketplace; that is to say, entrepreneurs identify places in the market where innovation could remedy an existing problem, then step in to fill those gaps. The private sector firms in public-private partnerships are the entrepreneurs needed to help fix the coming transportation crisis. Building on the Hayekian knowledge problem, Kirzner thinks that entrepreneurs are important in both their discovery and their innovative capacity. In order to identify new profit opportunities, entrepreneurs must stay alert to new opportunities in the marketplace. Not only do they create innovations where things didn't exist before, but they also can gain returns on their investments by updating currently existing structures. This economic theory relates directly to the government-operated road system.

A system in which the government has control over an industry, however, crowds entrepreneurs out of the market for that industry. Since the government has essentially unlimited funds to invest, profit-minded entrepreneurs, who have limited funds, simply cannot compete with government-owned or government-operated industries. Competition within the constraints of the government is rigged competition. This explains why the American road system has remained essentially the same for the past 50 years: government control of the industry destroys the opportunities for both discovery and innovation that exist in a competitive system. Both Kirzner and his intellectual follower Don Lavoie point out that entrepreneurs fill gaps in the market, and there is clearly a gap in the market for roads. If the government would simply release some of its control over this industry, it is extremely likely that entrepreneurs would step in to fill the void. Absent private ownership, there is a misallocation of scarce resources, and entrepreneurs help fix this problem.

CONCLUSION

Public-private partnerships have the ability to capitalize on the strengths of both the public and private sectors, without all the costs. These innovative contract agreements should not be seen as a quick fix to the transportation crisis, but rather as one tool to help alleviate the stress of increasing commuter demand. Furthermore, both Republicans and Democrats agree that the status quo is unsustainable. When both political parties agree on a key point, something must change.

There are benefits to market-like environments, and public-private partnerships can utilize the essential profit and loss system. Furthermore, the government can help lower transaction costs by utilizing eminent domain or other zoning techniques to acquire the land needed for new roads. Such contracts are quite useful, and necessary for future infrastructure development. Having the public and private sectors combine their most efficient attributes to form new governance will become more prevalent as the transportation crisis comes to a head.

Private firms have historically been prepared to pave the way for more American roads, and they are ready still. But supplying the roads is only half of the predicament. Road management is equally important, as it is the key to efficiency. As noted throughout this paper, public-private partnerships have been useful in managing both new and existing structures. Under market-like conditions, Americans would have the option to choose which road system to utilize. If a firm is providing a needed service better than the government monopoly, the commuters using it will send a powerful signal to both parties. The private firm will know its service is valued and needed, while the government will learn its roads are inferior. Some commuters may value a zero-priced system, and be willing to wait in traffic. However, public-

private partnerships allow commuters to show preference through action, and signal to firms what is needed. However, over the last 60 years, there has been a government monopoly and no true competition. If the government does not operate on a profit and loss system, how can it adequately price a good?

As proven through a historical analysis, government is not necessary to construct road systems, and roads certainly should not be categorized as public goods. Public-private partnerships have allowed roads to be managed by private firms, and with recent surges in management technology, roads should be categorized as private goods, needing private provision. Furthermore, the U.S. government should not fear private firms, but rather embrace them. Instead of one super-firm delegating road construction, private firms should be allowed to establish a competitive market. Private firms bring numerous benefits that the government is either unable or unwilling to realize. Private firms have a proven track record in saving costs, expediting construction, and utilizing new, innovative technologies. Moreover, projects in a competitive process will be reviewed under a stringent cost-benefit analysis, limiting wasted resources. During challenging economic times, governments need more than ever to welcome private firms into the market. This is not a zero-sum game in which private firms win and the government loses, but rather a positive-sum game in which all stakeholders, including commuters, benefit. With slow economic growth come lower tax revenues, meaning road construction continually loses ground as a government priority. In fact, on the 2009 Infrastructure Report Card, the American Society of Civil Engineers gave American roads a “D-minus,” the lowest score. What was the ASCE’s number-one suggestion? “Reform the federal highway program to emphasize performance management, cost-benefit analysis, and accountability.” This government problem requires a market solution.

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