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Claremont McKenna College

How American Transit Agencies Determine Fare Policy:

It All Comes Down to Politics

submitted to
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by
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for
Senior Thesis in Government
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ABSTRACT

This paper will provide readers with an understanding of the variables that US transit agencies grapple with when developing fare policy, with a particular focus on the political process. The framework chapter will examine the objectives of public transportation and how agencies face difficulties in achieving these objectives. While this paper will focus on American transportation policy, the framework will draw from the experiences of cities across the world. Three case study chapters will then each discuss an American city or region's approach to fare policy, and how variables have either complicated or enhanced agencies' ability to develop effective fare systems. Lastly, a discussion chapter will bring together the findings from each case study through targeted comparisons. This paper will illustrate how, while public transit in the United States aims to facilitate efficient and equitable societies through fare policy, the politicization of transportation reduces the ability of transit providers to optimally do so. Direct voter control over transportation funding and a decentralized yet consensus-driven governance structure can counter the adverse effects of the political process on US public transit.

INTRODUCTION

“Politics is Failing Mass Transit.” This headline from Democracy Journal (Anbinder 2018) does not criticize US transit’s reliance on political support to achieve acceptable fare policy, but rather that the current disconnect between politicians and the performance of public transit is untenable. In other words, does our current system of politics allow for a translation of popular discontent into politically responsive transportation? Transit ridership nationwide is declining, plummeting in 2017 to 2006 levels, indicating a seemingly impartial electorate. But at least some of this decline is due to a decrease in transit service overall: the New York Metropolitan Transportation Authority slashed its bus service by 1.3 million hours from 2008 to 2016. Indeed, the article from Democracy Journal suggests that “the number of politicians who believe the quality of the transit their constituents use will affect their chance of re-election seems to dwindle by the year” (Anbinder 2018). I believe, and this paper will explain, that the reason for this disconnect is that the current governance structure of major US transit agencies does not allow for the voice of the people to be directly represented in transportation policy. Most agencies are governed by a board that is not directly elected, whose members are appointed by a plethora of elected officials spread over a large geographic area. Holding these board members accountable would require an electoral strategy that would completely shift the political climate of a region. This is unrealistic.

This paper has two main goals. First is to illustrate the intricacies of fare policy, more specifically focusing on how transit providers must grapple with issues such as efficiency, equity and covering operational costs. In doing so, I will also list fare tools that agencies frequently use to tailor their fare policy to their own particular circumstances. Second is to use case studies of

three major US metro areas to illustrate how differing political climates in each region have led to drastically different fare policies; this will emphasize the crucial role that politics plays in US transit policy, and how regions that have depoliticized and decentralized their transit governance benefit from more directly responsive fare and service.

CHAPTER 1: FRAMEWORK

Transit operators exist to facilitate efficiency and foster equity, but often must balance these values against one another as well as other factors such as political feasibility and cost. This chapter will lay out the competing values and considerations that transit agencies must weigh when designing fare policies. It will begin with sections exploring the positive efficiency and equity effects of transit; the elimination of negative externalities from automobiles in particular is a significant positive aspect of public transportation. Next will be a section on other variables, such as cost and political feasibility, which tend to constrain the set of practicable options. The chapter will then discuss the different types of fare policy that agencies have implemented, and how each policy represents an acceptance of the tradeoffs inherent to the operation of public transportation.

Efficiency

One of the primary reasons for the existence of public transit is the facilitation of efficient economies. For the purposes of this paper, I will define economic efficiency as the allocation of resources in a way such that unnecessary economic costs are avoided. This might take the form of a transit investment leading to the removal of non optimal processes such as car travel that are slower and more congesting. A 2013 study of housing prices during and after the 2008 recession found that regions with heavy transit usage were less vulnerable to drops in residential sales than non-transit regions by 41.6%, indicating that areas served by transit are more resilient and maintain their value more easily (Center for Neighborhood Technology 2013). While productive companies clustered together are crucial to the economic vitality of a region, they would not be

particularly effective without access to a large and geographically dispersed talent pool. If every one of those employees chose to drive to work instead of take public transit, roads would be unacceptably congested and workers would spend time in vehicles that they could have spent at work. Indeed, while US rail transit required approximately \$12.5 billion in subsidies as of 2004, rail service is also estimated to have saved \$19.4 billion in congestion cost savings, \$22.6 billion in consumer cost savings, and \$12 billion in saved parking costs (Litman 2004). While the costs of public transportation have likely increased since 2004 due to the proliferation of new systems and growing cities, savings have increased as well.

In terms of environmental costs, public transit is a far less damaging method of transportation. According to a *PLOS Medicine* study, air pollution is linked to over 30,000 premature deaths in the United States, and is responsible for lowering national life expectancy by an average of 0.14 years (Bennet et al. 2019). The US transportation sector is responsible for 28% of the nation's total greenhouse gas emissions; the largest sector contributing to GHG totals (US Environmental Protection Agency 2018). As the majority of the transportation sector's emissions comes from automobiles, the elimination of car trips via public transit is a crucial step towards reducing US emissions and eliminating negative externalities associated with car use. Even a bus with as few as seven passengers is already more fuel efficient than a single occupancy vehicle, and it is estimated that US public transportation reduces carbon emissions by 37 million tonnes annually (Delaware Division of Waste and Hazardous Substances 2019).

In addition to environmental benefits, public transportation is physically significantly safer than automobile travel (Sierra Club 2017). Accidents and fatalities incurred by car travel are costly affairs that negatively impact other automobile trips and place financial strain on

hospitals and local governments. Data from the National Highway Traffic Safety and Federal Transit Administrations show that metro areas with 40 or more per capita transit trips annually have half the traffic fatality rates of areas where transit use is significantly less (*Safety+Health Magazine* 2018) This reduction in fatality rates has positive implications for the economic efficiency of a region: Rail service alone is estimated to provide \$5.6 billion in cost savings relating to a decrease in traffic incidents (Litman 2004). Therefore, a reduction in accidents and transportation-related deaths represents a specific kind of efficiency that is promoted by public transit.

Equity

The provision of accessible public transportation via responsive fare policy enhances equity by democratizing the right to movement; a privilege too often reserved for those who own an automobile. Limiting freedom of movement to just car owners excludes children, the elderly, and those with mental or physical conditions who cannot operate a vehicle themselves, effectively creating an inferior class of immobile citizens. The existence of public transportation allows those excluded groups the ability to move freely, giving them the same opportunities afforded to car owners. Researchers often define fare equity according to three criteria: 1) *benefits received*, which expects riders to pay a fare proportional to the level of service they receive; 2) *ability to pay*, where fares are to be charged according to riders' wealth; and 3) *cost*, in which the fare is expected to reflect the cost of providing a certain level of service (Brown 2018). These can be used to evaluate how various transit fare policies perform in providing equitable service. *Cost* will be discussed in the next section. It does not take much examination

of these criteria to notice that they can never all be satisfied at once by any system: how can a customer both pay a fare proportional to the level of service they receive and be charged a different price based on their socioeconomic status? Therefore, transit providers constantly struggle to balance these three in a way that achieves the most optimal compromise between the fiscal health of the operator and the number of people it can serve.

Unfortunately for transit operators, the provision of equitable services often clashes with economic efficiency, forcing agencies to choose between these competing variables. While it is equitable to provide transportation to as many people as physically possible, not all of those people will utilize transit services in a way that promotes economic efficiency. In an attempt to reach these riders, transit agencies might—knowingly or not—sacrifice efficiency by dedicating resources to a low-ridership high-cost route. These resources could alternatively be committed to high-ridership routes that serve an urban core. While electing not to serve rural and exurban regions might go against principles of equity as discussed in the previous paragraph, it would also allow transit providers to optimize economic efficiency by funding high-density corridors that promote economic vibrancy in urban and suburban communities. It is not enough to suggest that equity is limited to affordability: the environmental and safety considerations discussed in the efficiency section are even more pressing when viewed from a socioeconomic standpoint. For example, a 2018 EPA study found that minority and low-income communities are disproportionately harmed by air pollution relative to the rest of the US population, with African Americans being hit especially hard (Green 2018). As public transportation can substantially reduce air pollution as described earlier, its availability to these vulnerable communities is especially relevant. Therefore, a discussion of transit fare equity must naturally include

considerations of environmental and safety efficiency in addition to affordability. Indeed, a member of a disadvantaged community unable to consistently afford a subway trip harms not just their economic mobility, but also their health and safety.

Other Considerations

Agencies must ensure that their revenue is sufficient to cover their material costs, and strive to prevent revenue shortfalls from reducing service or raising fare prices. A transit agency giving away free rides would likely collapse quickly without heavy subsidization, and therefore would fail its mission of enhancing efficiency and promoting the various forms of equity discussed above. Agencies can use fare policy to meet cost obligations, but can risk overburdening and discouraging riders from utilizing transit if their fares are too high or too complex. Riders that would be disproportionately affected by high prices and unintuitive pricing are precisely those that transit agencies wish to serve to fulfill equity obligations. Similarly, passing too many costs to riders, and subsequently losing them to competitors such as automobiles, would dull the effectiveness of public transportation as a facilitator of economic efficiency. Therefore while cost is a crucial variable, its impact is closely intertwined with other considerations such as equity and economic efficiency.

Achieving political support is essential for a transportation provider because a lack of such support can undermine fare policies that might otherwise be ideal from an efficiency and equity standpoint. Free transit service has the potential to promote mobility for the most disadvantaged communities and can revitalize downtown retail corridors, but has historically been opposed by more affluent suburban communities and risk-averse local governments. As the

vast majority of US transit providers rely on government subsidies and tax revenue to operate, a lack of public and/or political support is fatal to continued operation. Therefore, political support for US transit agencies is especially linked to fiscal costs of providing service. Strikes coordinated by transit labor unions represent a variation of the impact that political and social pressures play. Especially in more socially liberal regions, transit agencies are hard-pressed to refuse perpetual union demands for salary increases; these increases often lead directly to service cuts, fare increases, or other adverse effects that have negative efficiency and equity implications.

The existence of entrenched stakeholders makes it more challenging for ambitious transit operators to provide regional integration of services. This translates to the unfortunate reality that older regions of the US with a more storied transit heritage are often ones that also lack a comprehensive vision for regional transportation. As will be discussed in later chapters, Washington DC's transit provider WMATA has struggled to hold together a patchwork coalition of regional partners that use its SmarTrip fare card. DC in particular must coordinate with two states—Maryland and Virginia—and dozens of existing local county operators. In addition, these older transportation providers must contend with aging infrastructure and technology, making integration even more complex. In contrast, a region like the Puget Sound in Washington State does not have to coordinate across state lines and has a more limited transportation history. Thus, when county governments came together to form a regional transportation provider for the multi-county Puget Sound region, it was far easier for them to do so. The resulting provider, Sound Transit, was also able to take advantage of newer fare technology to create a fare system compatible with all regional transit agencies. The remaining sections of this chapter will discuss

different fare policy options available to transit operators, and how these options interact with the variables described thus far.

Flat Fares

The most substantial consumer-facing fare choice that a transit operator must make is whether to implement a flat or variable system. Flat fare systems, such as the New York City subway, charge a single set fee that does not vary based on distance traveled. The natural result of this arrangement is that short trips are significantly more expensive, as customers traveling short distances are paying an identical fare to those who might commute from the outskirts of a city. This fare structure might be more inclusive in situations where a dense, high-income core is surrounded by less affluent communities radiating from the center towards the outskirts.

However while a flat fare might be more “fair,” it is not necessarily more equitable. It is difficult to fully assess the equity implications of a flat fare without understanding the geography of a served region. If, like New York City, a flat fare system is used to transport low-income riders further for the same price as wealthier ones, the New York subway would satisfy only one of the three criteria discussed in earlier sections: *ability to pay*. This structure fails to satisfy the *benefits received* criterion, in which costs to the consumer should vary based on distance, and also does not satisfy *cost*, where the fare should vary to reflect how much it costs to provide a certain level of service. Nevertheless, the *ability to pay* criterion is likely what would be considered most important by those seeking to alleviate the burden of the urban poor. In the case of London, however, one can see via figure 1 below how the wealthy “core” City of London—indicated with a black square on the map—is directly bordered by lower-income communities to

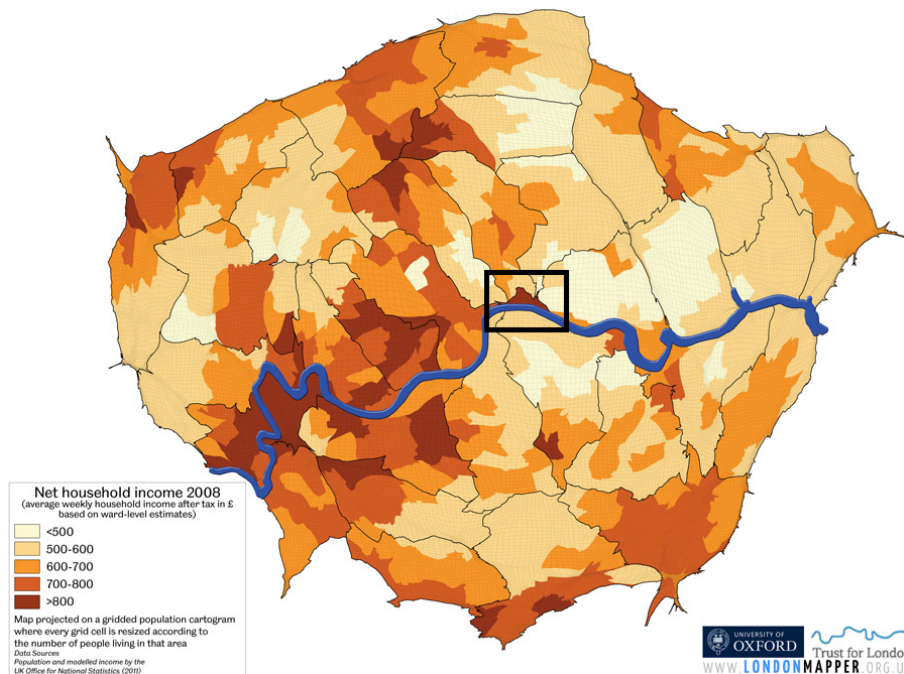


Fig. 1. London household income map. From London Mapper. <http://london.worldmapper.org/analysis/inequality-in-london/>

its immediate east and south.

In this example, a flat fare would be both inequitable and unfair; low-income commuters would be charged just as much to travel the short distance west or north into City of London as a wealthy commuter from the eastern outskirts of the city.

This arrangement would not satisfy *benefits received*, *cost*, or *ability to pay*. In addition to equity implications, many agencies might also see flat fares as more efficient to collect and less of a barrier to entry for consumers such as tourists who are less familiar with the system. Indeed, a single price to travel across the entire system is significantly easier to understand than a distance-based or zone-based system in which each fare is calculated after completion. A 2009 study of London's choice to transition its bus system from distance-based to flat fares found that this change resulted in a 4% ridership increase purely because the fare was "easier to understand" (Booz&Co 2011). Flat fares are also less technologically taxing to collect, as they only require a single payment at the beginning of a trip. A differentiated fare, whether it is distance-based or zone-based, requires payment calculation at completion of a trip. Therefore, fare gates are required for entry and exit at every station in order to accurately record the entrance and exit of

each passenger. New York City might find the prospect of retrofitting its 400+ subway stations with expensive and advanced fare gates too bitter to stomach.

Variable Fares

Distance-based and Zone-based Fares

Depending on a city's layout, a variable fare often better satisfies the remaining two criteria of equity; *cost* and *benefits received*. While it might be tempting to view differentiated pricing schemes as more "advanced," many transit operators in the United States moved *away* from them in favor of flat fares. Distance-based and zone-based fares were "superseded" by flat fares while trip lengths simultaneously increased due to the suburbanization of the US in the 1960s and 1970s (Yook and Heaslip 2015). Because of this, transit systems found themselves facing higher operating costs with lower ticket revenues (Cervero 1980, 1). As operators of these systems face ever-increasing deficits while passengers continue to travel more during peak hours and over longer distances, differentiated fare offerings are an option that many systems are now actively considering. Transit costs are "markedly higher" during hours of peak load and for longer trips; peak periods require additional capacity in the form of added employees and transit vehicles while longer trips require employee hours to be extended (Cervero 1980, 2). Returning to the three criteria of transit fare equity, the inclusion of a variable fare that takes into account busiest operating hours and distance would help satisfy *cost*; the fare would better reflect the cost of providing service. A differentiated system better satisfies the *benefits received* criterion, as customers would pay less to travel a shorter distance and less to travel during off-peak hours. However, the *ability to pay* requirement is more challenging to address. As mentioned earlier,

knowledge of a city’s particular income distribution and geography is the only way to determine if a variable fare would satisfy this criterion. In the case of the London map discussed earlier, a distance-based or zone-based fare would charge wealthier commuters from the far west more than lower-income residents directly east and south to commute to the City of London.

While both distance-based and zone-based fares differentiate between “short” and “long” trips, the mechanisms by which prices are calculated vary, and have interesting equity implications. Distance-based systems—as seen in Washington D.C.—calculate the physical distance traveled between start and endpoint. In the United States the share of transit systems using distance-based fares fell from 30% in 1994 to 23% in 2015 (Brown 2018, 766). A distance-based fare is complex to calculate, which is why some transit agencies have chosen to adopt a hybrid fare that incorporates elements from both flat and distance-based models. Zone-based

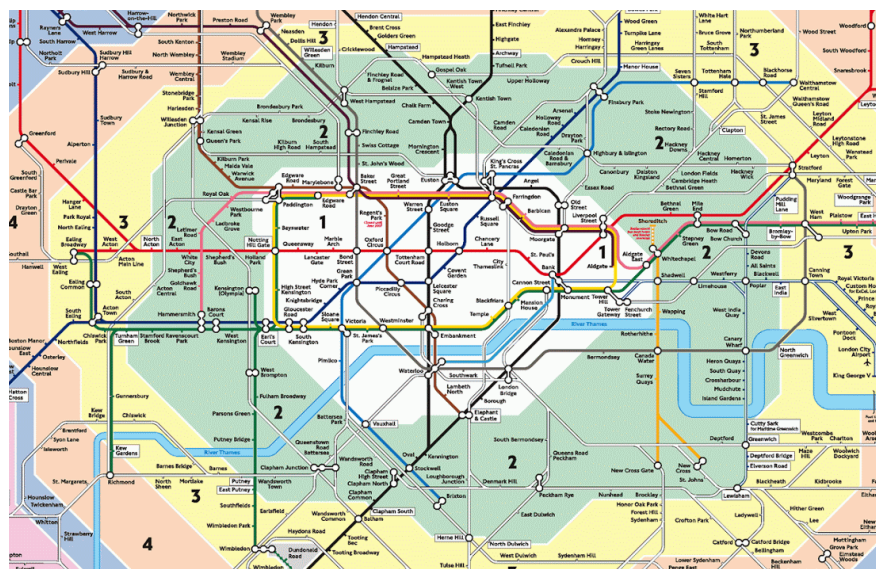


Fig. 2. London Tube map with fare zones. From Project Mapping. <http://www.projectmapping.co.uk/Reviews/londontubeandrai.html>

fares charge different prices depending on which fare zones a customer passes through to reach a destination. Crucially and in contrast to distance-based fares, these zones radiate out from a “core,” as seen in

this map of London’s transit system (figure 2). This creates several contrasts with distance fares, one of which being that a short trip could still be expensive if it happened to cross between

zones. In addition, zone-based systems are only logical if they are implemented in regions that center around a single—often urban—core. Therefore, cities that are spread out or do not possess a traditional central business district are not good fits for a zone-based fare. Cities like London have determined that zone-based fares, despite potentially leading to inequitable outcomes like charging disproportionate fees to travel short distances at the fringes of the city, are less complex to implement and are a potentially more equitable alternative to flat fares.

Time of Day Pricing

Time of day pricing is another form of variable pricing that has the potential to optimize the efficient allocation of resources. This can take several forms such as an additional charge for travel during designated rush hours, fare discounts during off-peak hours, and multi-ride passes limited to off-peak hours. The fare differential, or the difference between peak and off-peak hours, can range from \$0.05 to over \$1 (Cervero 1985, 23). It is no surprise then that time of day pricing has been adopted in part to address the US transit industry's deteriorating finances. Commuters who utilize transit services during peak hours tend to be higher-income professionals beholden to a fixed work schedule and therefore less "sensitive" to higher fares than other riders (Cervero 1985, 21). According to a 2004 study sponsored by the Federal Transit Administration, "off-peak transit ridership exhibits roughly twice the sensitivity to fare changes of peak period ridership" (McCollom 2004, 12-6). More price sensitive riders who are able to travel off-peak can do so using the lower off-peak fares. However, it would be a mistake to equate the insensitivity to price among peak riders as an ability to tolerate infinite fare increases. Many peak riders make "non-discretionary" trips for work or school, and are forced to accept fare increases with little to no change to their behavior (McCollom 2004, 12-15). Nevertheless, time of day

pricing is an opportunity for transit operators to recoup costs: a phone survey of major US operators found that 11 of the 31 systems surveyed implemented time of day pricing to increase farebox returns, with other answers including to “help the disadvantaged” and “strengthen downtown areas” (Cervero 1985, 24). Despite these aspirations, it is unclear if implementation of time of day pricing has significantly impacted ridership patterns or the fiscal soundness of transit agencies. All transit networks receiving federal funding are already required to offer half fare discounts to senior riders during off-peak hours, meaning that this demographic already tends to travel off-peak (McCollom 2004, 12-7). While surcharge programs, in which fares are made more expensive during peak hours, have been shown to increase farebox recovery rates by 5 to 10%, off-peak discount systems have seen farebox recovery rates plummet over 10% in the year after implementation (Cervero 1985, 28). However, cities like Columbus, Ohio have seen positive impacts on downtown retail after using off-peak discounts to incentivize riders to shift their usage from peak hours; the city saw a one-third daily ridership increase during the first month after a \$0.25 off-peak discount, with sales tax revenues increasing by 14% during the same time period (Cervero 1985, 28). It is therefore not a simple decision to implement time of day pricing, as transit operators must balance fiscal considerations with potentially advantageous efficiency and equity implications.

Tiered Pricing

Variable pricing that differentiates between different “tiers” of services like heavy rail versus bus is another option for operators that can impact the accessibility of different transit mediums and have implications for fiscal stability. For example, Washington DC’s Metro agency charges a flat \$2 fare for all local bus service, \$4.25 for express bus service, and a distance-based

variable fare for subway service that varies between \$2.25 and \$10 (Washington Metropolitan Area Transit Authority 2017). As a result, there is the likelihood that certain services are utilized more heavily by lower-income riders; in this case, Washington DC's bus ridership is likely to be comprised of low-income riders, while Metrorail serves DC's suburbs and its more affluent residents. Because of this, it is important for agencies to carefully consider their pricing across multiple mediums. In contrast, New York City has a unified fare system in which an identical static fare of \$2.75 is paid for both bus and subway trips, with an additional surcharge of \$4 for express bus service ("Everything You Need to Know about Transit Fares and Tolls in New York" n.d.). This system faces equity implications inherent in a flat fare system, but does not force low-income riders onto bus service to the degree that cities with tiered pricing do. Therefore the relationship of fares between different levels of service is yet another variable that transit operators grapple with.

Regional Fare Integration

The creation of a unified fare system for multiple transit systems leads to increases in ridership, reduced fares for customers traveling through multiple transit regions, and improvements in the efficiency of system administration by eliminating redundancies and sharing costs. In regions with multiple non-integrated transit systems, the fragmented nature of fare policy often forces customers to pay multiple fares to multiple agencies; this often makes a multi-region trip significantly cheaper with an automobile instead of public transit (Wiginton 2017). The subsequent proliferation of car travel leads to chronic traffic congestion and undesirable environmental and health outcomes as discussed earlier in this chapter. Metrolinx, a

state-owned corporation responsible for transportation in the Canadian province of Ontario, found in a fare concept study that implementing a unified fare system for the Greater Toronto area would lead to a 16-20% increase in ridership and a reduction in automobile emissions of 2-4 million metric tons (Steer Davies Gleave 2016, 12,19). In addition to these tangible benefits is the concept of complexity in fare policy. If a consumer is overwhelmed or confused by the need to jump through several hoops just to reach a destination easily available by car, the likelihood they will select public transit is low. Therefore, fare integration removes that barrier to entry and makes public transportation a more capable competitor to the use of private automobiles.

The benefits of fare integration are counterbalanced by fiscal and administrative hurdles. Many transit operators have found that fare integration, while leading to increased ridership and happier customers, has led to downturns in revenue. In the aforementioned Metrolinx study, the Canadian regional authority found that “it is not possible to achieve both ridership and revenue growth simultaneously in the short term,” and projected a 7.6% to 16.5% decline in revenue after accounting for new ridership (Steer Davies Gleave 2016, 18-19). Some operators might also find the up-front cost of integration with other systems to be unpalatable. New Jersey Transit in 2005 explored fare integration on one of its light rail corridors with the Port Authority Transit Corporation’s “Speedline” heavy rail system. The cost for designing, implementing, and operating an integrated system on this one line was expected to cost \$960,000, and NJ Transit was forced due to financial constraints to abandon the pilot project (Joslin 2010, 3-27). In addition, authorities must decide how to allocate revenue gained through a unified fare system to various system partners. One way to do this is distribution based on cost; revenue would be allocated to each agency based on how much it costs to provide service. While this might seem

most logical, this has the unintended consequence of reducing incentive for operators to decrease operating costs (Barr 1996, 45). Another potential strategy, ridership, revolves around allocating revenue based on total ridership of the agencies. However, this has negative implications when considering a situation where an agency with low ridership receives less revenue per trip despite perhaps shouldering higher costs for their portion of the trip. Even after partner agencies have settled on a revenue allocation strategy, it is often necessary for a “dominant transit provider” to control the process of fare integration by securing funding for implementation and taking responsibility for marketing and branding (Barr 1996, 45).

The city of Haifa’s old fare system had “serious implications for transportation equity” due to the need for customers to pay multiple full fares if they transferred between different transit networks (Sharaby and Shiftan 2012, 63). Haifa’s transportation network, based primarily on buses, featured intercity bus terminals from which local urban routes departed. Therefore, a rider from outside of the city would need to take at least two buses operated by multiple operators to reach a destination in the city. The new system, introduced in 2008, featured a unified zone-based fare with the ability to transfer between an unlimited number of lines within a period of one hour. As a result of the reforms, overall ticket sales increased by 7%-8% but revenues fell by approximately 7% as well. While ridership of Haifa’s bus lines decreased by 15% between 2002 and 2005, the introduction of the integrated fare system in 2008 and subsequent increases in ridership and ticket sales indicates a reversal of this downward trend (Sharaby and Shiftan 2012, 66). Not only were more people utilizing transit, but average number of boardings per trip increased from 1.38 pre-integration to 1.52 post, indicating that travelers were taking advantage of the reform to take longer trips using more transit lines (Sharaby and

Shiftan 2012, 67). While the city's transportation network saw decreases in revenue as a result, it has chosen to define lost revenue as a subsidy to help reduce the cognitive and financial burdens on their customers. Therefore, Haifa is an excellent example of a city considering the advantages and drawbacks of regional fare integration and choosing to proceed regardless.

Conclusion

This chapter discussed the purpose of public transportation, the fare tools available to transit operators, and the tradeoffs that they must make that often compromise their ability to deliver on their missions. Transit exists to promote efficiency, and I examined variants of this concept such as the facilitation of efficient regional economies, superior safety record of public transportation, and reduction of negative environmental externalities. As transit in the United States is almost always a government-provided and funded service, equity plays an important role as well in influencing how agencies operate: there is no profit motive. However this paper assumes a definition of fare equity that differs from traditional conceptions of social equity; a definition that factors in considerations of an operator's fiscal health and if changes in fare result in proportional changes to service provided. Indeed the purpose of this chapter was to emphasize that one size does not fit all, and that operators utilize vastly different fare models based on their method of funding, political and social pressures, and existing entrenched stakeholders.

The next three chapters will examine how three different regional American transportation systems have grappled with the mix of fare tools and variables discussed above. Each chapter will begin with a short history of the region and its transportation heritage, and will then link each system with one or more of the tools and variables discussed earlier in this

chapter. The goal of the following chapters is to apply the concepts discussed in the framework to real world scenarios, and subsequently explore how other American regions can learn from these experiences.

CHAPTER 2: NEW YORK METROPOLITAN AREA CASE STUDY

History of New York City's Transportation System

New York City's current subway system is an amalgamation of three separate systems that were forcibly brought under city control and consolidated. The Interborough Rapid Transit Company, the first subway system serving Manhattan, funded its network via a five-cent flat fare. Despite fierce competition from its rival the Brooklyn Rapid Transit Company, both companies were prevented by New York City law from raising fares above five cents, except limited trips to destinations such as Coney Island Terminal (New York State Public Service Commission 1912). While this arrangement proved lucrative during the early heyday of subway operation, the rapid expansion of both the IRT and BRT beyond the island of Manhattan necessitated significant infrastructure investments to bore tunnels into New York's unforgiving bedrock. In addition, the city government had the power to "recapture" lines built by either of the two corporations and run them as though it had built them. The city was also expected to receive a portion of the profits from each company (New York State Public Service Commission 1912). Meanwhile, subway advocate and mayor John F. Hylan was hostile towards both companies, and planned to drive both out of business so they could be replaced by a city-operated system. The combination of an artificially depressed fare and the city's active attempts to undermine their fiscal soundness led both systems into financial ruin. Mayor Hylan's municipally operated Independent Subway System was permitted to begin operation in 1932, and eventually absorbed the two struggling private systems in 1940 to create the unified transit system currently in use (New York State Public Service Commission 1912). This newly merged entity was placed under the jurisdiction of a city-operated New York City Transit Authority.

In 1948 due to post-World War II inflation, the fare was increased for the first time to ten cents; an acknowledgment that cost of operation would need to be reflected to some extent in cost of use (Desta 2015). This prompted a wave of fare increases culminating in a fare of fifty cents in 1975, in which extra charges to travel to further locations like the Rockaway Peninsula in Queens were rolled into a truly flat fare (*The New York Times* 1975). By the time MetroCard, New York's first transit charge card, was introduced in 1993 the fare for unlimited one way system ridership was \$1.25 (Desta 2015). The MetroCard completely redefined how New Yorkers paid for their trips, eliminating the ancient token system that had been in use since the 1950s. The token system itself had been introduced in order to remain flexible for future fare increases, as the system had been forced to retrofit its entire collection of station turnstiles to accept dimes after the 1948 fare increase (Berger 1948). Regardless, the MetroCard facilitated easy fare increases and the ability to transfer between buses and the subway, a development that effectively halved the fare paid by commuters forced to rely on multiple modes of transportation within the system (NYC.gov n.d.).

The ownership structure of the current subway system also plays a significant role in how it is funded and operated. The Long Island Rail Road, a previous private company gone bankrupt by the 1960s, was absorbed by a newly created state-owned Metropolitan Commuter Transportation Authority (MCTA) in 1965 (Robinson 1965). Shortly thereafter in 1967 the New York City Transit Authority along with the Triborough Bridge and Tunnel Authority were merged with the MCTA as well, forming a comprehensive authority with control over tolling and all transit in the metropolitan area (Schanberg 1967). The MCTA was renamed the Metropolitan Transportation Authority (MTA) shortly after. This has had significant positive and negative

consequences for the fiscal health and efficiency of New York's rail system. In terms of funding, the MTA has the ability to utilize a "metropolitan commuter transportation mobility tax" levied via the New York State Department of Taxation and Finance and tolls levied by its Bridges and Tunnels division (Department of Taxation and Finance n.d.): this division in particular contributes billions of dollars in funding for MTA's other transit projects including the New York City subway ("MTA Capital Program 2010-2014" n.d., 91). However, the MTA board's structure grants outsized power to the state Governor and smaller counties that are served by its commuter rail network. Because of this, critics representing the interests of New York City have long complained that they are not granted adequate transparency or control over what they feel is a decidedly local matter. This state government control of a local transportation system naturally leads to situations in which state issues are prioritized over local city needs. After a 1989 state legislature bill allowed state officials to charge fees on bonds issued by authorities like the MTA, New York State has received up to 1% of the MTA's bond issuances in the form of fees (Rosenthal, Fitzsimmons, and LaForgia 2017). This has led critics to refer to the MTA as a "piggy bank" for the state government. The State of New York also diverted \$5 million from MTA revenue to a state-run ski resort, and has been pressured by state officials to sacrifice Bridge and Tunnel toll revenue to reduce tolls; a politically popular move that has further financially crippled the New York subway system (Rosenthal, Fitzsimmons, and LaForgia 2017). Despite the vast majority of MTA ridership stemming from New York City transit, the authority has continually been used as a political tool by state leaders. Therefore while the MTA's regional scope has positive implications for regional fare integration in the New York metropolitan area,

officials in Albany are given outsized influence in a system that they have used to further their own interests.

Flat Fares in the New York Metropolitan Area

The New York subway system's use of flat fares stems from its ability to tap dedicated funding and the city's geographic distribution of wealth. While the subway is by no means on stable financial footing, New York City Transit—and the MTA—are structured in a way that does not require it to recoup its costs through fares as aggressively as other systems. In 2017 the MTA only collected \$6.2 billion in fares of its \$15.3 billion total revenue. The remainder of the funds were provided via dedicated taxes (\$5.3 billion), tolls (\$1.9 billion), state and local subsidies (\$1.2 billion), and advertising / parking charges (\$685 million) (Rivoli 2018). Because of NYCT's status as a subsidiary of the MTA and ability to tap toll and appropriations revenue, it does not face as much pressure to cover its operating costs via fares; it has therefore not been galvanized into adopting any kind of variable pricing such as time of day or distance-based fares. However, this does not mean that the system has completely disregarded cost. Although NYCT is able to lean on the MTA for financial support, the MTA itself is facing increasing deficits. As such, MTA has ordered NYCT to consistently raise fares, most recently to \$2.75 per swipe. In tandem with this, the MTA board has most recently eliminated the traditional bonus for loading money onto a MetroCard, raised weekly pass prices from \$32 to \$33, and monthly passes from \$121 to \$127 (Surico 2019). This governance system has thus had the effect of both disincentivizing fare reform and increasing fare burden on customers through price increases.

New York has also maintained its flat fares in deference to the geographic distribution of income throughout the five boroughs.¹ The city's wealth has historically been concentrated in the central business district of Manhattan, with poorer communities clustered on the outskirts of the

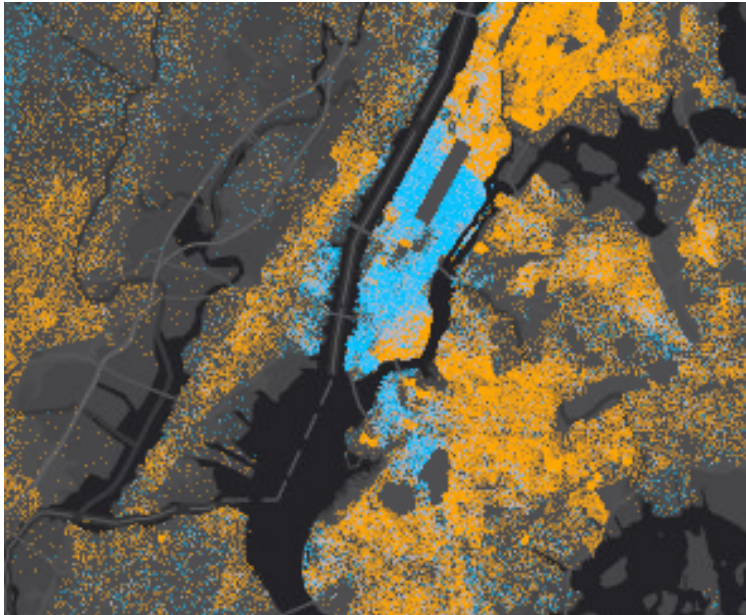


Fig. 3. New York City median household income. From ESRI Wealth Divides. <http://storymaps.esri.com/stories/2016/wealth-divides/index.html>

city. Affluent residents have more recently settled in neighborhoods such as DUMBO and Brooklyn Heights that are directly adjacent to the core of Manhattan.² In this income map of New York City (see figure 3) blue represents households with income greater than \$200,000, while orange represents mean annual income of less than \$25,000. In New

York's particular income variability, a flat fare better matches means with transit prices: wealthy Manhattan commuters subsidize longer trips from more distant communities in the Bronx, Brooklyn, and Queens. Therefore, while a distance-based fare might benefit from a closer relationship between cost to the operator and price paid, in this case it would also serve to place greater burden on the low-income high-distance riders in New York City. Indeed, New York has chosen to prioritize responsiveness to its geography over considerations of financial efficiency.

¹ A borough is a governmental subdivision of New York City.

² Please note that the blue areas west of the island of Manhattan are located in New Jersey, and are not served by New York City Transit.

That the MTA has historically served as a fiscal buffer has provided even less of an incentive for the subway system to adopt more a more responsive pricing model.

The Impact of Tiered Pricing on the Borough of Staten Island

While New York's subway system features a flat fare, the use of tiered pricing on express bus service has implications for those who live in areas with no access to the subway network. In particular, the city borough of Staten Island has long been a car-dependent part of the city, with only ferry and bus transit options linking the borough with Manhattan. While Staten is by no means an impoverished area of the city with a median household income of \$79,000, its transit usage lags significantly behind its neighboring boroughs (US Census Bureau n.d.): 29% of Staten Island commuters use transit (Barone 2015) in comparison to 88% of Manhattan residents (Ramsay 2018). Low transit usage has led to Staten Islanders experiencing some of the longest commutes in the United States, with an average commute of 44.5 minutes and more than one third of Staten Islanders facing an hour or more commute per day due to traffic congestion (US Census Bureau n.d.). A significant reason for this seeming aversion to transit use is the pricing that the MTA has adopted for express bus routes between Staten Island and Manhattan. While a one-way subway and local bus fare is \$2.75, Staten Islanders must pay \$6.75 to commute into the central business district. This \$4 premium per ride is not alleviated by the MTA's existing weekly and monthly passes, which do not include express bus fares: only a dedicated \$62 "express bus plus" pass grants unlimited weekly access, while a standard weekly pass is \$33 ("Everything You Need to Know about Transit Fares and Tolls in New York" n.d.). Therefore, Staten Islanders must pay \$29 more per week than comparable commuters in the other four city boroughs to receive unlimited weekly trips via express bus.

Staten Island pays a disproportionately high environmental price for its residents being priced out of transit. According to the American Lung Association's 2018 "State of the Air" quality report, Staten Island was ranked as having the highest smog level of the five New York City boroughs, despite possessing less than a quarter the population of Manhattan (Griffin 2018). Staten Island suffers from its proximity to factories in the neighboring state of New Jersey, and also from its disproportionately high reliance on car transportation when compared to the other boroughs. As transportation is, according to US EPA statistics, responsible for over 55% of nitrogen oxide emissions in the United States, Staten Island's comparative lack of public transit access harms its population and makes it a less attractive place to live (US Environmental Protection Agency n.d.). The MTA's current pricing model disincentivizes residents from utilizing their only realistic transit option by making express bus service far more expensive than any local subway or bus service in the rest of the city. While the Staten Island Ferry is free and links northern Staten Island with Manhattan, the vast majority of residents are still realistically unable to undertake daily commutes entirely via transit. In this way, tiered pricing has had a significant negative impact on the mobility and environmental health of Staten Islanders.

Political and Social Pressure

Due in part to New York's substantial transit heritage as compared to other more modern municipalities, the MTA and New York City Transit are subject to consistent pressure by mature social advocacy groups. The Straphangers Campaign, a transit interest group founded in 1979, conducts annual surveys monitoring the performance of subway and bus lines in the city. In addition to constantly admonishing the subway's shortcomings, the Campaign has also played a

significant role in the MTA's fare policy. In 2003 it won a lawsuit brought against the MTA and forced the transit agency to roll back fare increases on city subways, buses, and commuter rail. Due to the unique state-centric political nature of the MTA, it found its fare hikes opposed not only by the Straphangers but also by the New York State Senate Minority Leader, the City government, and the Transport Workers Union. As a result of the lawsuit the MTA announced that it would provide the general public more time to comment on budget proposals and provide more financial information on its website (Russianoff 2003). This lawsuit demonstrates the outsized power that New York advocacy groups like the Straphangers Campaign wield, and how New York's transportation providers must ensure that fare policy does not lead to costly political defeats. In another example of how New York's subway has been constrained by political and social pressures, 33,000 transit workers in New York City declared a strike in 1980 and "paralyzed" the city's transportation network (Stetson 1980). Job absenteeism due to the strike was estimated at between 15% and 20%, with the private sector losing \$100 million daily (Chan 2005). The economic strife only abated when the Transit Authority agreed to a 9% raise for union workers in the first year and 8% the year after; this led directly to the subway fare increasing from \$0.50 to \$0.60 (Stetson 1980). While a good result for transit workers, millions of New Yorkers were suddenly denied access to crucial transportation infrastructure and were then subject to a fare increase of ten cents. In this case, the Transit Authority caved to social pressures and was forced to raise fares on its riders to satisfy a vocal and critical advocacy group.

The MTA's state-dominated structure injects state-level and gubernatorial politics into a body that largely serves New York City, interfering with its ability to provide responsive service. As discussed earlier in this chapter, the MTA is controlled by a board appointed by the Governor,

suburban counties, and the City. This grants outsized influence over New York's transportation affairs to state politicians who often are not riders of the system. For example, the MTA spent \$500 million shutting down the subway system for sanitation in response to the COVID-19 pandemic, and simultaneously cited an \$858 million deficit as grounds for cutting service by an additional 40%. The shutdown and cleaning, ordered by Governor Andrew Cuomo, has been criticized by local advocacy groups and experts for not having "an appreciable effect on the transmission of Covid" (Wright 2020). The MTA also failed to cite scientific evidence for its decision to shut the system down from 1AM to 5PM every night. Unilateral state decisions such as this bypass local objections, and make it difficult for New York City Transit to adopt policies that facilitate economic efficiency and equity.

CHAPTER 3: WASHINGTON DC CASE STUDY

History of Washington DC's Transportation System

The District of Columbia's subway system, Washington Metro, is one of the newer major transit systems in the United States, having opened in 1976 via an interstate compact between the District and the states of Maryland and Virginia (Washington Metropolitan Area Transit Authority 2019). However the creation of a robust rail and bus network was not set in stone. After World War II, the District's population ballooned due to the rapid growth of the American federal government. Agencies and contractors could no longer fit in the crowded city itself and expanded into neighboring counties in the states of Maryland and Virginia ("The D.C. Freeway Revolt and the Coming of Metro: Introduction" n.d., 45-46). Therefore while the need to expand the means of entering and leaving the city was clear, the District Highway Department immediately gravitated towards building expressways carried through tunnels under the District itself, but did acknowledge the potential for "mass transportation vehicles" including underground streetcars to utilize these new roads. The National Capital Planning Commission, the US government agency responsible for the development of the Washington metropolitan area, pushed back against these plans, believing that a "rigid system of tracks" would prevent the system from adapting to population shifts and favored a "streamlined bus system" instead ("D.C. Freeway Revolt: Introduction" n.d., 47-48). After the District and federal governments settled on a highway plan that completely eliminated rail transit, they invited the public to provide feedback. Residents of Washington were not pleased with the plan and decried it as a "secret network of freeways" that put their children in danger; public sentiment was clearly favoring a rail rapid transit system ("The D.C. Freeway Revolt and the Coming of Metro: The Citizens'

Revolt” n.d., 81). Activists opposed the freeway system violently, claiming that the displacement of workers—with a particular emphasis on African American communities—was an inexcusable price to pay.

Pressured by the rigorous public outcry against a freeway system, President Johnson in 1964 stated that he supported a rail transit plan for the District and surrounding counties. Johnson, citing traffic congestion, called rail a “critical necessity” and called for all federal agencies to collaborate on a system (“D.C. Freeway Revolt: Citizens’ Revolt” n.d., 84-85). Shortly after, Congress passed the National Capital Transportation Act of 1965 which created the Washington Metropolitan Area Transit Authority (WMATA), known colloquially as Washington Metro (United States Congress 1966).³ While WMATA was given significant power to plan and build throughout multiple jurisdictions and across state lines, it was explicitly not given a dedicated funding source. The Act only states that expenses were to be “borne by the District of Columbia” and local governments served by WMATA (United States Congress 1966). This has led to significant implications for how the operator has chosen to fund itself, and has impacted the affordability of its services and safety record. While WMATA has not consistently received funding to cover its operating expenses, several amendments to the National Capital Transportation Act provided several billion dollars in federal funds to expand the system, mostly recently in 1990 (United States Congress 1990). The agency only received dedicated and consistent funding from the regions it serves—the District of Columbia, Maryland, and Virginia—in 2018. In contrast, New York City Transit has always received approximately 1/3 of its revenue

³ For the sake of clarity, the rail system will be referred to as Metrorail while the organization will be referred to as WMATA.

through dedicated taxes as of 2017 (Rivoli 2018). WMATA's inability to tap a guaranteed and reliable source of capital has prevented it from investing in infrastructure projects and fare subsidy programs. A 2005 report on funding for the system concludes that it "tends to peg costs to a level driven by the jurisdiction least willing or able to contribute," and warned that without dedicated funding the system would face a "downward spiral" creating delays and potentially fatal accidents (Auxier 2016). As a result, a peak hour Metrorail trip can range from \$2.25 to over \$10, making it potentially over triple the cost of a New York subway trip for longer distances.

Variable Fares in Washington DC

When Metrorail formally began operations in 1976, WMATA had not yet fully installed its fare collection system, forcing station attendants to collect a simple flat fare of \$0.55 during peak hours and \$0.45 during off peak hours; a price similar to New York's \$0.50 flat fare established in 1975 (Raschke 2011). This flat fare system was short lived due to a contract with Cubic Transportation Systems that introduced a paper fare card in 1977 (Cubic 2013). While municipalities such as New York City had long been using mechanical turnstiles to collect coins, Washington's system was built from the ground up to accept fare cards storing actual cash value, and calculate distance-based fares. Because of this, WMATA did not have to contend with potential upfront costs of retrofitting a system to support variable fares. In partnership with Cubic, WMATA debuted its SmarTrip contactless fare card in 1999.

Because of WMATA's historically unique funding structure, the agency has been forced to consistently raise prices and place increasing financial burden on its customers. This has

unfortunately been compounded by Metrorail’s distance-based fare system. The best way to understand these fare increases is to examine (a) the peak “boarding charge;” the base fare charged to a rider before additional distance charges are added and (b) “maximum possible fare,” which uses maximum possible distances to calculate the most that a rider could pay on a Metrorail trip. It is notable that the boarding charge increased only in small increments of \$0.05 to \$0.10 until 2004, when an increase of \$0.30 was followed soon after by one of \$0.20 in 2010 (Washington Metropolitan Area Transit Authority 2017). From 2004 to 2017, the boarding charge paid by all customers grew from \$1.35 to \$2.25. Meanwhile the maximum possible fare has ballooned from \$6.59 in 2004 to \$10.02 in 2017, indicating that the distance-based component of the Metrorail fare has been responsible for the vast majority of the increased cost burden of riders. This leads to a significant drawback in how WMATA has implemented distance-based fares on its rail system: due to the difficulty in analyzing the exact price paid for each trip cost increases have been difficult to detect, and are disproportionately born by those making longer trips.

Washington DC has a unique income distribution that is difficult to adequately address with transit. While cities like New York have a wealthy core and poorer peripheries, the District must contend with an affluent western portion and a disproportionately low-income eastern half (in red, see figure 4). Communities east of the

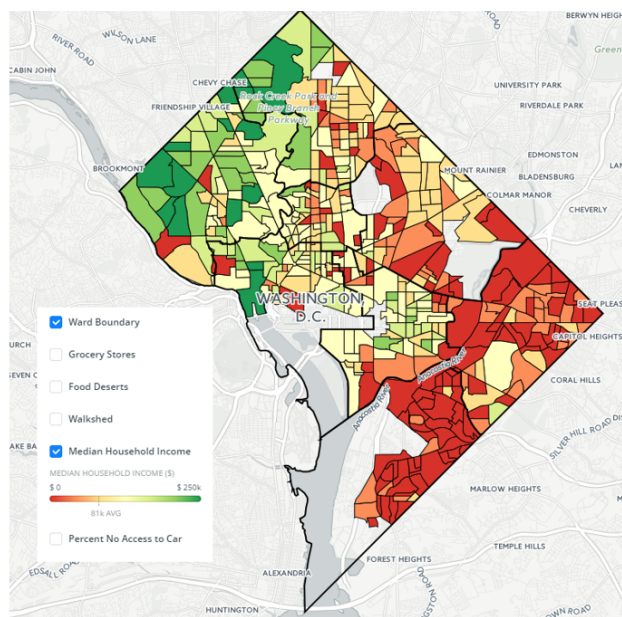


Fig. 4. District of Columbia median household income by Census tract. From D.C. Policy Center. <https://www.dcpolicycenter.org/publications/food-access-dc-deeply-connected-poverty-transportation/>

Anacostia River are primarily African American and low-income—especially in the S.E. quadrant—and are far from the central business district that includes Capitol Hill and Union Station (city-data.com n.d.). Under a distance-based fare system, these riders are paying far more than wealthier residents who live nearer the center of the District or even those who live in affluent communities further from the center such as Foggy Bottom.

Union leaders continue to advocate for a \$2 flat fare for Metrorail, believing that it would ease administrative burden and encourage more riders to return to the system. However, WMATA has calculated that a revenue neutral flat fare would need to be set at \$3, far higher than almost any other transit system in the United States. As of 2017, a \$2 flat fare would create an additional \$185 million deficit for the agency, a sum that would need to be covered through additional appropriations from risk-averse local governments (Di Caro 2017). Therefore in the matter of fare policy, Metrorail prioritizes fiscal savings over considerations of social equity.

Regional Fare Integration in the Washington Metropolitan Area

Regional fare integration in the National Capital Region started strongly with robust partnerships between transit providers, but lost steam as each agency has chosen to pursue independent fare systems. The first instance of integration began in 1997 when the operators of commuter railroads MARC and VRE entered into a regional partnership with WMATA allowing them to issue joint passes. In 1999 this partnership was expanded by introducing transfers and day passes between WMATA and local bus providers (Miller, Englisher, and Halvorsen 2005, xvi). Ridership on WMATA and partnering services increased substantially between 1999 and 2000, indicating that there may well have been a direct positive impact on overall ridership as a

result of fare integration. For example, Arlington County's ART service had steadily lost riders from 1995 to 1998, but experienced a sharp increase of 5.6% in 1999 and a further doubling of ridership in 2000 (Miller, Englisher, and Halvorsen 2005, 81-82). In 1999 as mentioned earlier, SmarTrip was introduced as a smart card usable on multiple compatible systems. Baltimore's MTA operator in particular was one of the first SmarTrip partners, introducing the CharmCard as its local branded equivalent (Maryland Transit Administration n.d.). In 2001 WMATA formed the Regional SmarTrip System with the intention of encouraging regional transit providers to switch to SmarTrip cards.

Despite a promising start that could have ostensibly led to total regional fare integration, regional partners have recently begun to stray from this objective by introducing their own proprietary payment systems and passes. While most regional agencies have taken the step of accepting SmarTrip since its launch in 1999, there has recently been a deterioration in cooperation on transfers and regional passes. This has been driven predominantly by partner agency frustration with WMATA's inaction on modernizing SmarTrip itself. For example, Baltimore in 2018 completely overhauled its ticketing system with a new backend and mobile ticketing option. While this has enabled the city to reduce cash usage on bus routes in particular, this CharmCard overhaul has also completely removed interoperability with WMATA services like Metrorail (Greater Washington Partnership 2018). Meanwhile, WMATA has also rushed to launch its own mobile application with integrated payments and ticketing. This new development would, unlike Baltimore's system, continue to use Cubic's legacy infrastructure. While certainly a modernization, this move has also served to further shut the door on potential regional integration. Indeed, transit partners were not consulted regarding this decision, and have as a

result moved to develop their own ticketing infrastructure independent of SmarTrip (Greater Washington Partnership 2018). This is a disheartening development for the future of regional fare integration in the National Capital Region. WMATA has failed to maintain regional usage of its SmarTrip standard because of a lack of transparency and its inaction on addressing the system's limitations. It has not demonstrated a sufficient coercive or coordinating capacity to encourage joint cooperation on a new fare standard. Therefore, regional fare integration in Washington DC and its surroundings has largely failed.

CHAPTER 4: PUGET SOUND REGION CASE STUDY

History of Puget Sound Region's Transportation System

The transit history of the Puget Sound dates back to the 19th century, but only recently has developed into a comprehensive regional system. While the city of Seattle had been served by a privately operated horse-draw trolley system since 1884, the municipal government purchased this network and formed the Seattle Transit System in 1939. The city, facing financial woes, wound down operation of all streetcars by 1941 (Crowley 2000). At the same time as the Seattle Transit System was struggling to maintain existing operations, a local referendum in 1958 created the Municipality of Metropolitan Seattle, or Metro, as an apparatus to manage wastewater and water quality in all of King County (King County Natural Resources and Parks 2018). The county had previously suffered poor water quality due to a patchwork of local boundaries and special districts. Metro completed its sewage treatment plan by 1967, and its founders were eager to use its countywide scope to create a King County transit network. The Forward Thrust ballot initiatives of 1968 and 1970 were intended to authorize substantial funding for a countywide regional rail system, but failed to pass amidst the Boeing Company's deepening financial woes and subsequent layoffs (Crowley 1993, 54-55). Voters eventually authorized Metro to run a countywide bus system in 1973. This also enabled Metro to absorb the embattled Seattle Transit System for its urban operations and the Metropolitan Transit Corporation, a struggling for-profit operator serving King County suburbs. Alongside this, Metro was authorized for the first time to levy a dedicated tax for funding its transit operations ("Transit Milestones 1970s" n.d.). The authority was run by a federated Council composed of elected officials from cities served by Metro. However in 1990 a federal district court found that

this system violated the equal rights provisions of the 14th Amendment; some members of the Council represented vastly smaller cities but received a vote just as a representative from Seattle would (Lane 1995, 83). As a result, Metro was absorbed into the King County government in 1992, and in 2018 was officially designated the King County Metro Transit Department (King County Council 2018).

King County does not exist in a vacuum, and thus its neighbors on the Puget Sound Pierce and Snohomish Counties also began to explore regional transit integration. The Puget Sound Council of Governments, the trio's planning agency, in 1986 commissioned King County Metro to complete a corridor study for light rail (CH2M Hill 2012). Soon after in 1993, the three counties formed the Central Puget Sound Regional Transit Authority, traditionally referred to as Sound Transit (Cohen 2017). This authority is responsible for coordinating and providing transit service to all three Puget Sound participating counties. In 1996, voters approved Sound Move, a ballot measure that called for the establishment of a regional commuter rail system, a light rail system serving the Greater Seattle metropolitan area, and a new network of regional express buses. Crucially, Sound Move also called for a "single-fare system allowing people to travel around the region using a variety of transit services with a single ticket or pass". Indeed, the plan noted that doing so would prevent riders "from being penalized for making regional trips via transit instead of an automobile" (Sound Transit 1996).

Regional Fare Integration in the Puget Sound Region

In preparation for Sound Transit beginning service in 1999, the county governments and their transit authorities together implemented a system of joint passes, and soon after in 2000

agreed to accept transfers from each other's systems (Miller, Englisher, and Halvorsen 2005, xv). As a result, customers were permitted to begin a trip on one system and end that trip on another system without paying duplicate fares. While eager to integrate their fares, the agencies involved were concerned that this would lead to reduced revenue; a concern justified by the experience of many other regions in the US and internationally. However, the existence of Sound Transit as an overarching regional partner to each of these agencies led to the solution of it utilizing a dedicated "Fare Integration Fund" to compensate each agency for potential losses (Miller, Englisher, and Halvorsen 2005, 74). In addition, Sound Transit shares most of its board members with county transit agency boards, and thus there was a greater ability for cooperation and consensus. Lastly, Sound Transit itself took over several cross-county routes and assumed full responsible for funding these, which further eased any potential financial strain on county agencies (Sound Transit 1999).

Customer Surveys on Fare Integration

As a result of the integration, Puget Sound riders have both been more aware of their expanded transit options and have accordingly adjusted their transit usage. In 1999 after the introduction of Puget Pass, Sound Transit's regional transit pass, 61% of King County Metro riders were already aware that the Pass could be used with all participating Puget Sound transit agencies. By 2004 this number grew slightly to 67%, and 60% of riders had used the Pass for multi-agency trips (Miller, Englisher, and Halvorsen 2005, 76). A survey by Pierce Transit, a regional authority serving Pierce County, showed that the share of their customers who used another transit system rose from 19% in 1998 to 27% by 2004. A separate survey found that the

share of Puget Sound customers with the Puget Pass who utilized multiple systems increased from 41% in 2001 to 67% in 2004 (Miller, Englisher, and Halvorsen 2005, xv).

Despite the loss of service revenue and resulting service cuts, customers have remained happy with the fare integration. Prior to the implementation of fare integration in 1999, 44% of King County Metro riders rated themselves as “very satisfied” with its service. In 2000 after the introduction of the Puget Pass and inter-agency transfers this rating rose to 50%, fell in 2001 back to 44% due to service cuts relating to lost fare revenue, and in 2003 rose back to 52% as service was restored. Similarly, 7% of passengers reported being dissatisfied with service from 1997 to 2001 and in 2003 6% of passengers selected this option (Miller, Englisher, and Halvorsen 2005, 76). It is important to note that the service cuts in 2000 to 2001 were due not only to lost revenue from fare integration but also from a ballot measure approved by Washington state voters that eliminated the motor vehicle excise tax; this eliminated approximately one third of revenue for several county transit operators (“King County Local Voters Pamphlet” n.d.). Despite these hurdles, Sound Transit’s Fare Integration Fund and its takeover of several inter county bus routes have largely mitigated these revenue shortfalls. In addition, voters approved a second round of funding for Sound Transit dubbed “Sound Transit 2” that provided \$13.4 billion in fresh funding over a period of 15 years, funded by a 5-10% increase in the regional sales tax (Sound Transit 2008). This generous funding coupled with a budget surplus has allowed the Puget Sound agencies to weather the potential risks of fare integration without lasting fiscal damages.

“One Regional Card For All” (ORCA)

In 2003 after cities like New York had introduced transit fare cards that could be loaded with stored-value, the Puget Sound counties decided to collaborate on a smart card system that could be used on all transit in the region. While this was by no means the first transit smart card in the United States, the Federal Transit Administration viewed the project as “the most collaborative” of its kind, and held it up as a model for future fare integration in other states and localities (King County Metro 2003). The rollout of the card was delayed from 2006 to 2009 due to technical setbacks, but launched with all partner agencies on board. Dubbed “ORCA,” the card can be loaded with fare via the internet and can be toggled to top up its cash value when it reaches a certain floor. ORCA was developed via a “consensus model,” in which the agencies agreed upon and developed the smart card together and jointly designated King County Metro and Sound Transit to manage the system (Joslin 2010, 4-3). This governance model allows the smaller agencies like Pierce Transit to have a voice in the operation of ORCA, but is also a more time-intensive process that requires constant interagency communication.

Unlike many other metropolitan regions in the United States, ORCA is both an accepted form of payment on multiple agencies *and* developed by the agencies to be accepted on all transfers. In contrast, the New York MTA’s MetroCard system is accepted on Westchester County’s Bee-Line bus service but has no ability to record transfers *between* multiple transit agencies (Westchester County Department of Transportation n.d.). While New York’s implementation does mean that customers have a single regional payment method, its lack of fare integration with its neighboring counties still forces customers to pay twice when utilizing more than one service. Another benefit of an integrated payment system like ORCA is the ability

to completely control the apportionment of fare revenue to participating transit partners. While the difficulties in apportionment have been discussed in Chapter 1, the Puget Sound participating agencies have chosen to adopt a cost-sharing formula based on “cost drivers:” the number of transactions, boardings, and customers are compared with transactions on each system to determine what each system’s fiscal burden is (Joslin 2010, 3-56). Revenue is then distributed to each agency accordingly. In addition, ORCA cards are valid for four years after purchase, meaning that the partner agencies have reduced expenses related to the sale, distribution, and administration of new tickets (Joslin 2010, 3-63). Lastly, a shared regional smart card like ORCA allows agencies access to granular ridership data. While this raises potential privacy concerns, agencies can use this data to gauge ridership on routes without having to conduct costly surveys, and can better understand passenger trips that utilize more than one service. This increases efficiency both through reducing costs and helping operators create services that they know most riders want.

CHAPTER 5: DISCUSSION

This final chapter is comprised of comparisons between the three case studies in the preceding chapters that serve to illustrate how differing choices and circumstances have impacted fare policy. The first section, New York vs. Washington DC, examines how the existence of entrenched stakeholders in the form of commuter rail operators has influenced how each transportation system structures its fares and services. The next section, Washington DC vs. Puget Sound, focuses on the reasons why regional fare integration is considered a success in one area yet a dismal failure in the other. Lastly, New York vs. Puget Sound discusses the role that social and political structures play in the responsiveness of transit fare policy.

New York vs. Washington DC: Entrenched Stakeholders and Fare Models

While both New York and Washington DC's heavy rail systems are comparatively comprehensive when compared to Seattle, they differ in their pricing models. As mentioned earlier, New York's subway uses flat fares of \$2.75 while Metrorail uses a complex distance-based formula with time-of-day pricing. While it may seem odd that Washington DC, with its distinctive east-west income gap, uses distance-based fares that have the potential to disproportionately harm low-income riders in the east, it is necessary to understand the comparative lack of auxiliary commuter services in the District. While New York City is served by mature and extensive commuter rail systems such as the Long Island Rail Road (LIRR) and Metro-North, Washington DC is served by the Maryland Area Regional Commuter (MARC) and Virginia Railway Express (VRE). MARC and VRE both commenced service in the 20th century, while the LIRR—the busiest commuter rail system in the United States—was established in 1834.

LIRR boasts 594 miles of track and its sister commuter system the Metro-North adds another 787 track miles to that total (“MTA-Transportation Network” n.d.). Meanwhile the Washington Metropolitan Area’s two state commuter rail systems combined amount to less than a quarter of that. Because of Washington’s comparative lack of formal commuter rail, many passengers utilize Metrorail in a similar manner to how customers might use commuter rail in other American cities. In understanding this, Metrorail’s pricing is actually below commuter rail offerings in the New York Metropolitan Area. For ease of comparison, a LIRR trip from New York’s Penn Station to Hicksville station on Long Island costs \$14 oneway off-peak for a distance of approximately 25 miles (Long Island Rail Road 2019). An off-peak fare on the Metrorail Red Line caps at \$3.85, and can be ridden for the entirety of the line’s 31.9 miles (Washington Metropolitan Area Transit Authority n.d.). However, Metrorail’s comparatively lower cost when used as a commuter rail option does not translate well into its concurrent use as a subway system. As mentioned in chapter 3 flat fares are not a fiscally responsible option for WMATA to consider, and thus this distance-based fare has been leaned on to fit both rapid transit and commuter rail needs.

Related to this lack of meaningful commuter rail, Metrorail average line lengths far surpass the New York subway. Its longest route, the Red Line, spans a 31.9 mile loop that extends deep into Maryland. Meanwhile, the IND Eighth Avenue Line, New York’s longest subway line, measures only 14 miles in comparison. This makes it more financially sensible for New York to continue using a flat fare, as NYCT does not sustain as high a cost for long-distance riders as Metrorail does. This, in addition to the New York system’s dedicated funding, allows this system to work without as much pressure to recoup its costs through fare increases. Indeed,

Metrorail's line lengths rival commuter rail services in other major American cities.

Unfortunately as Metrorail is considered a subway system, it does not have the same pricing latitude as New York's commuter rail systems do, and is fiscally constrained by customer expectations of affordability. WMATA has been placed in a situation where it must serve the needs of suburban communities expecting commuter rail service while also pricing itself affordably for urban users who use it as a subway.

Washington DC vs. Puget Sound: Regional Fare Integration

Transit agencies in Washington DC and the Puget Sound region have both made solid efforts to integrate their pricing and fare payment systems, but only Sound Transit and its partners have been able to continue regional cooperation. The key to understanding the reasons for WMATA's failure lies in its approach to addressing the aging infrastructure powering its SmarTrip smart fare card. SmarTrip is managed only by WMATA itself, with regional partners being granted permission to use the ticketing system. As discussed earlier in chapter 3, SmarTrip was introduced in 1999 but was built on technology introduced with the creation of Metrorail in 1976. Therefore, while it does boast features like contactless entry and stored value, the actual payment technology has not fundamentally changed. This has manifested itself in instances such as WMATA's rollout of online fare management; a deadline that was shifted from 2009 to 2011 after technical issues prevented a timely launch (Washington Metropolitan Area Transit Authority 2011). In another example of WMATA's inability to manage the technical shortcomings of SmarTrip, its retail partner CVS ceased sales of the card in its pharmacies in 2018, citing

“unsustainably slow response times to repair SmarTrip equipment that frequently malfunctions” (Jacob 2018).

Unfortunately for WMATA, initial launch partners like Baltimore’s MTA have moved ahead on their own to replace the aging SmarTrip system with modern albeit incompatible systems. Dubbed “CharmPass,” MTA’s new system consists of a mobile ticketing app that allows the purchase of fares for bus, light and heavy rail, and MARC commuter train services. The Maryland Department of Transportation declared that 147,000 users had downloaded the app within 10 months and surpassed one million total ticket purchases (Maryland Transit Administration 2019). An unfortunate consequence of this system built from the ground up is the loss of interoperability with the current SmarTrip network: riders transferring from MARC commuter rail to DC Metrorail, for example, now need to juggle two separate fare cards or mobile applications. Shortly after Baltimore MTA’s announcement, WMATA declared that its own SmarTrip mobile application was in development with a projected launch in 2021. However, this “new” application would be built on top of the existing SmarTrip infrastructure, and was developed without consulting WMATA’s remaining SmarTrip partner agencies. As a result, operators such as Montgomery County RideOn are piloting their own independent payment systems in anticipation of a full pivot away from SmarTrip (Greater Washington Partnership 2018, 15).

In contrast to WMATA’s lack of communication with its partners on its vision for the future of regional fare integration, transit agencies serving the Puget Sound have taken steps to ensure that any action is consensus-driven. Unlike SmarTrip, the ORCA smart card is managed by a joint board with representatives from every agency that use it as a payment method. While

the two largest regional agencies, Sound Transit and King County Metro, are tasked with day-to-day management of the system, all ORCA partner agencies meet monthly for granular discussions on joint fare changes, discounts and passes, and the joint procurement of fare equipment (Puget Sound Regional Council n.d.). Because of this, ORCA has not experienced defecting agencies like SmarTrip has. Indeed, Puget Sound agencies are currently working on a mobile application that offers the same features as Baltimore MTA's system detailed earlier, but are doing so in collaboration with each other and while continuing to offer seamless use of ORCA throughout the entire region (Sound Transit n.d.).

The reasons for the Puget Sound's success at regional fare integration offer hints at why WMATA has failed to build consensus and support for its SmarTrip service. In addition to the aforementioned governance of both fare cards, the existence of Sound Transit as a comprehensive regional entity is also notable. While Washington DC's transit history features WMATA in addition to commuter rail entities VRE and MARC, the Puget Sound's transportation infrastructure before 1993 was deeply fragmented. As discussed in chapter 4, Sound Transit was created by county transit agencies in 1993 as a way to provide inter county service and act as a coordinating body for the Puget Sound region. Unlike WMATA, which must negotiate inter county and interstate compacts with entities like MARC, Sound Transit was conceived as a regional provider with authority to develop a regional fare system *and* operate regional transit services itself. It is for this reason that local transit providers have been better able to build consensus around, for example, a new mobile ticketing application. Meanwhile, WMATA exists as a separate entity serving the District and its immediate surroundings, and has no ability to dictate or control the actions or policies of its neighboring transit providers.

New York vs. Puget Sound: History and Politics

The unique political structure of New York's transportation provider constrains it in comparison to the Puget Sound's more recent transportation system. As discussed in Chapter 2, the MTA's state-dominated board provides less opportunity for the City itself to have a voice in transportation decisions that ultimately impacts it the most. For example, in 2009 the MTA proposed a fare hike of fifty cents, service cuts to subway and bus service, and toll increases in order to stave off a ballooning deficit. The New York State Senate, balking at the toll increases, was unable to promptly propose an alternative funding plan for the MTA due in part to opposition from Republican senators who lived outside of New York City (King 2009). These Republican senators likely feared that toll increases would harm their suburban car-centric constituents. The ability of legislators from affluent suburbs of the city to dictate fare policy for low-income urban communities has negative implications for equity, as it represents a significant political hindrance to the responsiveness of the City's transportation system to its most vulnerable residents.

The MTA's structure, while problematic for the City, has nevertheless enabled social advocacy groups to use its institutions and elected officials to push back on MTA policies considered onerous or anti-consumer. The Straphangers Campaign, in response to the 2009 gridlock, initiated a public awareness campaign to pressure state senators and requested the New York City Independent Budget Office to review the MTA's proposal; the IBO concluded that monthly passes would increase from \$81 to \$103 under the proposal (Kabak 2009). Mayor Michael Bloomberg also spoke out against the MTA's proposed budget, demonstrating that social

advocacy groups could use the City's leaders and officials to push back on the state's dominance of the MTA. The Campaign encouraged commuters to attend MTA budget hearings, distributed leaflets to transit riders, and organized rallies protesting the fare increases and service cuts. While the fare increases remained intact in the MTA's final budget proposal, service cuts were less severe and more funding for the MTA was secured via regional "commuter" tax and various new fees on motor vehicles (Neuman 2009). While it did not achieve all of its stated goals, the Straphanger Campaign managed to perceptibly influence the decision making progress at the state level to gain concessions. The MTA, confronted by a looming fiscal crisis and a strong social critique of its budget proposal, was forced to compromise on its mitigation methods by drawing from new taxes and fees instead of cutting service further.

In contrast to the disproportionate power wielded by New York State over the MTA, counties in Washington State's Puget Sound region have carefully crafted a regional transportation infrastructure responsive to the needs of each local government. Unlike the New York metro area, the Puget Sound had no existing regional transportation provider and limited infrastructure that could be absorbed by a newly created one. This meant that the counties were not bound by a state-controlled organization, and that they had the freedom to create one from the ground up. Sound Transit, discussed in Chapter 4, was created in consultation with the three Puget Sound counties and is governed by a board of directors that reflects all regions served. Only one board seat is held by the State of Washington via the Secretary of Transportation, while the remaining 17 seats are appointed by the three counties with approval from local representatives on each of the county councils (Lindblom 2016). While this structure by no

means renders Sound Transit immune to political machinations, it places greater power in the hands of the regions actually served by the agency.

Despite Sound Transit's consensus-driven structure as compared to the New York MTA, its reliance on ballot measures for funding places the region's transportation in the hands of voters rather than the state. While both authorities rely heavily on county-level taxes, the MTA taxes are authorized by the state and can be altered or removed by the legislature. In contrast, Sound Transit relies on taxes authorized through ballot measures decided by voters. While this does place funding decisions for the agency directly in the hands of those who theoretically make the most use of it, voters have historically been reluctant to commit large amounts to transit: the initial ballot measure creating Sound Transit in 1995 was rejected by voters who balked at its \$6.5 billion price tag, and had to be redrafted into a smaller \$3.9 billion package that was then approved by voters in 1996 (Sound Transit Information Center Library 1996, 3). This smaller measure reduced the size of the proposed light rail system serving Seattle and was therefore able to invest more in commuter rail and bus services that served the entire region. Indeed, while voters went on to defeat a second ballot measure aiming to further fund regional transit in 2007, they subsequently approved a 2008 measure with reduced spending. This experience indicates that voters have been willing to fund significant investments in transportation, but favor smaller targeted investments and measures that serve the entire Puget Sound rather than just one area. In other words, the Puget Sound's transportation system is structurally more responsive to the needs of its constituents due to its governance model and its means of funding. A system more responsive to its riders has led to a more accessible fare system (ORCA), funding for transit that

serves all constituents, and a rider base that feels more confident in its ability to influence transportation policy.

Conclusion

This chapter discussed the reasons why some regions have been successful at adopting responsive fare policy while others have failed. In particular, the Puget Sound has performed admirably in comparison to New York and Washington DC because of its consensus-driven governance of transportation and its use of ballot measures to ensure that voters have a direct voice in how the system is funded and operated. It is no coincidence that the Puget Sound's transportation system is the newest, as its comparative lack of existing transit infrastructure and entrenched stakeholders has allowed its constituent counties to build a modern system together. This has allowed the region to utilize modern fare technology in contrast to systems like New York and DC which are reliant on—and bound by—fare systems decades old. Lastly, the Puget Sound region does not cross state lines, and the state government has no direct involvement in regional transportation policy. New York struggles with a governance structure that gives the state government disproportionate influence over local transportation, while Washington DC must coordinate regional fare and transit policy over multiple state lines and with dozens of existing transit providers.

The Puget Sound region's transportation successes can be applied to some extent to both New York and Washington DC. New York can increase the responsiveness and efficiency of its system by decoupling the local subway and bus systems from the state-run MTA, thereby placing responsibility for the city's transit solely in the hands of city officials. Unencumbered by the

whims of state legislators with no material interest in the region, an independent New York City transportation authority could engage more directly with its stakeholders and build a transit system free of the financial and political limitations imposed by a state-run authority. Washington DC's WMATA must strive towards the consensus-driven structure of the Puget Sound region's transportation system by including regional partners in its plans for a regional fare system. It must also make necessary investments in modernizing its fare card infrastructure to incentivize regional providers to continue using it. Without these reforms, Washington DC's transportation system will continue to decentralize and fragment. Indeed while some of the advantages possessed by the Puget Sound are inherent (such as its one-state jurisdiction and its comparative modernity), New York and DC can each learn from it to create responsive, efficient, and comprehensive regional transportation systems.

CONCLUSION

This paper has demonstrated the importance of politics in the relative success or failure of American public transportation systems. It began with a framework chapter that discussed variables such as efficiency, equity, and cost recoupment before then examining how different types of fare policy could help operators balance these considerations. Through the three case study chapters and subsequent discussion chapter, I have emphasized the central importance of politics in transit operators' balancing of competing values. Transit providers might develop a solution with positive equity implications and an inarguably beneficial economic outcome, but ultimately this would be at the mercy of local politicians. As American transit providers are, unlike many of their international peers, government-funded authorities, they are uniquely vulnerable to political machinations that could impact or cut funding entirely depending on the whims of constituents. An urban free fare zone might be universally supported by city residents and businesses, but face pushback from suburban residents (and thus their elected officials) and thus face long odds of implementation. New York in particular, as discussed in chapters 2 and 5, suffers from a state-controlled transit authority dominated by politicians whose constituents are not city residents. Thus, politics plays an outsized role in transportation policy, frequently overruling other variables that might better serve communities.

Fortunately, the variables discussed in this paper can dampen the role of politics in US transportation policy. The use of direct democracy through ballot measures as demonstrated by the Puget Sound region allows targeted funding to specific regions or counties without becoming politicized at the state level. This method also prevents riders from feeling a disconnect between their preferences and policy enacted by a governing body. In addition, striking a balance between

a dominant central authority and a patchwork of loosely affiliated member agencies is critical to securing regional support for a cohesive transportation network. The transportation provider for the rapidly growing Phoenix, Arizona metropolitan area is using these findings to run a responsive and nonpolitical system. Instead of a state-controlled agency like New York or a patchwork of local providers like Washington DC, Valley Metro serves as a unified public brand for all transit providers in the Phoenix area. Every member agency appoints representatives to the Valley Metro board, and uses the same fare system. This allows both for responsiveness at the local level and a cohesive regional system that provides for transfers between all participating providers (Valley Metro 2017). In terms of funding, Valley Metro can initiate ballot measures at the county level and its member cities can also enact their own sales tax increases to fund their respective services themselves. This allows for a transit system tailored to each served region yet compatible throughout the entire metro area.

This arrangement is certain to be the future of public transportation in the United States: a coalition of city agencies governed by a unifying public-facing brand that coordinates fare policy. Both the Puget Sound's current system and Valley Metro were formed in the 1990s, positioning them at the forefront of modern US transit policy. A locally responsive yet regionally integrated transportation system can avoid many of the political pitfalls suffered by cities such as New York and DC, and therefore allow focus on the anchoring variables of efficiency and equity that make public transit so essential.

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