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The Economic Impact of Failing Infrastructure in the New York Metropolitan Area

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The Economic Impact of Failing Infrastructure in the New York Metropolitan Area

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Abstract

Infrastructure in the New York Metropolitan Area has been seriously underfunded due to a failure of public investment on the local, state and federal level. Prior research has presented concrete reasoning that the now crumbling infrastructure will seriously affect economic growth and worker productivity. This research seeks to quantify the economic effects as a result of this failing infrastructure. My research asks: what are the concrete, additional economic expenditures, due to failing infrastructure, that drivers spend each year? How much do these economic costs decrease our economic productivity, and how do the economic costs compare with proposed infrastructure improvements? From the research, it is evident drivers in the New York-Newark NY-NJ Metropolitan Statistical Area experience some of the highest of these costs than other areas in the Combined Statistical Area. It is projected the 2018 economic cost to these drivers will be \$2,045 based on the value of one's time lost spend in traffic. With a continued lack of investment, these costs are expected to grow due to continued infrastructure failure and a growing population. Various programs have been proposed to alleviate specific bottlenecks in the region, but a coordinated source of investment from local, state and federal levels remains a major issue in securing funding for these projects.

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Introduction

We've all been there: you're 10 minutes late to a meeting, stuck wondering why traffic isn't moving and pissed because the person in front of you cut you off to get a whopping one car length ahead. Each year the number of passenger cars on the road continues to swell, just as the owners of these cars log more and more miles. As a result, citizens of the United States depend on their cars and in turn the roads they drive on ever more. Unfortunately for these ever busy drivers, infrastructure in the United States hasn't seen major investment or attention since President Eisenhower passed the Federal-Aid Highway Act of 1956. This milestone authorized the construction of the Interstate Highway System. Its original design focused on connecting major cities and the country together, but the act could never imagine how integral the system would become to the nation. Now, with minimal expansion and an overall lack of infrastructure funding, the system of roads, bridges and tunnels which connect us is clogged, overwhelmed and ultimately failing to serve its purpose. These problems will not fix themselves. Repairing and improving our infrastructure will require a comprehensive, cohesive, and focused plan with efforts between cities, counties, states and the federal government working together to ease the problems. Recent improvements and proposals for new projects have been made but the efforts are not yet great enough. There remain significant bottlenecks for traffic throughout the New York metropolitan area. Specifically, this congestion has already subjected the region to excess fuel costs for drivers and decreased productivity for businesses; and, with traffic projections expected to reach dizzying levels, the economic consequences will only be greater. This research seeks to identify the history and issues regarding traffic and roadway infrastructure, and hopes to provide a deeper understanding of the challenges faced in alleviating these issues in the New York Metropolitan area.

Literature Review

Historical Background of the Interstate Highway System

With the success of the automobile, the American population found itself a new, personal way to travel between places, and the car quickly became a staple of many households.

Unfortunately, in the early 1900s, only 12% of roads in the United States were paved, and so there was great difficulty in traveling long distances because of these rough, unsophisticated and unmaintained roads (Blas, 2010). Prior to WWII there had been numerous proposals to improve roadways in the United States, but very little headway was ever made on a national system. It wasn't until the postwar period, with manpower aplenty and a strong desire to work, that the country began to really focus on developing a modern roadway system. The passage of the Federal-Aid Highway Act of 1956 provided the means to build a national controlled-access highway system for the United States. These roads would be fundamentally different from previous endeavors in that they were to be uniform in design, of a high quality, and funded 90% by the federal government (Reid, 2006).

The development of the interstate highway system was not without its opponents, but its success at connecting the continental United States cannot be denied. Initial complaints of the system focused on the controlled-access nature of the highways. To enable consistent highspeed travel, entrance and exit ramps to the system would be required for safety. As a result of their design, the highways would cut off certain areas and towns, while making it difficult for some people to take advantage of them. The highway construction leveled many areas, required the eviction of people from their homes while destroying parks, historic areas, and jeopardizing environmental security (Mohl, 2008). A grassroots movement, which would become known as

the Freeway Revolt, took hold mainly in urbanized areas that opposed the construction of roadways directly through their city centers. These movements were mostly localized, and the interstate system successfully powered forward, pouring concrete in its tracks. By 1973, when most of the system was completed, the vast economic prosperity from the new roadways was beginning to show. President Eisenhower, who signed the initial bill, had pushed the system as direly important for public safety and security. (Mohl, 2008) He did not foresee how the system would also become be a major driver of economic growth in the United States. Currently the Interstate Highway System's 41,000 miles of roadway is just 1% of the total paved surface roadway in the United States, however the system carries more than 17% of all traffic in the country ("Beyond," 2015).

Direct and Indirect Impacts of the Interstate Highway System

The efficient movement of resources across a region is a key economic principle for success and continued growth. These resources, whether they be land, labor, or capital goods would ideally find themselves being efficiently transported across the nation's infrastructure to their final destination. It is imperative to recognize the Interstate Highway System's creation of vast economic prosperity for the United States (Chi, 2010). Roads, bridges, tunnels and other pieces of infrastructure are referred to as public goods for this key reason. They are publicly owned and maintained, and they provide the means for moving these resources. The value of these systems to the public is almost unquantifiable, but their necessity is undeniable (Haughwout, 2001). Typically, the local effects of infrastructure are easier to comprehend than the large-scale effects. Despite this, there is a general consensus that reliable infrastructure is both productive and valuable to society. Furthermore, there is strong evidence the Interstate

Highway System has been a key part in spurring economic growth across a diverse range of industries (Haughwout, 2001).

The Interstate Highway System has been considered a main driver of economic growth because of its reduction of “inefficient down time.” Inefficient down time is a problem which arises when economic resources cannot be efficiently moved during the production process. During these periods, the goods are “down” and not being used to their maximum potential. Location theory refers to how firms determine where to locate their business in order to maximize the firm’s efficiency mainly by reducing this inefficient down time (Chi, 2010). In the dynamic and connected 21st century economy, the proximity of producers and suppliers is key to a firm’s success. If the two parties are far apart then there is “inefficient down time” during the transport of the goods. Reducing this inefficient down time will maximize a firm’s efficiency and increase their productivity (Haughwout, 2001). Reliable highway infrastructure, and a firms location to this public good, thus become primary factors for consideration as companies seek to maximize profits. As a result, maintaining and expanding roadways is key in aiding to minimize overall inefficient downtime and supporting future economic growth.

Demand for Roadways

Metropolitan areas continue to host some of the largest population growths in the United States. Such large growth has created over 11 mega-regions in the country. A mega-region is defined as a regional area that covers multiple states which are linked by transportation, economic and various other factions. 75% of the U.S. population lives in these 11 mega-regions as the rural population declines (“Beyond Traffic,” 2015). It is expected that these migration trends will continue, and that the U.S. population will remain mostly urban and suburban with outer lying exurbs being added to the inner metropolitan areas. The continued increase of the

population within these centralized urban areas as well as the growth of exurbs in the outside of these mega-regions, will place higher demand on already congested and failing roads. Americans drove 3.22 trillion miles in 2015 (Federal Highway Administration, 2016). That is approximately 13,000 miles per individual per year, and the mileage is only increasing (“Beyond Traffic,” 2015). Despite increases in travel, the construction of new roads has slowed since the majority of the interstate system was completed in 1992. The resulting congestion on roadways is two fold from more drivers in general and each driver driving more miles. This has caused drivers to plan as much as twice the travel time into their commuting schedules and across the United States the results of the congestion are very prevalent. Washington D.C. is the most gridlocked city in the United States with 82 hours of delay time per commuter per year. Los Angeles, San Francisco and New York follow D.C. with 80 hours, 78 hours, and 74 hours of delay time, respectively (“Traffic Gridlock,” 2016). These large cities have historically come up on these lists, but the problem has now to spread to small and medium sized cities with infrastructures not designed for the now burgeoning population. Notably, some of the worst traffic congestion is seen in areas which saw the largest decreases in fuel prices. Since the start of the great recession, fuel prices have dipped even further than the national average decrease of 4.1 percent in the following areas: Riverside, California; Houston, Texas; Los Angeles, California; San Jose, California; Boston, Massachusetts, and Chicago, Illinois (“Traffic Gridlock,” 2016). Coincidentally, these areas have also all seen traffic congestion above the nation average.

In addition to passenger usage, roadways are heavily relied on for freight purposes. Of the over 16 billion tons of total freight moved within the United States in 2012, 81.5% was moved by truck. Furthermore, total freight volume is predicted to increase 45% by 2040 to 29 billion tons of freight. Trucking, versus rail or waterway, is expected to remain the preferred

method in moving freight, and the industry is forecasted to move 18.8 billion tons of goods by 2040 (“Beyond Traffic,” 2016). Freight movement is key to economic productivity, but it demands significantly more physical road than vehicle traffic. This reality further shows the need for expanded roadways, mainly highways and interstates, to maintain productivity. Freight traffic is also strongly correlated with population growth. As cities and suburbs grow denser, roads will be more congested from personal use. These people will demand more goods, increase the need for freight movement, and further congest the system. Shipping delays can cost between \$65 million to \$150 million a day depending on the goods at stake. The United States’ shift towards a service-based economy has helped to mitigate some of this demand for freight movement but with the economy predicted to double over the next 30 years, freight movement will increase (“Beyond Traffic,” 2016).

Cracks in the Infrastructure

As early as the 1970s and 1980s, the U.S. Department of Transportation began reviewing the state of infrastructure in the United States. There were a few notable instances, including a bridge collapse on the New York State Thruway which killed 10 people, which put the potential failure of these systems into the public spotlight. During this period, the federal government and the current account both accrued increasing deficits, and so a smaller amount of investment was being made in infrastructure (Aschauer, 1991). Since 1980, traffic has almost doubled in the United States while roadway capacity has remained unchanged. The federal gas tax remains at 18.4 cents per gallon and has not been raised since 1993 (Seely, 2008). This has left the Highway Trust Fund nearly insolvent and unable to fund necessary repair projects. The list of imperative repair projects is unnervingly long. The American Society of Civil Engineers 2017 Infrastructure Report Card gave U.S. roads a D rating as a result of their chronic underfunding. Their report

stated that 1 out of 5 miles of highway pavement is currently in poor condition (“2017 Infrastructure,” 2017). A mere 35% of U.S. roads are in good condition (“Beyond Traffic,” 2016). As of 2016, 9.1% of bridges in the country were deemed structurally deficient meaning they require more frequent repair to stay in service. (“2017 Infrastructure,” 2017) In certain regions, infrastructure needs are higher. For example, New York and New Jersey account for 2,589 of the 56,007 bridges deemed structurally deficient in 2016. These two states contain 4.6% of structurally deficient bridges but 8.9% of the US population (US Census Bureau). Additionally, 100 bridges in New York State were closed as of 2015 for their serious deficiencies (“2017 Infrastructure,” 2017).

These deficiencies are the product of years of reduced public investment. Nearly all research regarding infrastructure mentions the lack of public investment as the main driver of these issues, as well as the dire need for public investment to improve infrastructure issues. Starting in the early 1970s and through the 1980s, productivity growth in the United States began to slow down. At the time, economists were perplexed as to what was causing the productivity slow down, but Aschauer’s 1991 article reasons public infrastructure capital as one of culprits in decreased productivity. In 1985, the federal government invested \$552.7 billion (CPI-adjusted, 2016 dollars) in public capital for infrastructure. This investment was less than 1% of GNP for 1985 (Aschauer, 1991). In contrast, the 2016 Fixing America’s Surface Transportation Act provided just \$56.2 billion per year for highway and transit programs (“Failure,” 2016). This was a mere 0.30% of 2016 GDP. Given that the economic costs, including: vehicle operating costs, travel time delays, safety costs, and environmental costs, of deficient infrastructure are so great, the condition of our roads and bridges can impact our productivity positively or negatively (“Failure,” 2016).

The Economic Benefits of Strong Infrastructure and the Costs of Failing Infrastructure

If Aschuaer's theories hold ground, then our lack of public investment has been and will continue to cripple our economy. He refers to the need for infrastructure fixes as "America's third deficit," in addition to our budget and current account deficit. Furthermore, he reasons that importance of public investment should be recognized because of the many spillover effects it has across the private sector. Public investment has two key effects on private investment. Primarily, it increases the rate of return and productivity of private capital. The profit increases for the private sector are then multiplied in the economy as businesses increase their capital investments. Secondly, public investment in infrastructure frees up capital in the private sector for private companies to use more efficiently. Rather than having privately developed and maintained roadways, public investment can maintain infrastructure while private entities can specialize in other markets, creating a more efficient economy. (Aschuaer, 1991) Conversely, without proper public investment, reduced productivity has negative spillover effects as resources are wasted across industries ("2017 Infrastructure," 2017).

Both businesses and consumers should expect to feel the negative economic effects of a lack in public investment. As road quality deteriorates, travel time will increase, increasing shipping costs for goods across the country. This will cause all products and services to be more expensive to cover these extra costs. This could limit the competitiveness of U.S. goods abroad, further impacting manufacturing in the country. Imported goods will also see their delivery prices rise as it becomes more difficult to deliver products to customers. The increase in pricing would continue to hinder economic productivity by way of the reduced demand for industry, leading to lower corporate profits and employee layoffs. Consumers too will see the negative effects directly in their wallets. The increased cost of goods will decrease retail demand. There

will be a decrease in the demand for normal and luxury goods as consumers divert their spending towards necessities. These negative spillovers will ultimately mean people are working more for less pay, and business income and consumer wages will be suppressed by the inefficiency of our ability to get around. (“2017 Infrastructure,” 2017)

In numerical terms, the economic costs of these infrastructure deficiencies, including: vehicle operating costs, travel time delays, safety costs, and environmental costs, amounted to \$147 billion in 2015. By 2025, the American Society of Civil Engineers expects the annual economic cost to society to total \$238 billion. Even more shocking is the projected annual economic cost of \$575 billion in 2040. The cumulative economic cost by 2025 will be \$4 trillion of lost GDP. The yearly economic cost to households is projected to be \$3,400 from 2016-2025. These costs will directly reduce annual disposable income for families across the United States, hindering both growth and productivity. (“2017 Infrastructure,” 2017)

Calls to Spur Investment

Think tanks from across the political spectrum have argued a stronger federal-level transportation program is necessary to coordinate the proper efforts to repair infrastructure. There have also been proposals and advisements to consolidate the multitude of transportation agencies currently in the federal government with the hopes that consolidation could streamline funding and improve responsiveness (“Beyond,” 2015). Highway spending by the federal government has focused mainly on maintenance in recent years. The original engineering lifespan of the interstate highway was between 25 to 50 years depending on the location. Since most of these roadways were built from 1950-1960, many of them are overdue for replacement. Surprisingly, while 1/5 of U.S. roadway surface remains in poor conditions, this is actually an improvement in roadway surface quality of about 17% since 2011 (“2017 Infrastructure,” 2017).

The use of the few federal transportation dollars on maintenance has to some extent placed a “band-aid” on the decrepit structures. Nevertheless, maintenance remains only half the problem, and little has been done to replace deficient structures or to increase roadway capacity.

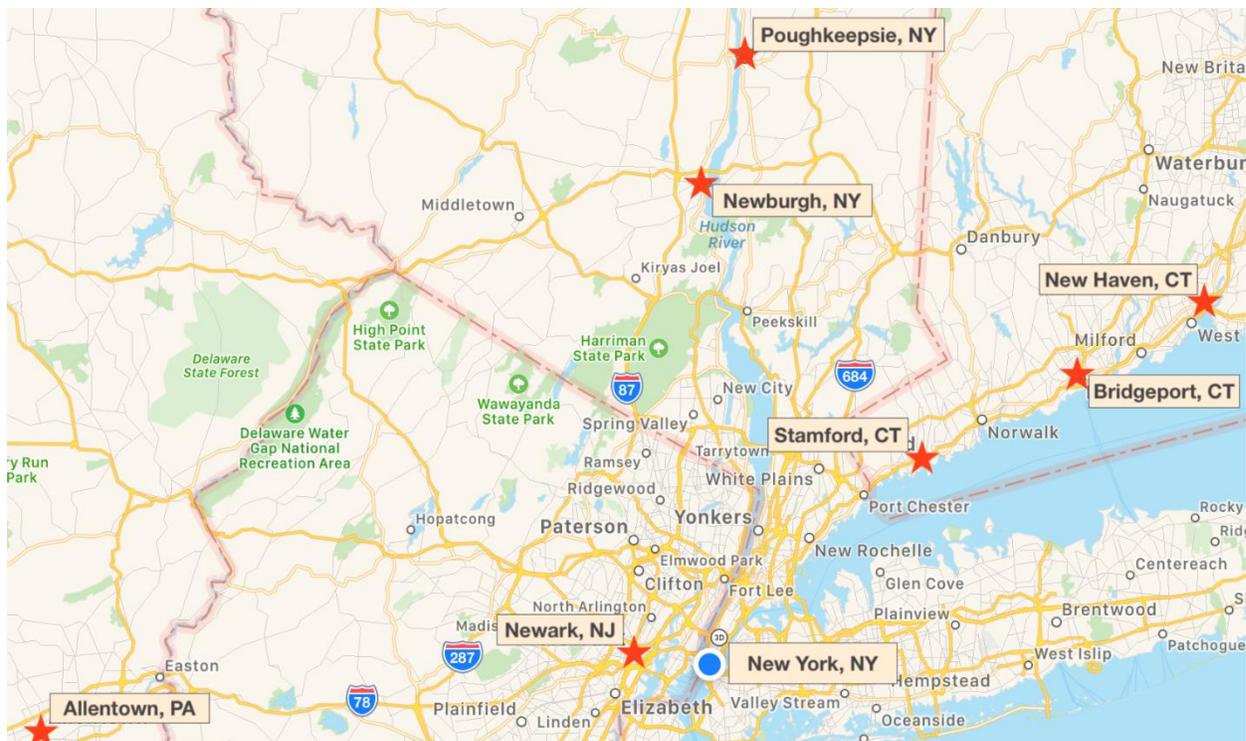
Research Question

What are the concrete, additional economic expenditures, due to failing infrastructure, that drivers spend each year? How much do these economic costs decrease our productivity? How do the economic costs compare with the cost of proposed infrastructure improvements?

Methods & Procedures

The basis of this research builds on a previous study conducted by the Texas A&M Transportation Institute (A&M). Their 2015 Urban Mobility Scorecard analyzed traffic speed data from INRIX and highway performance data from the Federal Highway Administration to

Figure 1



Map of the New York Metropolitan Area w/ Key Surrounding Regions

Source: Apple Maps, April 2018

produce an analysis of the traffic patterns in 471 urban areas across the United States. This research will bring their 2015 analysis forward to 2018, producing a 5-year projection of future traffic trends to 2020, and modify the Value of Time factor to find a more accurate economic cost to drivers.

This research will narrow A&M's focus from the entire United States to the New York-Newark Combined Statistical Area (CSA). The focus is specifically on the New York-Newark-Jersey City NY-NJ-CT Metropolitan Statistical Area (MSA) subset but will include key surrounding regions to create a regional traffic projection. These key surrounding regions comprise the remainder of the New York-Newark CSA and include: Allentown PA-NJ, Bridgeport-Stamford CT-NY, New Haven CT, and Poughkeepsie-Newburgh NY-NJ. See *Figure 1*, on the previous page, for the labeled regions of this study.

This research will modify A&M's Value of Time factor. According to A&M's Methodology Report, the Value of Time factor was calculated equally across the nation and represents the estimated value of time for a person. This research aligns the value of time factor with US Department of Transportation's recommended method to create a more complete value of time. It includes the average hourly wage in the region, to represent the opportunity cost of not being able to work. The US Department of Transportation recommends using a weighted average of hourly median income to determine the value of time. Local traffic is estimated to be 95.4% personal travel and 4.6% business travel, which will be used to weight the value of one's time appropriately between the two types of travel. Personal travel includes: errands, commuting, shopping trips, etc., while business travel refers specifically to travel from place to place strictly and solely for business related purposes. Hourly income is calculated by taking the US Household Median Annual Income and dividing it by 2,080, to maintain consistency with the

Bureau of Labor Statistics. The Median Annual Income used in this study is provided by the US Census Bureau and is specifically the median income for the Northeast region of the United States (this region historically has a higher median income than other regions throughout the country). Personal travel time is valued at half of median hourly income and business travel time is valued at the entire hourly income. After applying their appropriate weights, the value of time for this study is \$16.19 per hour for the year 2016.

Results

The projected economic loss per driver in 2018 ranges throughout the region from a low, in Allentown PA-NJ, of \$785 to a high, in New York-Newark NY-NJ, of \$2,045. The remaining projected losses per driver in 2018 according to my calculations are as follows: New Haven CT \$1,036; Poughkeepsie-Newburgh NY-NJ \$1,057; and Bridgeport-Stamford CT-NY \$1,300. These dollar amounts represent the direct and indirect costs of congestion and traffic in the region. They include the value of one's time, as well as excess fuel costs. These projections show economic costs will continue to increase in the near future given current growth trends continue and there is no expanded roadway capacity in the region. The total economic loss to drivers in the New York-Newark CSA is projected to be \$13.025B. Figure 2, on the following page, displays the projected annual cost per driver in the New York-Newark-Jersey City MSA. Figure 3 compares the projected 2018 total annual cost between the 5 regions in this study.

Calculating the economic loss per drive follows a rather straightforward formula. First, the number of commuters is derived as a proportion of the total population in the region. Daily roadway mileage is calculated from historical values and then projected to grow linearly. From the daily mileage, the predicted annual hours of delay can be found by forecasting its historical growth against the projected daily mileage. With the annual hours of delay, the annual cost of

delay is found by multiplying the hourly value of time by the annual hourly delay. Finally, the annual congestion cost per auto is found by dividing the annual cost of delay by the number of auto commuters.

Figure 2

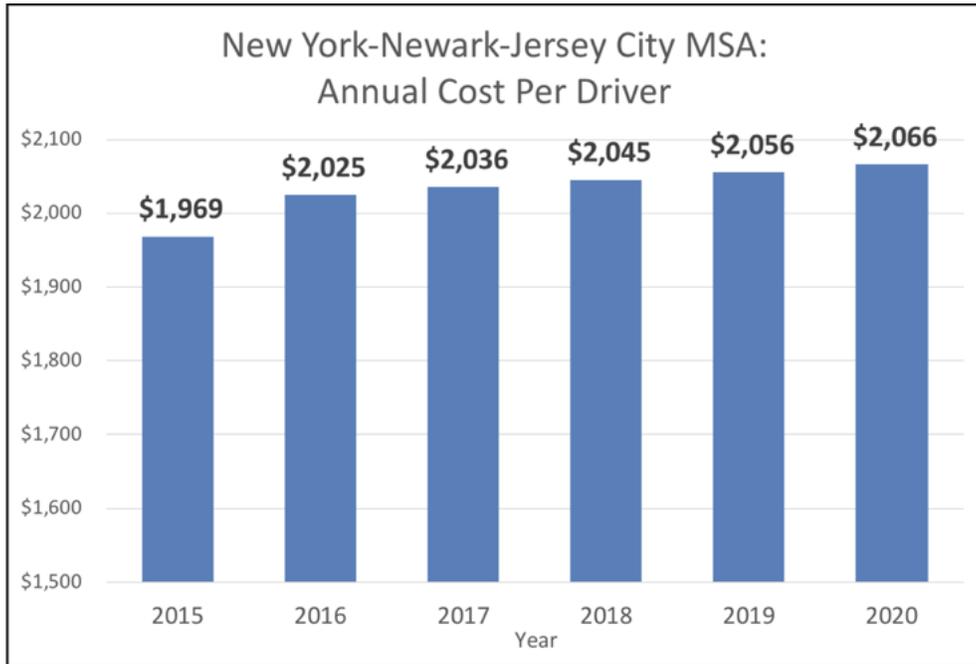
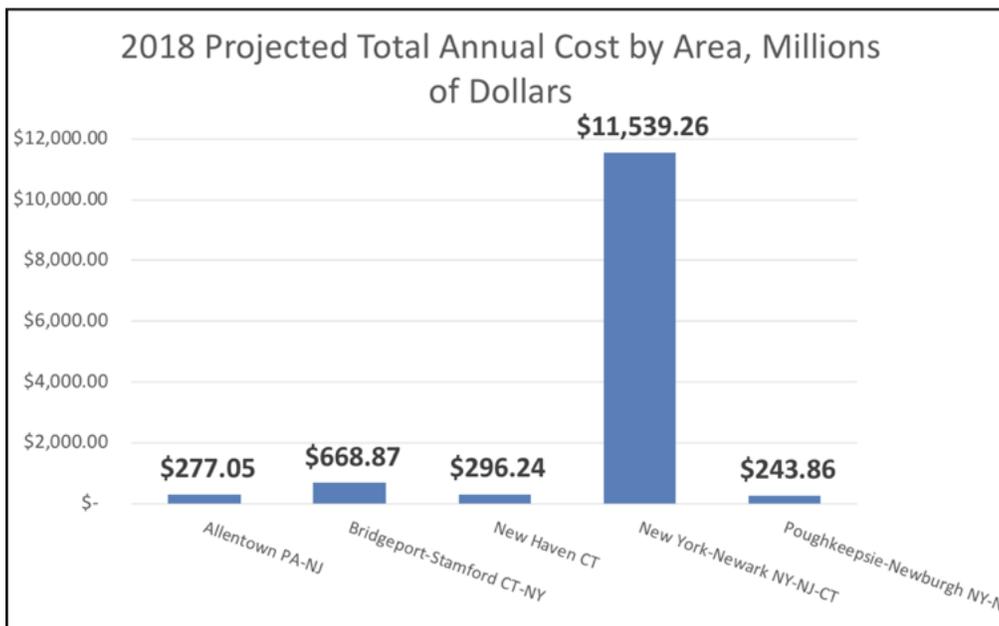


Figure 3



Discussion

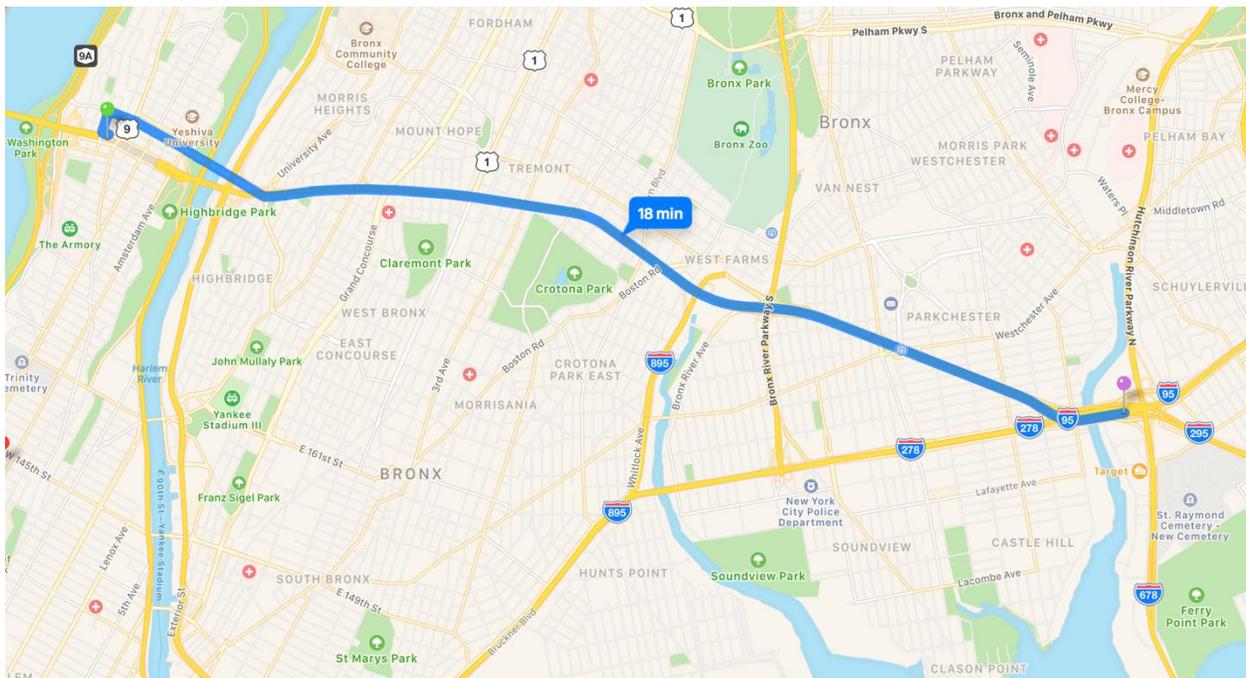
Both the literature and the research detailed the constantly increasing economic costs from the failing infrastructure that plagues the New York-Newark CSA. When costs begin to total into the billions, it becomes evident how severe the issues really are. These issues, which range from pot holes, crumbling bridges and leaking tunnels to the lack of roadway capacity, are nothing new to the region. As New Yorkers, we have long understood that 20 minutes in travel time really means 25, and that a 45 minute drive will probably take you an hour. There is a tipping point, which, ironically, we are approaching quite quickly, where we can no longer dismiss these delays as an acceptable part of everyday life. Furthermore, these congestion issues seem to increase exponentially over time. This will only make matters worse as the population concentrated in the Northeast continues to grow larger. The roads, highways, bridges and tunnels of the Northeast were once an engineering marvel deeply envied by other regions of the United States; now, they are its greatest limiting factor.

In 2016, the New York-Newark-Jersey City NY-NJ-CT Metropolitan Statistical Area accounted for 2.13% of annual US Real GDP. This ranked the MSA as the largest metropolitan contributor to annual GDP than any other region in the United States. Furthermore, the tristate region of New York, New Jersey and Connecticut accounted for 3.01% of Real GDP in 2016. This makes the region one of the most important economic hubs in the United States, yet its productivity is hindered by such poor infrastructure. INRIX's Global Traffic Scorecard estimates the total economic loss to businesses and people in New York City is \$33.7B for 2017. This is a sizable, 2% chunk of the region's annual GDP, and it far surpasses the economic losses in other US cities. For reference, Los Angeles's cost is \$19.2B in 2017, followed by San Francisco's cost of \$10.6B (Cookson, 2018). Some of these costs are related to spillover effects that run

throughout the region. New York City is at the center of the Northeast Corridor which runs from Boston to Washington D.C., through New York City, Philadelphia, and Baltimore. Its unique location makes it a major bottleneck for economic activity along the eastern seaboard. Trains, cars and freight trucks routinely face delays along the corridor which magnifies economic costs.

Idling gas away in traffic is far from the major cost due to failing infrastructure. It is the many small costs, that we all share the burden of, which add up throughout the year. Mailing a package becomes more expensive because UPS's fuel expenses increase with traffic. Fruits and vegetables are more expensive in the grocery store because distributors must cover the losses of product which rots before making it to the store. These price increases divert important money away from where they can be utilized more efficiently. Why should consumers effectively subsidize a UPS truck idling in traffic when that money could be used to increase roadway spending and possibly alleviate the problem in the first place? Of course, it is nearly impossible

Figure 4



I-95 from I-278 to the George Washington Bridge, running through the Bronx. 18 minutes represents a travel speed of ~17-18MPH

Source: Apple Maps, April 2018

to draw a direct comparison between the economic costs and the real costs to repair these structures. For example, the I-95W corridor from I-278 to the George Washington Bridge, detailed in Figure 4 on the previous page, is ranked the worst corridor for traffic in New York with a peak average speed of 10.8 MPH during the evening commute (Cookson, 2018).

Expanding capacity along this stretch of road will not directly lead UPS to recognize its fuel expense has decreased. Expanding capacity would instead alleviate pressure on a major bottle neck in the region. I-95 carries an immense amount of traffic that effects the entire Northeast Corridor so any improvement in congestion would create positive spillover effect for the macroeconomy.

The infrastructure within New York City is some of the oldest and most archaic in the nation, and the effects of Superstorm Sandy in October 2012 brought many of these issues to light. Salt water breached tunnels and power stations, corroding them from the inside out and further accelerating their deterioration. One of the most affected structures were the Hudson River tunnels that carry train traffic under the Hudson River and into New York Penn Station. Theses tunnels date back the 1910s and today carry ~450 trains per day as part of the Northeast Corridor train service operated by Amtrak and NJ Transit. The Hudson Tunnel Project is one of two key parts of the much large Gateway Program currently proposed to expand and modernize the corridor. Phase 1 of the program, which builds two new tunnels, rehabilitates the existing tunnels and replaces the obsolete Portal Bridge over the Hackensack River comes with a price tag of \$14.2B. While sizeable, that price tag is significantly less than the \$33.7B economic loss to New York City each year; and given the number of people who travel these tracks each day, the project would greatly increase economic productivity in the region.

There is a reality check one must have to learn that road surface quality in the United States has actually improved 17% since 2011, though still being in overall poor quality, because the little available funding has been directed solely at maintaining the current roadways. These roads, however, should not have fallen out of maintenance in the first place. As a first world country, receiving a D rating in road quality from the American Society of Civil Engineers is shameful. Yet these are the results of continuous, year over year, under funding of our most valuable public asset. A further implication of these compounded effects is that now, with transportation funding focused exclusively on maintenance, there is even less funding to research and develop capacity-expanding projects.

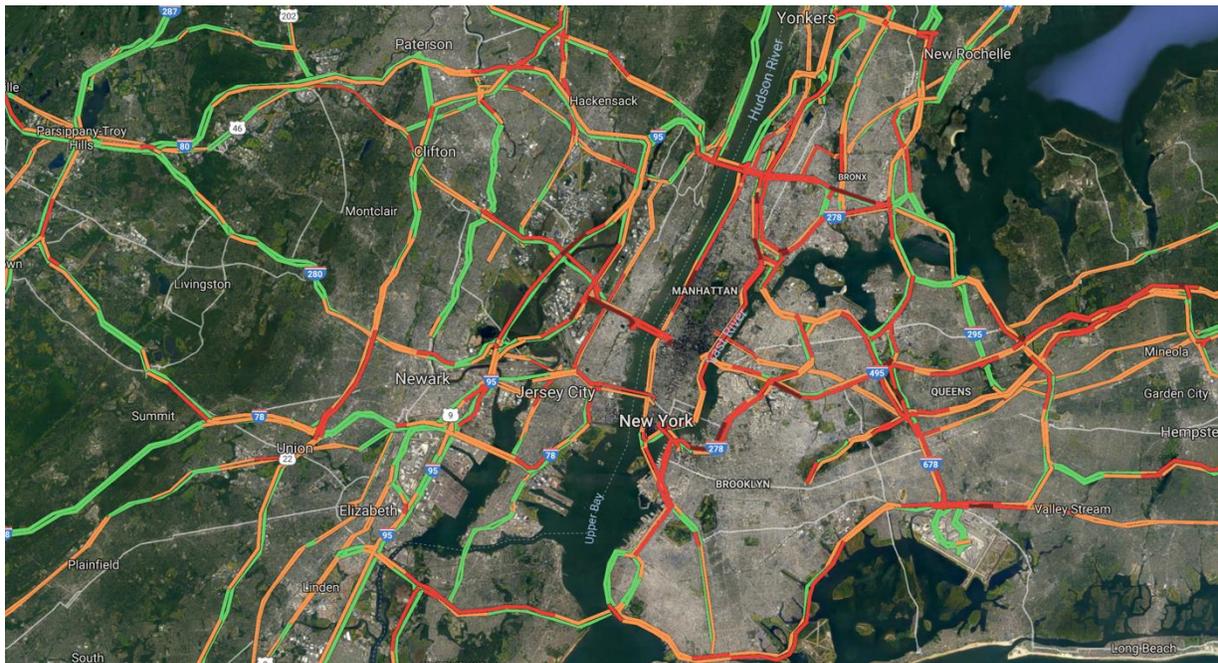
To successfully alleviate the economic problems of our failing infrastructure, the programs must be thorough and comprehensive. This starts with raising and indexing the federal gas tax the keep rate with inflation. The federal gas tax was last raised in 1993 and remains at 18.4 cents per gallon on gasoline and 24.4 cents per gallon on diesel. The lack of a provision where the tax tracks with inflation is one of the key reasons the Federal Highway Trust Fund is nearly insolvent. Though people are resistant at the thought of new higher taxes, raising the federal gas tax would be simply to align the tax to its current economic value. Under these presumptions, the federal gas tax should be raised to 31 cents per gallon on gasoline and 41 cents per gallon on diesel. These new values would account for the 72.7% cumulative inflation from 1993. Furthermore, a provision must be added to automatically adjust the federal gas tax rate to keep track with inflation in the future. This provision would prevent the tax from failing to fund the Federal Highway Trust Fund in the future.

After properly funding the Federal Highway Trust Fund, the desperately needed resources to repair and rebuild the United States' infrastructure would be available. This is where

our past infrastructure success becomes deeply valuable knowledge. When President Eisenhower signed the original Federal-Aid Highway Act, act clearly defined the process for states to apply and receive funding for their programs. States would develop and design roadways to federal standards and then apply to the program for 95% funding to cover the construction of the roads. States would pay the remaining 5% and maintain the roads. I suggest following a similar program for new roadway development. States and regional areas are more able to understand the infrastructure problems they face than the federal government. However, there is benefit to have the federal government operating as an overarching governing body because these roadways ultimately form a system beyond a state's boundaries.

Specifically, in the New York Metropolitan Area, a tristate organization between New York, New Jersey and Connecticut should be commissioned to analyze traffic bottlenecks in and around the city center of Manhattan. Traffic moves throughout a region with a flow, much like

Figure 5: Friday, 6 P.M. Expected Regional Traffic



Map showing expected traffic bottlenecks throughout the New York Metropolitan during Friday rushhour at 6 P.M.

Source: Google Maps, May 2018

water in a river system. Our current roadway system has numerous bottlenecks throughout its system where traffic must slow as the section of roadway reaches its maximum capacity. These bottlenecks can be analyzed to see which cause the largest delays throughout the region. Then, by alleviating these major bottlenecks and adding roadway capacity through these restricted corridors, new bottlenecks will appear as the traffic finds new restricting areas. This process, albeit lengthy, would successfully provide the necessary roadway capacity for the New York Metropolitan area. With freight and personal travel expecting major growth this capacity will be required to maintain even current levels of productivity. If done right, with a comprehensive approach, roadway capacity could be expanded and actually improve the productivity and quality of life in the region. Most importantly, we should seek to reduce and mitigate the current economic loss to the region from our current infrastructure problems. As previously mentioned, these problems will not correct themselves, and our roads, bridges, highways, and tunnels are seriously decrepit. This kind of approach could seriously bring about the necessary improvements to the region.

Conclusion

The roads, bridges, highways, and tunnels which connect us once provided significant growth for the economy of the United States. When signed, the Federal-Aid Highway Act of 1956 was hailed as a marvel and the roadways which its funding provided were truly state of the art and something the United States was deeply proud of. Woefully, the lack of public investment, and focus on maintaining our infrastructure over the past 30 years has left this system in appalling conditions. The minimal expansion, and lacking maintenance compounded with ever more traffic demands means the system is in dire need of some American, super-sized attention.

In the New York Metropolitan Area, the problems are some of the worst in the country. The area is home to numerous structurally deficient structures, and damage from Superstorm Sandy only shortened the available time to replace these structures. Drivers in the New York-Newark-Jersey City Metropolitan Statistical Area will face a projected \$2,045 cost per driver in 2018 due to the economic losses from failing infrastructure. These costs, rather obviously, are projected to continue to grow in the near future should problems not be addressed. The problems, however, run deep. They can no longer be remedied with band-aid fixes and road surface repairs. Rather, repairing and improving our infrastructure will require a widespread plan with efforts between cities, counties, states and the federal government working together to ease the problems. Investments will need to be large and extensive, with expanded roadway capacity, new bridges and tunnels, and coordinated effort to reduce bottlenecks.

At this point, the infrastructure issues at hand are undoubtedly slowing our economy and costing drivers a hefty sum. A lack of action will only continue to decrease our productivity and growth. Increasing structural failing, coupled with increasing travel time has already resulted in lower levels of growth in the New York Metropolitan Area. Continuing down this path of little public investment could jeopardize even current levels of productivity as the region gridlocks itself. Fortunately, public investment has one of the highest economic multipliers for dollars spent; mainly because anyway can benefit from better infrastructure. That means that increasing our public investment would have a near immediate return on investment by increasing the region's productivity and economic growth. Drivers would benefit from decreased travel time and free up income currently spent on car repairs and wasted gas. Businesses would be able to focus reinvestment in their respective, specialized markets while seeing increased worker productivity and decreased overhead costs from shipping and material sourcing.

The region ultimately faces an important decision; the infrastructure issues are present and known. Therefore, local, state and federal government can bite the bullet and fund projects which everyone will benefit from, or let its once golden, economic hub of innovation succumb to the realities of limited public investment. By first raising the federal gas tax and then replenishing the Federal Highway Trust Fund states would be able to request the necessary funding for their projects. Then, in the New York Metropolitan Area a tristate commission would be able to alleviate bottlenecks throughout the system to increase roadway capacity. This comprehensive approach will ultimately restore the region's prowess as a major contributor to U.S. Gross Domestic Product and allow strong economic growth well into the 21st century.

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