POLICY BRIEF

Microtransit

Susie Pike and Maxwell Waechter
University of California, Davis

April 2025

Equity Review by Ruben Abrica

Program Description

This project reviews and summarizes empirical evidence for a selection of transportation and land use policies, infrastructure investments, demand management programs, and pricing policies for reducing vehicle miles traveled (VMT) and greenhouse gas (GHG) emissions. The project explicitly considers social equity (fairness that accounts for differences in opportunity) and justice (equity of social systems) for the strategies and their outcomes. Each brief identifies the best available evidence in the peer-reviewed academic literature and has detailed discussions of study selection and methodological issues.

VMT and GHG emissions reduction is shown by effect size, defined as the amount of change in VMT (or other measures of travel behavior) per unit of the strategy, e.g., a unit increase in density. Effect sizes can be used to predict the outcome of a proposed policy or strategy. They can be in absolute terms (e.g., VMT reduced), but are more commonly in relative terms (e.g., percent VMT reduced). Relative effect sizes are often reported as the percent change in the outcome divided by the percent change in the strategy, also called an elasticity.

Summary

Strategy Description

Microtransit is a shared-ride, on-demand form of transit that offers point-to-point service within specified areas and times. The service may be door-to-door, curb-to-curb, or corner-to-corner. Microtransit may be offered on its own or in addition to fixed-route transit. Microtransit operates without set routes or schedules.

Behavioral Effect Size

No studies were identified that evaluate the impact of microtransit on VMT. The focus is generally individual microtransit use, or overall microtransit ridership. Shifts in the use of other forms of transportation (reductions in vehicle use, increase in transit use, etc.) are also considered. In one zone-based system, microtransit is used by large numbers of travelers (Xing et al. 2022). Microtransit use has mixed impacts on individual frequencies of fixed-route transit use (e.g., Shaheen et al. 2016, Macfarlane et al. 2021).

Strategy Extent

Microtransit typically offers service in limited geographies or with limited hours and is often constrained by available funding. Uptake may be slow if there are minimal outreach efforts, low technological literacy, or challenges with operational characteristics such as wait times or limited coverage.

Strategy Synergy

Spatial and temporal coordination of microtransit to complement other alternative modes can lead to greater reduction in private vehicle use even (or especially) if microtransit is not the only mode used as a substitute.

DOI: 10.7922/G26H4FSJ

Equity Effects

Microtransit may improve mobility when it fills temporal or spatial gaps in the existing fixed route transit network, particularly for transit-dependent populations. Microtransit fares are typically less expensive than ridehailing fares and similar to fixed-route fares. It can also take some of the burden off paratransit services with approximately 30% of trips being made up of riders with some sort of disability (Miah et al. 2020). Equity concerns include technological literacy and safety while accessing and waiting at pickup locations.

Strategy Description

Microtransit is an on-demand transit service offered by public transit agencies and in some cases municipalities. A key feature of microtransit is that trips can be booked and paid for using a smartphone application. Some microtransit providers also provide a call-in option and/or prepaid or cash option for those without smartphones. Trips may be door- to-door (drivers provide riders with assistance from the curb to the door), curb-to-curb, or corner-to-corner, where travelers may be instructed to walk a limited distance to a safe pickup location such as a nearby intersection. Microtransit is typically offered within a set geographic area that may also be further divided into zones.

Microtransit fares may be the same as fixed route bus or rail services within an area, or sometimes a premium fare is charged. Fares are typically less than those of on-demand ridehailing services such as Uber and Lyft.

A transit agency or municipality may operate microtransit service directly with its own staff and vehicles or may contract with a private provider for some or all components of the operations. For example, some private companies offer not just a technology platform but also "turnkey" microtransit services, including the management of the vehicles, staff, safety, maintenance, and/or customer service call center operations. All microtransit operations employ some technology or process for matching ride requests to vehicles. The degree to which a transit agency or jurisdiction contracts out the various components of the microtransit service can impact the amount of control the agency has over the system, the amount of service data that it has access to, etc.

Microtransit has the potential to replace private vehicles or ridehailing trips, but it might also substitute for transit, bike, or walking trips. It may be used in combination with sustainable modes and with fixed-route transit to allow for a car-free or car-light mobility pattern, thereby reducing VMT and emissions. The scale at which microtransit is offered is likely the key limiting factor in terms of car use, VMT, or emissions reductions.

For more detail on many of the service and operation considerations that an agency should account for in the planning and implementation of microtransit, see Ghimire et al. (2024).

Strategy Effects

Behavioral Effect Size

The studies and outcomes reviewed in the writing of this brief are detailed in Table 1. Studies of microtransit typically evaluate how frequently individuals use microtransit or overall use of the service in terms of ridership. This answers research questions such as "How much is microtransit used and by whom?" However, since some of this work is evaluative, it may result in insights related to various aspects of the system's design. Nonetheless, the authors did not find studies that evaluate VMT changes as a result of microtransit implementation.

The outcomes of interest cover overall use of the system and the ways and extent to which individual users change their travel behavior because of microtransit. Travel behavior changes resulting from microtransit may consist of increased travel due to improved mobility or microtransit use in place of other modes (for trips that would have been made regardless). In contrast to these outcomes of interest, microtransit evaluation often centers on the use of the microtransit system.

Some studies aim to evaluate the microtransit VMT of travellers and/or of the service. In one study, the authors compute VMT in their simulations and compare this to ridership in AM peak hour travel. The authors find different rates of VMT per ride across study locations. Using VMT and trip count information from the paper, we can compute the average distance of the microtransit trips for each location in the study. In Salt Lake City, Cupertino, and Sacramento, trips averaged 5.0 to 5.1 miles. In Columbus rides were 37 miles on average (quite different than the others) while Austin was about 8.0 miles and Jersey City was about 2.1 miles (Rath et al. 2023). These figures do not necessarily correlate to passenger vehicle VMT reductions due to confounding factors such as shifting from other sustainable modes or additional trip-making.

Fu and Chow (2022) try to estimate VMT reductions of the microtransit service itself. They study a special case of microtransit with vehicle-to-vehicle transfers. They compare VMT reductions for different network densities and find that greater VMT reductions within the microtransit service can be achieved within denser networks. The denser network had 20.37% reduction and the less dense had 7.38% reduction (Fu and Chow 2022).

Martin and Shaheen (2025 forthcoming) estimate the total changes in VMT in the West Sacramento area resulting from microtransit. The estimate accounts for travel behavior changes, mode shifts from automobile modes including ridehailing, changes in household vehicle ownership, and the total miles traveled by the microtransit vehicles themselves. They estimate annual VMT reductions of 981,000 to 1,034,000 (the variation is due to using different deadheading assumptions for mode switching from ridehail services).

Shaheen and coauthors (2016) evaluated the implementation of the RideKC microtransit service in Kansas City. The service was implemented to provide more transit options. The researchers found that 6% of RideKC riders used it to commute. Of those who recently used RideKC, 33% would have driven alone and 33% would have taken the bus. Making up the final third was primarily users who reported they would have used Uber (22%). In addition, of RideKC users who drive, 25% now drive less, while of those who use the streetcar, 16% do so more and 7% of bus users do so more. However, 29% of bus riders said they use the bus less (Shaheen et al. 2016).

Turning to Tel Aviv, Israel, Soria et al. (2023) used an integrated choice and latent variable model to evaluate potential changes in the use of cars and transit for two different formats of microtransit. Elasticities were calculated based on the features of the service, including travel time. If travel time increases by 1%, the elasticity indicates the increase in demand for the focal alternative. Traveler behaviors were elastic with respect to travel time in some cases; for the status quo choice, elasticities were -0.12 for car commuters and -0.22 for transit commuters. On the other hand, they were -1.07 and -0.85 for sedan microtransit and -1.41 and -0.72 for van based microtransit. This suggests that there is lower tolerance for longer travel times among car commuters (Soria et al. 2023). In a related vein of research, Rossetti et al. (2023) examine value of time for the use of different travel modes and different characteristics of microtransit. This study examines microtransit systems in Washington, DC, Miami, Minneapolis-St. Paul, and Seattle. Out-of-vehicle time (walking and waiting) was valued at $75.38 per hour among the study sample, while in-vehicle travel time was much lower and had very similar values of $20.24 for their current mode and $18.63 for microtransit. Reducing the time walking and/or waiting for microtransit may therefore make a large difference in its use.

In the Sacramento area, microtransit was implemented in 2018 in two zones and later expanded to eight zones. Each zone had different characteristics and different service goals, including replacing a fixed-route transit service in one location. Changes in the use of other modes were attributed to SmaRT Ride microtransit use by travelers. Individual travelers may increase or decrease their use of other modes. The reported percentages include both the percent of users that *increased* and the percent of users that *decreased* use of each other transportation mode. Notably, the greatest decrease (30% of users) and smallest increase (12%) in use occurred for Lyft/Uber (Xing et al. 2022). Bus and light rail use decreased by 28% and 25% of microtransit users, respectively, and driving decreased by 28%. At the same time, bus and light rail increased by 14% and 13% of microtransit users and driving increased by 13%. These result suggest both substitution and complementary use.

Salt Lake City's microtransit system is the subject of a few studies. The microtransit service was introduced in 2019 and aimed to expand accessibility to fixed route services. Removing or rerouting fixed routes was considered but was not implemented at the initial launch of microtransit. First, one study conducted in 2018-2020 found a small decline (-0.45%) from 2018 to 2019, and a small increase (+0.18%) from 2019 to 2020 in fixed route transit ridership in areas not served by microtransit. In areas that are served by microtransit, there were declines in both periods (-4.61% and -13.75%) (Macfarlane et al. 2021). This suggests there is substitution but does not completely rule out complementary use.

Extent

Scale of Application: Different types of users are more sensitive to different features of the microtransit service. Those who typically drive are more sensitive to walking times and waiting times than those who typically use transit (Soria et al. 2023). This suggests that implementations with greater numbers of vehicles may attract more drivers to adopt microtransit.

Efficiency or Cost: Microtransit passenger fares are determined by the transit agency or municipality that offers the service. Shaheen et al. (2020) note prices ranging from $3 to $6 for Chariot and $5 to $25 for Via based on trip distance. Others have identified fares as low as $1 and up to $7 (Volinski 2019); fares may be linked to features of the service such as how much time is needed in advance of a ride request. In Xing et al. (2021), the cost of microtransit for Sacramento's SmaRT Ride is $2.50 per ride per person, the same as the fare for fixed route transit and light rail. This is common – microtransit pricing matches or is close to other transit pricing (Volinski 2019).

Microtransit per-passenger costs to agencies are usually greater than the costs of fixed-route bus services, though less than Americans with Disabilities Act (ADA)-required complementary paratransit (Volinski 2019). Microtransit services are frequently operated as a pilot or special program without a dedicated ongoing source of funding. As such, they must secure funds with some regularity.

There is some evidence that microtransit costs can be reduced when en-route transfers are allowed (Fu and Chow 2022), though this simulation may not fully account for users with physical limitations.

Time / Speed of Change: Microtransit can have quick adoption once implemented, but use varies over time. A Salt Lake City-based study found that a program launched in November 2019 and showed growth up to 325 trips per day on average prior to March 13, 2020, growing fairly quickly up to the COVID-19 pandemic (Zhou et al. 2021).

Considering use of microtransit in Salt Lake City, Macfarlane et al. (2021) show a 4.61% decrease in ridership from 2018 to 2019 and a 13.75% decrease from 2019 to 2020. The latter decrease was most likely due to Covid during that time. Ghimire et al. (2024), on the other hand, show a significant increase in ridership when comparing the latest month's ridership to average ridership up to that point in multiple North Carolina locations. In June 2022 they found an increase of 19.5% in Wilson, 41.5% in Wilmington, 27.1% in Morrisville, and 34.5% in Wake County.

Location within the Region: There is potential for microtransit to be successful in a variety of geographies, but the services should be tailored to fit the needs of any community. In the Sacramento region, three systems have operated over the past eight years (Hyland et al. 2024) with different models in different contexts, and that has made each successful in different ways. In operation, the systems are very different but are all fairly successful in terms of use, likely because of their differences make them each a good fit.

Using regression models, one study finds that the use of microtransit and corresponding VMT are related to a number of factors including employment and household density, income, street network and transit stop density, and car ownership (from Rath et al. 2023). While these factors vary from place to place, they should be considered when planning and implementing microtransit service.

Equity

This service has the potential to improve equity outcomes as it can offer a new mobility choice to those who do not have access to or cannot use (due to physical limitations) a private vehicle. Improving mobility in this way is expected to improve access to a greater number of destinations, particularly for older adults. Bills et al. (2022) find that a microtransit service could increase accessibility 13.18% to 20.68% in Detroit.

Miah et al. (2021) compare paratransit and microtransit usage in Arlington, Texas, gathering data on people with disabilities and their use of microtransit. The percent of trips by disabled customers was 1.90% with a mental disability, 28.10% with a physical disability, 0.07% with visual disability, and 69.94% had no disability. This example likely indicates improved mobility outcomes. ADA compliance is an important consideration for transit agencies when implementing microtransit (Ghimire et al. 2024). Similarly, ensuring that drivers have ADA training and are able to assist passengers is important.

Another possible equity issue for microtransit is that for travelers living in more rural areas or less dense areas there may be less service per area served which could result in more canceled rides or rides that cannot be fulfilled. This can be as high as 25% in "small, disadvantaged, communities" (Bardaka et al. 2024).

A recent study examined the Yolo County BeeLine service that serves small rural areas around Woodland, CA. The authors, from reports from the agency, found that the service had garnered a good amount of use and seemed to be serving community needs better than the lifeline fixed route transit service that it replaced (Hyland et al. 2024).

Equity concerns surrounding microtransit also relate to the user interface and technological literacy. Most systems use a smartphone application as the primary means of requesting and receiving updates about rides. Any users who are less proficient in their use of smartphones may be less able to benefit from microtransit. Similarly, lower income individuals may not have data plans for their phones, and this could pose an obstacle to access.

Some of these issues are addressed by allowing passengers to call in to a multilingual reservation line or use a web portal to request or book a ride. Payment methods vary by location and partner agency, though they may be limited to digital payments, a potentially less accessible means of payment for some people in some locations.

The types of areas and the sociodemographic characteristics of those who are served also vary by location. This can mean that not all transportation-disadvantaged areas have the most access to microtransit. This is linked to funding in some cases, as microtransit may be funded by local option sales taxes that require service coverage in specific areas based on the ballot initiative text. This may also be impacted locally by the efforts of the transit or city planners to include disadvantaged areas in the system design.

Considering the labor force employed in microtransit service, in some cases the microtransit drivers are employees of the transit agency and receive full salaried employee status and benefits. However, equity concerns have been raised related to microtransit service operated by gig workers or non-union drivers who do not receive the full employee status nor full time positions of other transit agency employees.

Synergy

Primary synergies relate to the potential for microtransit to fill gaps that would otherwise be filled by private vehicles or ridehail services. There is some evidence that microtransit is a complement to fixed-route transit and other alternative modes, at least in some systems (e.g., Xing et al. 2022).

Confidence

Evidence Quality

There is a large degree of variation in research study locations and methods. It is difficult to compare results for this reason. There are very few papers that cover this topic of microtransit and VMT reduction. Existing literature typically covers before and after implementation or expected program use but cannot offer a comparison to what would have happened without the program. Similarly, the results of the available papers may not be generalizable to other locations.

Many studies are focused on the use of the service (i.e., the frequency of use among passengers or the total number of passengers or passenger miles served). This may or may not indicate changes in the use of private vehicles and/or the use of alternative modes. It cannot be relied on as a proxy to evaluate VMT impacts of microtransit.

Technical & Background Information

Study Selection

Studies included here are centered on the implementation of microtransit and the evaluation of one or more outcomes resulting from microtransit. Search terms included microtransit, on demand transit, and demand responsive transit. Where appropriate, simulation studies are included as they provide information on the potential differences in outcomes resulting from different features or designs of microtransit systems. Literature searches from recent studies related to microtransit were also reviewed to identify any other relevant studies. Selected studies evaluate microtransit use, changes in other travel behavior or expected impacts of microtransit through comparisons (e.g., travel time comparisons).

Methodological Considerations

The studies included here vary in methods and include stated preference, temporal analysis, ridership and mode share estimates as well as survey data. Each study has limitations typical of the methods employed. None of the studies present transit ridership elasticities in connection with the programs, though some present elasticities related to travel time or other features. Outcomes do reflect changes in transit ridership, program use, or transit (and alternative mode) use reported as resulting from the programs. It is not possible to determine, based on these studies, what would have happened without the program (in terms of, for example, transit ridership) and how much impact could be expected if the program were expanded or implemented in another area. In addition, there is limited information about baseline conditions or pre-implementation conditions for some locations, making it difficult to evaluate what has changed since implementation.

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Table 1. Microtransit Outcomes

Study	Study Location	Collection Method	Measurement	Effect Size
Martin and Shaheen (forthcoming 2025)	West Sacramento, CA	Surveys (users: N = 224, non-users: N = 145) and vehicle activity data	Mode substitution and household vehicle reduction to assess total VMT change	Estimates range from 981,000 to 1,034,000 annual VMT reduction for the region
Rath, et al., 2023	Five mid-sized US cities	Multiple models to predict future ridership and VMT	First/last mile microtransit use	Percent of microtransit trips that are first/last mile connections to transit: Salt Lake: 35% Cupertino: 82% Sacramento 14% Columbus: 100% Austin: 88% Jersey City: 67%
Shaheen, et al., 2016	Kansas City, Missouri	3 surveys (riders (N=18), signed-up (N=119), and community (N=78))	Impact of RideKC on travel outcomes including mode shifts	Among RideKC users, 6% used microtransit for main commute mode. Among those who drive, 25% reported driving less, Among streetcar users, 16% use streetcar more. Among bus users, 29% use the bus less, but 7% use the bus more.
Soria et al., 2023	Tel Aviv Israel	Survey with choice experiment; 1,326 participants	Elasticities (percent change in demand in relation to a percent change in travel time) based on integrated choice and latent variable model for microtransit adoption among car and transit users using mode attributes	Elasticity of travel time for: Status quo: car, -0.12; transit, -0.22 Microtransit–sedan: car, -1.07; transit, -0.85 Microtransit–van: car, -1.41; transit, -0.75
Rossetti et al., 2023	Washington DC, Miami, Minneapolis-St. Paul, and Seattle	Survey of 2,315 participants roughly equally spread across the four cities	Value of time per hour for different modes and microtransit characteristics	Current mode: $20.24 (95% CI: $13.71-$26.94) Microtransit: $18.63 (95% CI: $13.39-$24.46) Out of vehicle: $75.38 (95% CI: $59.22-$94.96).

Table 1. Microtransit Outcomes (continued)

Study	Study Location	Collection Method	Measurement	Effect Size
Fu & Chow, 2022	NA	Created and compared optimization models	Cost and time savings from simulation of en-route transfers	VMT savings of microtransit vehicles = -7.31% to -20.37% in lower density and higher density areas Cost savings = -2.45% to -2.86%
Bills, et al., 2022	Detroit, Michigan	Uses a 4-step travel demand model to test scenarios with microtransit	Accessibility impacts resulting from microtransit – measured as consumer surplus	Increases for low income: 17.24%, high income: 13.18%, car-less households: 20.68%, single-car households: 14.60%
Macfarlane, et al., 2021	Salt Lake County, Utah	Intercept survey of riders before and immediately after the microtransit service is launched	Average weekday fixed route transit boardings % change per year (2018-19 and 2019-29) in microtransit area:	2018-2019 = -4.61% 2019-2020 = -13.75%
Miah, et al., 2020	Arlington, Texas	Total: 128 responses through face-to-face and phone surveys in May and June 2018, and use data	Barriers to usage, age, disability status, purpose of use	% Trips by disabled customer: Mental = 1.90% Physical = 28.10 Visual = 0.07% None = 69.94%
Xing, et al., 2022	Sacramento, California	Mobile phone and email survey (N=997) along with 4 focus groups (N=14)	Changes in travel behavior since Smart Ride adoption	Decrease/increase by mode. Drive alone: -28% /+15% Bus: -28% / +14% Light Rail: -25% / +13% Lyft/Uber: -30% / + 12%