A Political Economy of Access

Infrastructure, Networks, Cities, and Institutions

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The Magic of Streetcars, the Logic of Buses

Once upon a time (1888 to be precise), the United States and the world launched a huge building boom for urban streetcars. Companies like Twin City Rapid Transit laid miles of track in fast-growing cities, extending well past the built areas to serve greenfield sites for emerging suburbs waiting to be platted and built. They did this because the streetcar promoters benefited directly from the land sales. The availability of a new, fast transit system connecting to downtown made houses much more valuable. The fares from the new passengers covered the operating costs of the system.

Streetcars were financed by a mechanism we now call value capture,\textsuperscript{1} Joint development was quite common in the railroad and

\textsuperscript{1}§16. but is more accurately called joint development.

Figure 11.1: These images from Coffman Union show the main Mall of the University of Minnesota campus over a period of 60 years.
streetcar eras. As part of grants of rights-of-way to the transcontinental railroad in the United States, large grants of land were given to help the railroad pay for the infrastructure they were creating. In an urban context, private transit companies were often developers of 'streetcar suburbs.' This occurred in the Twin Cities in the late 19th and early 20th centuries, where large parts of what are Minneapolis and Saint Paul were built around that era’s dominant transport technology. Evidence shows that the streetcars led development in the Twin Cities (though in other places, transport may lead or follow development). This growth is illustrated in Figure 11.3.

Though it was used widely in the past, there is a lesson to be learned from the deployment. Joint development was critical in paying for the initial capital costs of the streetcars.

Networks continued to grow until the 1920s and 1930s, when the boom came off the boom. The new motor car served the prospective suburbanite just a bit better than the sluggish streetcar. However over time infrastructure needs replacement. By 1950, the streetcars were upward of 60 years old and needed a major infusion of capital to be maintained. Instead, they were abandoned en masse across the United States for buses in a process that in the transport field has been termed 'bustitution.' Unfortunately, the initial source of funds, the cross-subsidy from real estate, was no longer available, as the real estate was already developed. The owners of the streetcars in Minnesota, still private, like many others across the world, chose to convert to buses – 'free-riding' on public roads required much lower capital outlays than reconstructing and maintaining tracks.

It may be too much to expect the initial streetcar developers from the 1880s to have planned for replacement in the 1950s, but should it be desirable to maintain infrastructure over a long period, a continuing source of revenue that pays not just for operations, but also accrues revenues ultimately for periodic reconstruction, must be identified.

The causes of the decline of the streetcar remain a sore point with urbanists, but this was a global phenomenon that happened in any country rich enough to see mass motorization defeat mass transit. The US transit crisis – a collapse of demand and thus revenue beginning shortly after the peak of transit demand during the rationing of fuel and rubber during World War II – affected not only streetcars, but also commuter trains and urban subways.

In response, the US federal government began funding large transit capital projects starting in 1964 through the newly created Urban Mass Transit Administration (UMTA). UMTA helped with
the municipal takeover of transit, and then provided capital for expansion in the 1970s. It's worth noting that there was more experimentation in this period than at present – the Peoplemovers installed in Detroit and Miami came from this period, as did funding systems like the San Francisco region’s Bay Area Rapid Transit (BART), Washington, D.C.’s Metrorail, and Atlanta’s Metropolitan Atlanta Rapid Transit Authority (MARTA). Beginning in the 1980s, the underwhelming performance of this new generation of heavy rail – especially systems like those in Baltimore and Miami – led the federal government to support, instead, streetcars, newly rebranded as light rail transit (LRT) systems.

This new generation of rail, including San Diego’s Tijuana Trolley and the Portland MAX, differed from traditional streetcars in subtle ways; even professionals have difficulty differentiating the two. In general, the LRTs are wider and longer than the streetcars of a century ago and their more recent reboot. More important, LRTs tend to run in exclusive, but not grade-separated rights-of-way. With federal matching dollars being just given away, cities bid for new light rail systems, and many were constructed.

The modern streetcar was born when local governments balked at running LRT vehicles down city streets because it took away too much right-of-way from cars. The solution was to make a narrower, shorter vehicle that harkened back to historic streetcar proportions – although often modernized with low-floor boarding to comply with requirements of the Americans with Disabilities Act, among other amenities – and that could run in the street right-of-way.
Running in traffic has major downsides. A streetcar, unlike LRT in an exclusive right-of-way, cannot pass cars; it too gets stuck in traffic. In fact, because it is tracked, it is more likely to be stuck in traffic than a bus, which can change lanes. As any rider of legacy systems can tell you, streetcars are no faster than buses, and in many circumstances no faster than walking. Average streetcar operating speeds range from 7.1 km/h in Little Rock to 12.4 km/h in Tacoma. Tellingly, streetcars have been embraced by the ‘slow transport’ movement.\footnote{In 2017 Toronto installed a pilot project where streetcars on King St. were given traffic priority, parking was eliminated and traffic was restricted was put in place. Speeds increased and ridership improved by 11% during the following year.}

Portland, Oregon is one of the major battlegrounds in the mode wars (bike vs. car vs. transit and the internecine rail vs. bus). Since the 1980s, Portland has been held up by planners as the exemplar American city that does almost everything right. The foremost thing they do right in the view of the planning establishment is promoting LRT and bicycling.

Portland opened a modern streetcar system in 2001. Along with introducing the streetcar, the city changed zoning and other development regulations, and the development machine took off. The zoning could have been implemented in the absence of the transit investment, but often rail justifies change.

This Portland example, excellently marketed, has been promoted in city after city as the latest urban elixir, both absolving the city of all its sins and growing city development muscles to Hulk-like proportions. Other cities followed Portland, though more have wound up with systems like that in Tampa (about 1,000 boardings per day) than Portland (about 10,000).

The most recent boomlet in streetcar construction responds to changes in federal funding priorities, as the Obama Administration promoted livability through Transport Investment Generating Economic Recovery (TIGER) grants. (Previous federal funding sources were not amenable to streetcar service). Most of the lines are local circulators, connecting tourist and entertainment destinations. Many in fact are heritage lines, using historic streetcars (or replicas) to deliver passengers in the same fashion as 100 years ago, as in Figure 11.2.

The problem of streetcars as transport is inherent in the technology, but also in how the technology is operated. To rely on transit, prospective passengers want frequent service – every ten minutes or better. Almost none of today’s streetcars achieves that frequency. It may look good on the watercolor rendering to have the streetcar in front of the building, but for actual users, a conveniently appearing streetcar is a rare occurrence.

In addition, though American streetcars seem to be cookie-cutter systems, in fact they all involve custom designs, driving up costs.
From a cost-efficiency\textsuperscript{9} perspective, streetcar systems should all use standardized parts and cars.

Transport investments (both locations and choice of technology) are empowered by emotion and feelings, as well as magical thinking, at least as much as reason.

In the 1880s and 1890s the first generation of streetcars provided a huge increment of accessibility over competing modes (walking, horse). Today’s political leaders seem to engage in magical thinking on the subject, claiming streetcars will have the same kinds of transformative effects today as a century and a half ago. But unlike the 1890s, now streetcars provide no increment of accessibility over cars and buses. They allow no one to get anywhere faster than before. The entire argument rests on qualitative improvements.

As rational observers with formal training in transport, we have had a hard time understanding the emotional relationship even some people have with rail. Why do people like rail more than buses? Is it simply how they are operated, or that it is modern capital, or is there a psychological benefit some accrue by traveling on deterministic tracks instead of the highly stochastic, very complex, and widely diverging road network?

There are uncountably many theories on the matter, a large subset of those are discussed and critiqued in the following sections. While this chapter discusses transit, emotion rather than reason is also an important factor in the location of other transport modes.

11.1 Ride quality

‘The Trolley Song’ speaks to the smoothness of the ride.\textsuperscript{10}

The quality of the ride on an LRT is smoother and less herky-jerky than a bus, and passengers have a nicer facility.

The ride quality issue is primarily one of new infrastructure than of rail or streetcar infrastructure, though to be clear, it is probably easier to keep rail infrastructure smoother than roads. In the waning days of streetcars, people praised the new buses for their ride quality.

For a young musically-inclined romantic, even a bus can be idealized. For the regular commuter or the harried shopper, \textit{bump, bump, bump} is far from romance.
Figure 11.3: The joint development of streetcars and suburbs in the Twin Cities. Source: Xie and Levinson (2009)
11.2 Speed

Transport is about speed (and frequency and reliability). While speed has historically risen overall, speed (and reliability) on any particular transport facility tends to decline with age. The day it is deployed is the fastest the system will ever go, and over time it will slow. While there are occasional improvements, as infrastructure ages, it declines. Roads get more congested and more access points, reducing speed. Transit wears out, is shut down for maintenance, or slowed down in work zones, has stops added (more than they are eliminated). New is usually faster, but more importantly, limited access is faster. We can and do build new transport facilities that are overall slower (though more frequent) than existing transport, but that is harder to justify, so it is always pitched as faster, even if in contradiction to the facts.

Trains are faster than local buses if they have their own right-of-way and few stations. Bus rapid transit (BRT) on exclusive right-of-way is faster than buses in mixed traffic as well. Streetcars lack exclusive right-of-way. Exclusivity is the fact that distinguishes streetcars from LRT in most US definitions, although the terminology, and its use, are fuzzy. Streetcars are thus not inherently faster than buses, and may be slower since they stop at every stop, while buses can skip stops lacking passengers.

11.3 Operating costs

Some advocates argue from a systems perspective, which while of little import to the daily rider, matters to the bottom line. Trains, with a single driver pulling multiple carriages, and electricity rather than fuel, may have lower operating costs (cost per passenger km) than buses. Clean electricity powering a streetcar will save energy and reduce environmental impacts compared to a diesel, or even an electric, bus in traffic. We do not have clean electricity (yet) in most of the developed world, so while the energy claim may remain, the environmental one is weak at best. The labor argument may also hold if you have a long streetcar that carries more passengers per driver than a bus. Germany has double-decker buses that hold 128 passengers, while streetcars by Skoda hold 157, as with all things, it depends on configuration, but it is not a knock-out punch. And it is only critical on routes and times with that level of demand. And if to achieve that demand, you lower frequency, you are worsening service.

Table 11.1: Twin Cities Metro Transit Annual Costs (excluding initial construction, 2006).

<table>
<thead>
<tr>
<th></th>
<th>Bus</th>
<th>LRT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capital</td>
<td>$41,728,775</td>
<td>$21,569,465</td>
</tr>
<tr>
<td>Operating</td>
<td>$208,249,261</td>
<td>$18,725,334</td>
</tr>
<tr>
<td>Total</td>
<td>$249,978,036</td>
<td>$40,294,799</td>
</tr>
<tr>
<td>Daily Pax</td>
<td>212,088</td>
<td>28,147</td>
</tr>
<tr>
<td>Total/pax</td>
<td>$3.88</td>
<td>$4.50</td>
</tr>
</tbody>
</table>
Offsetting the operating cost advantage is the major capital cost disadvantage. Buses can effectively free-ride on streets paid for out of property and gas taxes, while streetcars are responsible for their own tracks (and BRT on exclusive right-of-way similarly are responsible for their own pavement). Does the $100 or $200 million dollars spent per line garner any new passengers? Are the existing passengers qualitatively better off in a way that they would actually pay for? Is the trip any faster? If the service were indeed better, it should be able to charge a premium and retain its customers.

Further offsetting this is scale economies. Cities that have buses will continue to have buses. At first, and for a long time, those same cities will have few streetcars. The buses will have many people working on them, a collection of spare parts, expertise, and so on to keep them maintained efficiently. The greater the number of distinct technologies used, the lower the economies of scale that can be achieved with any one of them. Streetcars will, especially at first, be rare, without the library of spare parts, without the staff maintenance expertise, and without any of the other advantages of buses. Either costly redundant vehicles will need to be provided, or the system will be ‘out’ more frequently than buses. As the data in Table 11.1 shows, it is not even necessary that LRT has lower annual costs than bus, even after neglecting the quite large initial construction cost.¹¹

### 11.4 Navigability

It is hard to navigate current US bus systems, while the fewer number of rail lines are fairly easy to figure out. Because trains cannot steer, they cannot get lost the way a bus can.

An article in a local Minneapolis newspaper, “A Streetcar Named Development”¹² discusses the potential for streetcars for Minneapolis. In the closing quote, Teresa Wernecke, director of the Downtown Minneapolis transport Management Organization says “With rail, you know where you’re going.” The implication is that with bus you don’t. The navigability problem with streetcars is solved by wires in the air and tracks on the ground, which tell you where the service is going. Buses on undifferentiated blacktop have no such obvious signals. In one sense this is correct, but this is easily solved with better signage, and more importantly, tall lights with ‘T’ on them as deployed on arterial rapid bus lines, which can be seen from several stops away, as illustrated in Figure 11.4. Not to mention this can be solved through smart phone routing apps, such as Google Maps. This has been enabled by the remarkable

¹¹ More recent data, including the 2014 Green Line, looks better for LRT in the Twin Cities. The point is that looking at some costs (such as operating only) to the neglect of annual capital costs, much less initial capital costs, significantly biases the perspective.

¹² (Haugen 2006).
standardization on the General Transit Feed Specification (GTFS) \(^{13}\) and the use of automated vehicle location (AVL) to locate buses in real-time.

In contrast to the assumption that rail is deterministic in its destinations, we present an anecdote: In London\(^{14}\) on rail, you don’t necessarily know where you are going either. Returning home from Imperial College on the District Line, one might board a Wimbledon-bound train at the South Kensington Station towards a destination at Putney Bridge.

Well, more than once, before the train reached Gloucester Road station, the conductor announced the train has been redirected to Ealing Broadway, and all passengers bound for Wimbledon (or points in-between) needed to change trains at Earl’s Court.

While this is not a big deal, walking from one train on the platform to another across the platform, it created a lot of confusion. Native Londoners were asking visitors and tourists what was going on.

Those in charge of dynamically rerouting the trains may have had a good reason for this (another Wimbledon-bound train was already at the Earl’s Court platform, one for Ealing must have been held up somewhere upstream), trying to balance service or flow of trains.

If this had only happened once, one might say, “that’s strange.” But this happened about monthly. If you missed the announcement you would have to backtrack. This does not regularly happen with buses. (Though sometimes they are cut short due to works or events.)

The point is that:

- When you have a complicated system, this creates opportunities to dynamically reroute (on a single line system, the exercise would be meaningless), and

- There is not something inherently more secure or informative about rail over bus.

Real-time apps could, in principle, inform travelers of such unusual activities, but as of this writing, most travelers are not using them, and the rest are using them to choose a vehicle to board, not expecting the vehicle they boarded would change midstream.

11.5 *Payment and boarding times*

An advantage that rail stations often hold over bus stops is in how trips are paid for.
Transit companies are moving to requiring smartcard (and credit card and smartphone) use for buses as well as trains, though this movement is much too slow.

Smartcards are often standard for trains but not buses. On a bus, payment is usually onboard. Cash payment takes about 6 second per customer to process when boarding, while smartcard users are at 2 seconds per customer.\footnote{Based on work from a student paper.}

Boarding times are reduced further still with prepayment and all-door boarding. Right now this is standard on trains of all kind, and rare for buses, but there is no need for this to be so. Payment readers can be installed at bus stops, starting with the busiest.

Reducing boarding time benefits not only transit passengers by speeding the trip, but by making the bus go faster, enables more runs per bus per day, increasing operational efficiency and driver productivity and the frequency of service that can be attained from the fixed fleet.

Any location worthy of being served by fixed-route transit is worthy of an off-board fare-collection mechanism (to speed boarding) at every bus stop, as ubiquitous as modern parking meters, which can take cash, coins, pin-and-chip credit cards, and near field communications (NFC) embedded in modern smartphones.

\section*{11.6 Nostalgia}

Famously, Minneapolis and St. Paul saw their streetcars ‘bustituted,’ a word meaning substituted for by bus, by 1954, and many mourned their loss. But Minneapolis and St. Paul were not alone. Streetcars were obsoleted worldwide. Yet we don’t go to London to visit their famous double-decker streetcars (at least not since the 1920s). We don’t see them in New York or many other world cities. Trams disappeared in Sydney in 1961, though Melbourne kept theirs. There are reasons for this.

People who like rail recall (or wish they could recall) the immediately post-World War II America when streetcars were at a maximum.\footnote{Perhaps coincidentally, this is also the ideal time for model railroad enthusiasts, as it authentically permits the mingling of steam, electric, and diesel model trains.} The year 1946 was a magical period in US history, a boom following the long depression, when streetcar networks if not at a maximum were really close. Though streetcars were clearly on the decline everywhere, this loss is felt deeply in the Twin Cities region.

Losses (of things we want) are always felt more than gains. Having the streetcars did not make residents as happy as losing the streetcars made them unhappy. This observation connects with
Prospect Theory of Kahneman and Tversky, and helps explain why change is so difficult. We are loss averse. Even today, people who were not born in a place feel outrage by the change that occurred.

Loss aversion can be rational as a signaling mechanism. If you believe we will be ‘irrationally’ upset at losses when you take something from us, you will be less likely to take it. You will also over-compensate us if you do take it, so that we will feel that we have been properly compensated.

11.7 Novelty

The flip side of nostalgia is quest for novelty. People like new things better than old things. Anything new (and shiny) has some appeal, especially compared to old and run-down. We invent words to make old things sound nicer than they are (historic, classic, vintage, legacy, antiqued, previously owned, well-loved, patina). While once streetcars were old and buses were new, the opposite is now (or soon will be) true.

11.8 Conspiracy

There is a thought widely held that a conspiracy of automakers and oil companies undid the streetcars. Conspiracy plus nostalgia is not without power as an explanatory force. The conspiracy as told is not quite what happened, and most objective observers agree the streetcar’s mid 20th century demise was driven by economic factors.

Yet in many conspiracies there are kernals of truth that are exploded into popcorns of myth. The aging tram system of Brisbane was burned in the mysterious Paddington Depot fire. Phoenix lost most of its streetcars similarly. Unlike the situation in most of the United States, the loss of streetcars in the Twin Cities was in fact the result of a criminal conspiracy. The Transportation Experience notes:

The streetcar lines in the Twin Cities were built by Tom Lowry in the nineteenth and early twentieth centuries, and like many cities were aimed at large part in land development. For the period between 1925 and 1948, fares held steady at $0.10, leading to capital shortfalls. The Twin Cities lines were publicly traded and most shareholders were non-local. The conversion from streetcars to buses took place after a series of events helped drain the company of even more resources. In 1949, Charles Green undertook a hostile takeover. He asked for a fare hike, fired 25% of the workforce, and canceled capital investment. He
was employing a traditional ‘cash cow’ model, wherein new owners milked the system of resources to pay for its own takeover.

A strange turn took place when Isadore Blumenfeld, a.k.a. Kid Cann (rumored to be a gangster and murderer) and Fred Osanna (known to be a lawyer) tried to take the system from Green. The State Railway Commission made an investigation of bribery, embezzlement, kickbacks, and death threats. Osanna and company did successfully takeover the Twin Cities Rapid Transit in 1951, and sold off the streetcars and many of the rails. It is reported that the vehicles are still running in New Jersey and in Mexico City, though while the shells may still operate, whether the mechanics in the vehicles do is unclear. Osanna claimed “the fastest and most massive streetcar-to-bus conversion ever undertaken in any major US city.” However, Osanna wound up in jail for fraud. The system was subsequently sold to Carl Pohlad (later owner of the Minnesota Twins), and was eventually sold to the public Metropolitan Transit Commission in 1970 for $7.9 million.

11.9 Amenity

People like amenities, features, gadgets. Some of them are genuinely useful, like the LRT station variable message signs which are supposed to tell you how many minutes until the next train. Shelters and heat are nice in bad weather. Pre-paying saves time. Working, real-time signs can provide useful information which relieve anxiety. New systems are coupled with amenities that old systems lack.

11.10 Sexuality

Jonathan Richmond identified sexuality as an explanatory force in his book *Transport of Delight* and earlier paper “The Mythical Conception of Rail Transit in Los Angeles.” The image of the train entering the tunnel clearly evokes a primal response. A bus entering a tunnel would not have the same length, and thus presumably fall-short in the primal response department.

11.11 Respect

Some people won’t ride buses. Buses are perceived as a means of travel for the lower classes. These same people would be happy to ride an intercity coach, or a London Routemaster double-decker bus, or a tourbus, or have their kids ride a school bus. It is not the technology, it is a matter of respect and status. If buses are perceived

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23 See (Richmond 2005).

24 Whether mass transit needs to be sexy has been disputed. (Jaffe 2013b).
as being for the lower classes, people striving to be in (or stay in) the upper classes will avoid them.

But this is not about buses, it is a more general issue.

The Hiawatha (Blue Line) LRT opened in Minneapolis in 2004. Soon thereafter it was already beginning to feel rundown. The litter-strewn (Figure 11.5), ticket-machine-jammed Franklin Avenue LRT station “just makes you feel poor.” Located in a no-man’s land beside Cedar and Hiawatha, it is not a place one feels safe walking to, especially at night. At the end of a Minnesota winter the accumulated detritus of six months past is just par for the course, but apparently no one claims responsibility for cleaning up the hill adjacent to the station, or the boulevard along the street. This is the same kind of big investment in capital but “not one penny for maintenance” philosophy that led the buses to decline, and the streetcars before them. At least there was a police car parked next to the station, hopefully deterring violence that is dragging some systems down.

The perception of transit as a failure is succinctly summarized in the wrongly but widely misattributed quote: “Any man who finds himself on a bus over the age of 26 can consider himself a failure in life.”

11.12 Status

People like to live with people who are like them, or their economic ‘betters,’ who raise their status by association. This process explains economic sorting in real-estate markets. It should be no surprise that people want to ride with people who are like them, or their economic ‘betters,’ who also raise their status by association, and don’t want to ride with others.

This ‘people like us’ phenomenon also leaks into the taxi vs. Uber/Lyft debate. Uber and Lyft drivers are more like ‘us’ (if ‘us’ is middle class folks and above) than your typical taxi driver.

The decision of the ‘choice rider’ (as opposed to what was once unfortunately called ‘captive riders’ in the field, and then ‘transit dependent,’ and now the more positively-framed ‘transit reliant’) to ride the bus depends on whether other similar people ride the bus. Presumably they are making the same kind of decision. They are not considering the positive externality (virtuous cycle) that their riding the bus increases the likelihood someone like them rides the bus (and their not riding the bus lowers the same likelihood in a vicious cycle). Like any positive feedback system, this is both a cause and an effect.
The potential choice rider who doesn’t ride transit, or more specifically the bus, chooses not to ride because of reasons of efficiency (compared with the car), and respect and status (compared with the car and the train). Their not riding makes the status question even worse.

Imagine there are two transit services in an area, a low quality system \((L)\) that is pervasive (everyone is within \(400 m^{29}\) of a low quality stop) and a high quality system \((H)\) that is skeletal, only a small fraction are within the same distance of a high quality stop.

Imagine there are two classes of potential users, poor people \((P)\) who will use either system, and rich people \((R)\) who will use only the high quality \(H\) routes.

Poor people perceive the system as larger (both \(L\) and \(H\)) and get more network externalities from the system. They can go anywhere in town on transit. Rich people see a small system, and perceive few network externalities. They can only go places on the \(H\) system.

As a consequence, poor people are more likely to use the system than rich people. The lack of choice riders weakens the political constituency for improvements.

Try to tell people at dinner party they should willingly ride on an old, slow, amenity-free service with people who they otherwise would not associate with, even though they don’t have to and can afford alternatives, and they will smile and turn to the next person. They don’t want to feel second-class, so they don’t ride, but they also don’t want to feel guilty about not wanting to feel second-class. All too-often, this mode is ‘bus,’ especially in cities without historic, classic, and patina-ed rail systems.

Instead tell people who have a choice that they can ride on a mode that is new, fast, with amenities, and with people who are like themselves, and they might consider it from time to time, and more regularly if it is cost and time-effective. This mode need not be rail.

Unlike a new, fancy, and expensive rail system, existing buses are now the opposite: old, basic, and cheap. There are several solutions to this problem. The expensive solution is to build high quality services everywhere to attract the fraction of \(R\) that would not otherwise take transit. The less expensive solution is to change the perception (and reality) of the low quality system so it appears higher quality. Give it as many of the same features of \(H\) as possible, starting with information (such as what bus stops at the bus stop, when does it stop, what hours does it operate, where does it go, what does the local neighborhood look like, is the bus on-time, how much does it cost) and navigability.
Instead agencies sometimes exacerbate the problem. In a recent branding effort, The Twin Cities’ Metro Transit tried to differentiate their services.

‘The METRO system name identifies the developing LRT/BRT services as unique,’ said Arlene McCarthy, director of Metropolitan Transport Services for the Council. ‘METRO riders can expect fast, frequent, and convenient service, whether they ride the Blue Line to Target Field, the Red Line to Mall of America, or the Green Line to the State Capitol.’

By implication the some 80% of regional transit riders who use local buses can expect slow, infrequent, and inconvenient service, whether they ride the 3 to downtown or the 67 to Franklin Avenue Station. This framing aims to diminish local buses into second-class service.

There is nothing technically preventing the bus and bus stop from being nice, (basically as nice as a brand new train and rail station, but usually a lot less expensive) but the reluctance on the part of the public from doing so. The best example of trying to reverse this status problem is the new rapid bus A Line serving St. Paul and Minneapolis. Whether this will spread is unclear, though a large set of these rapid bus lines are under consideration.

Bus transit has more than an image problem. Its image problem results from the reality of services, which are due to the rail-favoritism, which results from bus’s image problem. It is a vicious cycle.

11.13 Pedestrian accelerator

Streetcars running along shopping streets can function as a ‘pedestrian accelerator,’ supporting walking trips who might hop on and off a slow moving streetcar with frequent stops. Why a streetcar is any different from a slow moving bus in traffic on the same corridor, especially one that is marked as a shopping circulator, is never made clear. It is also not clear why pedestrians need to be sped up. If pedestrian speed is of interest then a moving sidewalk may be a better answer.

11.14 Traffic calming

By moving in traffic rather than an exclusive right-of-way, streetcars are slower than LRT (or BRT). Some, especially those with the ‘slow travel’ movement, claim this as a virtue. Others argue that moving in traffic slows traffic, and thus it acts as a traffic calming mechanism, and improves the quality of pedestrian activity in the
corridor. Again, why a streetcar is any different from a slow moving bus in traffic on the same corridor is never made clear.

11.15 Superstructure

Rail transit forms an urban superstructure. Guideway transit, especially LRT makes the city more like a single structure, and makes everything seem closer. The LRT vehicle is continuously running, and if activities are along the path of the vehicle, everything seems quite coordinated. In a way, by organizing activities linearly (or multi-linearly), it simplifies the city. Hopping on a train is much like getting on an elevator.

LRT, like walking indoors, keeps you enveloped within civilization, while walking, biking, or driving is a frontier experience, you alone in the wilderness. Bus falls in-between. We can posit that distances within buildings seem shorter than equivalent distances between buildings. Distances connected by the urban superstructure will likely feel closer than those which are not so connected. Walking through a modern airport, or the Minneapolis Skyway, or the Mall of America, will tell you enveloped distances can be quite large, but still not feel as large as leaving one building into nature for another.

Preferences for civilization or frontier-crossing (or degree of each) vary across individuals. Driving of course places you in a machine, but you, not civilization, are operating the machine, so just as driving is freedom, not everyone wants that freedom to drive, they may prefer freedom from driving. The extent to which you believe in the importance of community over individuals (or vice versa) will affect your perception of the issue.

11.16 Feedback

Transit invokes further passions because of the positive feedback loop between ridership, revenue, and route frequency, especially where transit is weak as in much of the US. Our riding transit creates a positive externality for you: more riders, more frequent vehicles, and more routes, leading to more riders. So of course transit riders want to impose their preference on non-riders. It is only selfishly rational. Rail transit attracts more riders per mile than buses.

Further, cars use scarce roadspace, create congestion, and make bus travel even slower. While similar feedback loops may exist on the highway side (more drivers means more closely spaced roads),

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34 The etymology of *trans-port* comes from the Latin for across or through the gate or door. We might think of travel within an enclosure as *cis-port*.

35 §A.4.
congestion mitigates that and the network is largely built out, so drivers do not feel the same need to impose their modal preference on the transit-riding minority.

Finally, drivers may benefit in the short term if other drivers take transit. Where transit is already congested and frequent, additional riders produce few positive externalities as diminishing returns set in.

### 11.17 Congestion reduction

Matt Kramer, then a Minnesota Chamber of Commerce representative lobbying for additional public transit and transport spending (then, as always, being debated at the Minnesota Legislature) is quoted as saying

> “Every person who is riding transit is one less person in the car in front of us.”

This is a fascinating quote. First is the use of “us.” So the Chamber of Commerce (probably correctly) identifies riding transit as something someone else does (since “we” are still in the car). And goes on to imply that it benefits “us” because there will be fewer cars.

This evokes the famous Onion article: “Report: 98 Percent Of US Commuters Favor Public Transport For Others.”

But it also suggests transit reduces auto travel. The converse is almost equally true, building roads reduces transit crowding. But that is not an argument road-builders make. It is an argument urbanists make against roads.

Of course, some transit users would have otherwise driven, but many would have been passengers in cars, walked, ridden bikes, or telecommuted. No one really knows what the alternative untaken mode would be.

While there are surveys that have answered those questions, they are all context specific. For most riders, transit lines are not a direct substitute for driving.

Most transit users would not otherwise drive themselves. For instance, the 2004 Minneapolis - St. Paul Metro Transit bus strike could not be detected in the traffic counts. Most displaced users carpooled, walked, or biked. That is not to say there was no hardship; there was, but it was felt by transit users not drivers. And sometimes in a larger city, the fear of a strike or an actual shutdown will cause people to work from home for a short period, reducing traffic for at least a few days.
The line of reasoning in the quote above suggests the primary purpose of transit is reducing auto travel, rather than serving people who want to, or have to, use transit. This by no means an original claim. In other words, building transit is good because it reduces traffic congestion.

That is at best a secondary benefit, a benefit which could be achieved must more simply and less expensively through the use of prices as we do with almost all other scarce goods in society, even necessities like water.

Transit today is, in most markets, slower than driving, and as a result the access by transit is lower. As shown in Figure 11.7, people who depend on transit can reach fewer jobs than those who have automobiles available. Some people use transit by choice, for instance to save money (if they need to pay for parking), and the rest without choice.

From an equity perspective, it is more important to spend scarce public dollars to improve options for those without choices than to improve the choices for those who already have alternatives. Perhaps ideally we could do both; in practice, one comes at the expense of other.

The purpose of transit is moving people from A to B who want (and/or don’t have a good alternative) to use transit because it is faster or less expensive or more convenient than the alternatives. Their willingness to pay for that trip is the primary (and perhaps dominant) benefit transit provides.
The idea that transit is for the other person is true for the 95.5% of people who don’t use transit regularly. But it warps thinking that the aim of public transit funding is to benefit those non-transit users.

11.18 Transportainment

Transport and entertainment are ever inter-twined.

Every movie is a road trip, and not just the obvious ones, like Thelma and Louise, or National Lampoon’s Vacation, or Apollo 13. The linear narrative of movies is constrained to follow the single dimension of time, marching ever forward. While attempts at braking the strict linearity are possible (think about flashbacks, or Rashomon-like stories, or Pulp Fiction) within those cul-de-sacs it remains a road trip.

Many stories star or feature transport. Not just the obvious ones like, Speed, the Faster and Furiouser series, or Gravity, but any story which involves motion and gadgets. In some cases they attain human-level personality, like Herbie, the Love Bug or all the anthropomorphized vehicles of Thomas the Tank Engine and its ilk.

Outside of movies, sporting events too are about motion. Running of course is simply who can move the fastest (unaided, unhindered). Hurdles is who can move the fastest, with hindrances. American Football is about who can move a ball across about 90 meters of territory with a limited number of stops for committee meetings, hindered by violent resistance, ensuring at least steady progress.

NASCAR, a sport that emerged from the use of cars during the period of prohibition of alcohol to outrun the law, is even more obvious. Going around a racetrack in a vehicle 400 times is interesting enough to attract more than 145,000 people to attend an event at the Charlotte Motor Speedway and seven million people to watch on TV. Though, apparently, in-person attendance is dropping. While we might complain about dozens of vehicles traversing 966

\[ 600 \text{ mi.} \] km and doing no physical work (i.e. returning where they started), the more severe environmental consequences of the race are not due to the racers, but the fans, traveling hundreds of miles themselves.

Having now been to Charlotte, the Charlotte Motor Speedway, and the NASCAR Hall of Fame, we have first hand knowledge of the magnitude of racing in the local culture. You too can drive a car on a race track for a not inconsiderable piece of coin. You learn that people have purchased condominiums overlooking the race-track. You learn they are now ‘right-sizing.’ You learn the stands are multi-colored so they look more full in ads even when they are not.
Not only is entertainment about transport. Transport has become about entertainment.

We are not talking just about the in-vehicle entertainment systems designed to entertain you while you travel, thereby making travel less onerous (and more frequent).

Many, if not most, of today’s transport network investment decisions are made by people who won’t regularly use the thing they are deciding on. In one sense, this must be true, there are many facilities, and only so much time in the day for decision-makers to travel, given our relative centralization of decision-making in the hands of government.

It is not only the specific links and segments of networks, but entire modes that go mis-understood. As we noted above, many people argue, if not believe, that the purpose of transit is the reduction of congestion, one less car in front us.

Decision makers may try to imagine how they will use the facility, but cannot develop a full scenario moving their home and workplace and other activities to advantage themselves of the corridor, which would enable them to see the package as a regular user. They are limited to envisioning their occasional interaction with the link or mode. They think WiFi matters more than frequency or direct service. In this sense, they are viewing the facility the way a tourist might, rather than an everyday user.

The decision-maker’s (or anyone’s) view of the transport modes, links, and vehicles that they don’t use is like your view at the amusement park or a place where you are a tourist: a ride, part of an urban entertainment package, an appendage to a game or concert or night-on-the-town wrapped up as an event.

These rides-cum-transport are designed to lure people who have nothing better to do with their time than be entertained. If these projects were self-financing, more power to them – perhaps raising emotions of disdain for those who have nothing better to do with their time but spend it on a ride and trivial amusements, but not particularly impacting anyone else.

Unfortunately, these investments are not self-financing, except in the fantasies of economic development analysts and perhaps in the special case of Pedal-Pubs.

It heeds the cry of the child: “I’m bored, entertain me.”

It is fantastic that decision-makers believe our society has so much wealth and so many resources that there are no more important problems to solve, that we can build urban amusement park rides for the sake of the novelty-seeking joy-riders. That we can prioritize circuses over bread. That we can rise up Maslow’s
Hierarchy of Needs from security and basic mobility to societal self-actualization and social entertainment. That we can fuse entertainment and transport into a newly converged transportainment (hopefully obviating the need for entertainment on the subject).

Do they really believe that?

Certainly, most travel is not ‘work’ travel (most people don’t have regular jobs), but much of it is productive (or re-productive). And if everyone had the opportunity to simultaneously have adequate housing and adequate transport, then public subsidy for transport as entertainment (or housing as entertainment – which in the US is generally left to the private sector) would not be the worst way to spend our social surplus.

Yet we keep hearing that there is insufficient affordable housing, and more than a few people walk or ride bikes not out of choice but for lack of affordable faster modes, and many people ride on buses that take 2 to 3 to 4 to 5 times as long as cars for the same trip (not even considering schedule delays) because they cannot afford or otherwise cannot drive a car, and because the transit system is so poorly designed it takes so long to get to many places.

Every $2 billion spent on rail as part of the urban transport-entertainment complex is $2 billion that cannot be spent on more serious and economically productive urban needs of travelers without the luxury of time and choice, improving their safety and reducing their travel times, or just giving them the resources to make choices.

11.19 Permanence and directness

It is claimed that rail induces economic development. A developer can make a permanent investment decision based on the location of rail lines, as the transit system is committed to this line, while a bus line may be temporary, and thus not induce as much development. Even if we don’t believe that ‘bus is temporary but rail is permanent’ argument ourselves, if we believe other people believe it, it creates the consensual hallucination that organizes development and turns in to a self-fulfilling prophecy. The rail line thus acts as a coordinating agent.

The simple fact that after some point in time most cities that had streetcars lost them (for instance 1948 in Phoenix, 1954 in the Twin Cities, 1961 in Sydney) belies their permanence. Yet on almost every former streetcar route, today we see continued bus transit service. This indicates the service is permanent if the demand is there, not...
the physical instance or particular technology. We can further look at the built form of cities which have made significant commitment to bus rapid transit (Ottawa, Curitiba) to see evidence of development following the service, not the technology. BRT of course is more comparable with LRT if it runs in its own right-of-way. Arterial BRT or Rapid Bus, sharing the right-of-way with cars, is more like streetcars or trams.

Even more notably, bus routes can be quite long-lived. London Buses route 22 was introduced on May 17, 1909. By 1911 it had evolved into the route that served as the link between Putney Commons and Piccadilly Circus. (The route was extended from Putney Bridge to Putney Commons in 1916). The route has evolved some since that time mainly being split into two pieces, the northern branch ‘shortworkings’ designated 22A, 22B, and 22C and later 242. The 22 was later stopped at Piccadilly and the Northern shortworkings were fully separate routes.

Why is this of interest? A continuously numbered bus has managed to last over 100 years on largely the same route, longer than most rail services. One could attribute this to bureaucratic inertia, but it also helps locals at least retain knowledge about their transport geography.

There is however an aspect of embeddedness that works to the advantage of streetcars over buses. This is the resistance to rerouting. Tracks are more expensive, so once laid down, tracks are harder to move than buses. This means it is harder to make routes circuitous. Many bus routes look like they were designed by drunk transit planners. One particularly egregious local bus in Sydney, the 370, (Figure 11.8) which runs near David Levinson’s office and home, is so circuitous it is faster to walk even ignoring schedule delay (which happens to be the highest in Sydney). This is hardly a problem unique to Sydney, we have studied transit circuity in the US and found it far worse than typical travel by road.

There are undoubtedly reasons for every indirect zig that diverts buses from the straight and narrow, its aim is to collect passengers. Serve this building, serve that one, cover this street, reduce pedestrian walking time. However, every circuitous zag also loses passengers by increasing running time for everyone on-board.

In contrast, trams in practice are much more straitlaced, paragons of transit routing virtue. The historic Sydney Tram Map (Figure 11.9) gives a sense of routes that were pretty much as direct as possible.

It can be argued the 370 bus provides an east-west service that no tram did, which is true in part. But that doesn’t mean trams could not. It also could be argued that almost no one rides the 370 end-to-end.
end. Though we have not checked the Opal smartcard data, this is probably true as well. But a well-structured suburb-to-suburb transit network could avoid this.

**11.20 Development-oriented transit**

“Item! Subsidies requested for project built along transit line that itself was built with subsidies justified by promise of economic development. *chomps cigar*” – Nick Magrino.\(^{42}\)

**We subsidize transit to spur development**

- Apple Valley hopes BRT line can spur development near transit stations.\(^{43}\)
- Twin Cities regional transitways will spur economic development.\(^{44}\)
- New Lechmere Station for MBTA Spurs Development.\(^{45}\)

**We subsidize development to spur transit ridership**

- Feds grant $2.9 million to ‘Reinvent Phoenix,’ light rail developments.\(^{46}\)
- Grants help fund Twin Cities’ transit-oriented development.\(^{47}\)
- Urban Transit Hub Tax Credit Spurs Development Interest in Newark.\(^{48}\)

We as society cannot make up our collective mind whether we want development to drive transit use, or we want transit use to increase development. Advocates would say we want both to create transit-served high density communities because of all the good that it brings.

But if the transport-land use cross-dependency is so strong, why do we need to subsidize either, much less both, side(s) of the equation? If you subsidized transit to get the positive externalities which are beneficial to development, it might make sense. For instance maybe transit is under-supplied because the private sector cannot capture the positive externalities due to transaction costs and prohibitions on *value capture*,\(^{49}\) or because the automobile is subsidized. If even after subsidizing transit, and there is still not enough demand for private development to proceed without subsidy, maybe you are trying to stimulate development in the wrong place.

Someone is profiting off of this, and it isn’t the public.

\(^{42}\) Nick Magrino quoted from Streets.mn Forum, April 1, 2014 (Magrino 2014a).

\(^{43}\) (Wolf 2012).

\(^{44}\) (Metropolitan Council of the Twin Cities 2011).

\(^{45}\) (Jessen 2011).

\(^{46}\) (Jimenez 2011).

\(^{47}\) (Dornfeld 2012).

\(^{48}\) (Corbalis 2011).

\(^{49}\) §16.
New streetcar projects in the United States are almost entirely rationalized by increased real estate prices. An examination of projected benefits of recent systems shows that about 80% of all benefits – in particular, increased property tax revenue – are simply due to higher property prices.\(^{50}\)

From a developer’s perspective, spending ‘other people’s money’ on this urban amenity is a brilliant idea.

An even better strategy for developers is to get a subsidy (often in the name of affordable housing) for the transit-oriented development (TOD) adjacent to these newly constructed lines. Programs in a number of cities, such as those of the Livable Communities Act administered by the Metropolitan Council in the Minneapolis - St. Paul region, subsidize development along transit lines.

The best strategy for developers, of course, is both – a publicly provided system and public subsidies for TOD adjacent to it.

Although only implemented sporadically, land value-capture techniques, such as special assessment districts or tax increment financing, present strong opportunities for cities to recover some, all, or more than enough revenue to pay the cost of many types of transit infrastructure and operations. If streetcars are important to developers, and not particularly important to the traveling public, property owners should follow the example of the Grove shopping center, a retail and entertainment complex by Caruso Affiliated in Los Angeles straddling an iconic trolley: they should fund the streetcars entirely themselves. Caruso, though, is not immune to the siren song of free money. Now that they’ve seen the public largess going to other streetcar projects, they want their system extended,\(^{51}\) mostly paid by the public.\(^{52}\)

The claim of permanence inducing development is wrong. Sometimes rail lines induce development; sometimes they don’t. Sometimes (most of the time) development occurs without rail lines. For instance, witness the LRT of Broken Dreams that is Bloomington, Minnesota between the Minneapolis – St. Paul International Airport and the Mall of America, which is the line’s busiest station.\(^{53}\) A station every 200 meters, and no business, just grass and asphalt and one park-and-ride ramp. The line has had nearly 14 years to attract development (more if you count construction, when it was obvious a line would be built) and no one has said “this is the place for me.” The activities along the line past the airport seem to all pre-date it. There is of course a nice plan, shown in the Figure 11.10, with many tree circles, and a surprising amount of parking. Given all the hoopla and awards the plan had

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50 (King and Fischer 2016).

51 (Bachrach 2013).

52 (Bachrach 2013).

53 (Moore 2018).
won, we had once thought the developments (or at least some of them) there had actually been built. For now they are just imaginings.

In a recent debate, Minnesota’s Metropolitan Council of the Twin Cities argued that it shouldn’t have to fund local streetcars proposed for downtown Minneapolis, because they were more for economic development than for transport, and so Minneapolis should be seeking a different pot of money.

Do streetcars actually develop the economy? We have evidence in many historical cases of the co-evolution of transport and land use (such as London, New York, or the Twin Cities). But in probability theory, absence of evidence is always evidence of absence. If $E$ is a binary event and $P(H|E) > P(H)$, “seeing $E$ increases the probability of $H$”; then $P(H|E)$ [Probability of $H$ given Not $E$] is less than $P(H)$, “failure to observe $E$ decreases the probability of $H$.” $P(H)$ is a weighted mix of $P(H|E)$ and $P(H|E)$, and necessarily lies between the two.55

Historical cases, while informative, are not predictive without considering context. We have no evidence that streetcars, of themselves, promote economic development in the context of present-day US cities. That is, there is no case where modern streetcars were built, nothing else was done by the public sector (no road reconstruction, no public subsidies for development, no change in development regulations), and the level of private sector economic development changed measurably, and more than in an otherwise comparable control case.

We have hypotheses as to why there should be no effect, and that is the maturity of the system (streetcars are not connecting places that are presently unconnected) and the lack of positive changes to accessibility (or even negative changes to accessibility) that comes with adding a slow mode to a network, which is already faster than it was in the 19th century.

Absence of evidence is, in fact, evidence of absence.

But it is often said that “Absence of Evidence is not Evidence of Absence,” but this is wrong. This is especially wrong in a context were we have motivated people searching for evidence.

Consider the example of Bigfoot. Bigfoot is a supposedly big humanoid or primate living in very small numbers (and


<table>
<thead>
<tr>
<th>Year</th>
<th>St. Paul</th>
<th>Minneapolis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1970</td>
<td>170,490</td>
<td>265,090</td>
</tr>
<tr>
<td>1980</td>
<td>176,900</td>
<td>268,600</td>
</tr>
<tr>
<td>1990</td>
<td>172,578</td>
<td>278,438</td>
</tr>
<tr>
<td>2000</td>
<td>188,124</td>
<td>308,127</td>
</tr>
<tr>
<td>2010</td>
<td>175,933</td>
<td>281,732</td>
</tr>
</tbody>
</table>

54 (Levinson 2007; Xie and Levinson 2009; King 2011).

55 The very logical Less Wrong blog discusses this issue: Absence of Evidence Is Evidence of Absence: (Yudkowskii 2007).
presumably hiding from humans). There was a fad in our youths for blurry pictures of Bigfoot to appear in weekly tabloids like the National Enquirer sold at supermarket checkout stands. However, as the comic strip XKCD points out, cameras are everywhere now, on billions of phones, and yet we have no more evidence of Bigfoot than before.\footnote{(Munroe 2013)}

Does this constitute ‘proof’ of the non-existence of Bigfoot? No, because one can never prove a negative.\footnote{See Popper (1953) on Falsifiability.} It does however cause the rational among us to become increasingly skeptical about our hirsute friend’s likelihood of being real.

**But for.** We need to think in a ‘but for’ way when evaluating economic development claims.

Would the development not occur ‘but for’ this particular investment? Would it occur with streetcars and BRT, with only streetcars, with only BRT, with neither?

We can’t fully know this without running four experiments in four parallel universes. We can estimate this statistically by looking carefully at multiple cases that have already opened, under multiple conditions, and get likelihoods that effects are as estimated by the model. There are some examples of modern transit lines increasing property values, there are some examples of no effect, and there are even some examples of transit lines destroying wealth.\footnote{Sometimes all found in the same study (Landis et al. 1995).}

Once many studies are done, we can do a meta-analysis, and try to put the complexity of findings into some order. The meta-analysis is much more robust, combining the sample size of all of the studies it takes in.\footnote{For instance, see (Debrezion et al. 2007).} These studies unfortunately do not generally apply to modern streetcars, which have very different characteristics than high capacity services.

There have been a few attempts to summarize the results of the streetcar and economic development debate. The Transportation Research Board’s Transit Cooperative Research Program basically finds an absence of evidence.\footnote{Relationships Between Streetcars and the Built Environment (Golem and Smith-Heimer 2010).}

None of the reports about economic development effects have survived a rigorous peer review process. So in the end, we equivocate. If the new transport infrastructure notably increases the relative accessibility of a place (compared to other places), it might attract some development that would otherwise go elsewhere. If it signals to developers to coordinate actions, and develop here, rather than there, it might also concentrate development. If we concentrate development, and create more accessibility, we might have some economies of agglomeration further driving growth. If, If, If.
The evidence we do have is that employment in the core cities of Minneapolis and St. Paul is very stable, as shown in Table 11.2, independent of most of the vagaries of the economy, shifts from low rise to skyscrapers, construction of freeways and skyways, the expansion of the University, the rise of the dual worker household, and so on.

An anonymous source nicely summarized some publicly available information of the costs and ridership of alternative transit technologies in Minneapolis, shown in Table 11.3.61

Upzoning and development would be factored into all alternatives, especially since a number are already being developed without a streetcar or other improvement. These ridership projections also include the Alternative Analysis’s assumption that streetcar riders perceive a 25-minute travel time savings (implicitly making their travel time negative in some cases), and thus more choose streetcar.

Do we really believe a small investment in infrastructure serving a thousand additional people per day will change urban development patterns? That would be the equivalent of urban homeopathy.

Advocates will advocate, that is their nature. If no one believes their small estimates of economic impact, the estimates will just grow and grow, so they can get attention. But don’t confuse their advocacy with scientific knowledge, about which we have very little.

Are streetcars the best amenity? Are they the best transport service possible? Or do they drain resources that would otherwise be spent on something else, like maintaining and improving existing transit systems or serving many more passengers with Arterial BRT?

Unlike the case for LRT and even BRT, the peer-reviewed literature provides little evidence that streetcars actually increase land value – and the absence of evidence, when a systematic search is involved, is evidence of absence. One study did find that the restoration of

Table 11.3: Costs and ridership of alternatives: Nicollet Alternatives Analysis and Met Transit’s Arterial BRT study.

61 (Metropolitan Council of the Twin Cities 2012; City of Minneapolis 2013).
legacy streetcar service in New Orleans after Hurricane Katrina was associated with building permits.\(^{62}\)

**Is there such a thing as BRT-oriented development?**

Above we asked if streetcars had economic development effects, and concluded we have no evidence to date. In contrast, for BRT systems, there is much peer-reviewed evidence, though not as much as we might like.

First, obviously the nature of the impacts depends on what kind of BRT you are talking about. Broadly, we can divide systems into freeway-based BRT systems with stations, and arterial-based BRT systems with stops. The differences are that stations are more elaborate than stops, and less frequent. Worldwide, systems are hybrids.

A 2008 review found wide variations in the types of BRT across many dimensions (speed, construction costs, ridership, subsidies, etc.) with some systems offering a peak headway of well better than 1 bus per minute, while others were at 10 minutes between buses.\(^{63}\)

BRT thus has many distinguishing characteristics, ITDP developed a ranking system: the BRT standard.\(^{64}\)

The standard scorecard is more complicated, and includes many other factors as well. The best systems are rated Gold, and so on. We don’t agree with all of the points or categories, but this is a good place to start. The US and Canadian systems (Los Angeles, Eugene, Pittsburgh, Las Vegas, Ottawa) tend to fall into the Bronze Category, though Cleveland’s Health Line makes Silver.\(^{65}\)

As many people worry, something can be pitched as a high-quality service, and then whittled down by the time of deployment, or afterwards to save costs. Frankly, this can happen with any technology, just look at what has happened to service frequencies on the Phoenix LRT, which dropped to 12 minutes in 2010, but were 10 minutes at opening in 2008, or the Minneapolis-St. Paul Blue Line, which began life with 7.5 minute headways that were quietly retracted to 10 minutes). Clearly, as BRT is developed and deployed, this needs to be monitored. But this is true for any service with net ongoing operating costs that can be reduced over time.

Some findings from the peer-reviewed literature are below. Most, but not all of the evidence is favorable to measurable economic development impacts, clearly every system is unique:

- “Multilevel models reveal BRT improvements prompted property owners to convert single-family residences to higher density apartments and condominiums. Land price premiums of up to

\(^{62}\) (Guthrie and Fan 2013).

\(^{63}\) (Hensher and Golob 2008).

\(^{64}\) The categories for which points are awarded in BRT Basics are:
- Busway alignment: 7 points
- Dedicated right-of-way: 7 points
- Off-board fare collection: 7 points
- Intersection treatments: 6 points
- Platform-level boarding: 6 points
(\(\text{Hook et al. 2012}\)).

\(^{65}\) This is appropriate given the color of the buses and its former name “The Silver Line”. 
10% were estimated for residences within 300 m of BRT stops and more than 25% for retail and other non-residential uses over a smaller impact zone of 150 m.”

• “First, Seoul’s BRT contributes to increased development density in urban centers, acting as a centripetal force to attract firms from the suburbs into urban cores and supporting arguments for Smart Growth proponents. Second, unlike its redistributive effects on nonresidential activities, the BRT has a limited effect on the redistribution of residential activities, implying that residential locations are less sensitive to accessibility improvements made by the BRT than are nonresidential locations. Third, reflecting the transferred space demands from the suburbs to the urban cores, the CBD reaps the highest property value gains, while all of the outer ring zones suffer from reduced property values.”

• “[T]he BRT system is the favorable component for the location of creative industries and service sectors within 500 meters of BRT-bus stops. In addition, the BRT operation increases the employment density within the same distance to the bus stops by 54%.”

• “The statistical analysis suggests that accessibility advantage conferred by BRT is capitalized into higher property price. The average price of apartments adjacent to a BRT station has gained a relatively faster increase than those not served by the BRT system. The capitalization effect mostly occurs after the full operation of BRT, and is more evident over time and particularly observed in areas which previously lack alternative mobility opportunity.”

• “Results suggest that for every 5 min of additional walking time to a BRT station, the rental price of a property decreases by between 6.8 and 9.3%, after controlling for structural characteristics, neighbourhood attributes and proximity to the BRT corridor.”

• “Properties [in Bogota] offered during the year the extension was inaugurated and in subsequent years have asking prices that are between 13% and 14% higher than prices for properties in the control area, after adjusting for structural, neighborhood and regional accessibility characteristics of each property.”

• “The main results showed that, with respect to the value of properties in relation to proximity, the housing market places value premiums on the properties in the immediate walking proximity of feeder lines. The analysis by socio-economic strata

(Cervero and Kang 2011).

(Jun 2012). This study uses simulation, rather than empirical evidence, so keep that in mind.

(Kang 2010).

(Deng and Nelson 2010).

(Rodríguez and Targa 2004).

(Rodríguez and Mojica 2009).
showed that middle-income properties were valued more if they fell closer to the system, while there were opposite results for low-income housing. Finally, analysis across time reflects slight average annual increases in property values correlated with the implementation of the system in two specific areas analyzed.” 72

• “In common with other forms of mass transit, a fully-featured BRT has the potential to offer significant effects on land development.” 73

• “A property 1,000 ft away from a station is valued approximately $9,745 less than a property 100 ft away, all else constant.” 76

• “A key result is that for condo sales that occurred in 2007 or 2009, the BRT premium was approximately 7.6%. For condo sales in 2000 and 2001, prior to the opening of the Silver Line, no sales premium existed for proximity to the corridor.” 77

All of this is consistent with general observations and what theory would predict about accessibility improvements. A transport system that adds to accessibility in a significant way warrants a premium in the prices people are willing to pay to take advantage of it.

11.21 Discussion

Like magicians, modern US streetcar promoters engage in diversion and distraction, attributing all urban success to streetcars and covering up the mistakes. The net benefits of streetcars (compared with other, less expensive technologies) are illusory, the costs are real.

Wealthy US cities like their toys: new stadiums, trains, convention centers, and the like are the most egregious examples. If money were free, this would not be a problem. If money were free, it wouldn’t be money. Consideration of resources matter in transport design. Constraints (limits on available resources) can drive creative design. But constraints matter, we should not dedicate all of our resources to your pet project because that means there are fewer resources to spend elsewhere. Aside from a few macro-economists, no one believes that money grows on trees. Wealth is created, and the more of our wealth we spend here the less we can spend there. Spending more money on streetcars means spending less on something else.

The notion of ‘permanence’ is in stark contrast with the idea of ‘responsiveness’ that make spontaneous cities work. 78 Every dollar

72 (Munoz-Raskin 2010).
73 (Deng and Nelson 2011).
74 300 m.
75 30 m.
76 (Perk et al. 2010).
77 (Perk et al. 2013).
78 (Levinson 2016b).
sunk into fixed cost is a dollar less available to adapt to changing conditions.

Making large investments now in fixed expenditures to support weak transit lines is a poor use of scarce resources. As the technology environment changes, the types of appropriate investments will change with them, and for the first time in almost a century, we are on the cusp of major technological transformation in transport. The arguments about streetcars will shortly appear to be as moot as argument about canals.