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Decrypting fare-free public transport in Tallinn, Estonia: How modest ridership gains result from a fare policy intervention

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ABSTRACT

Among many possible interventions in public transport finance and policy designed to enhance the attractiveness of riding public transport, one of the most extreme, which is seldom implemented, is the elimination of passenger fares, effectively making public transport "free" for riders (with operating costs paid from other funding sources). This article describes a fare-free public transport program in Tallinn, Estonia, launched in 2013, which has exhibited lower-than-expected increases in ridership. Evaluations of Tallinn's fare-free public transport program are presented and synthesized, with a focus on program goals and how goals are met through program performance. Findings suggest certain flaws limit the program's potential success since the program design is misaligned with its primary stated goals, and several program goals relating to external effects of fare reform cannot be evaluated. Although it would be valuable for transport managers in other cities to learn about this experience, the Tallinn fare-free public transport program provides scant transferable evidence about how such a program can operate outside of a politicized context, which was crucial to its implementation in Estonia.

1. Introduction

City leaders, urban planners, and transport managers the world over have sought for decades to reduce the amount of driving in cities (especially solo driver commuting) to lessen the impacts of space-consumptive, energy-demanding, and polluting automobiles. New urgency about the need to curb driving has emerged in the face of growing automobility. While policy change may incrementally produce marginal gains in suppressing driving, large-scale high-profile interventions can, through their visibility, further advance strategy and action that fundamentally changes urban transport mode choice paradigms.

Various policy instruments have been introduced in recent years in cities around the globe to increase public transport ridership (and effect a modal shift from automobiles to public transport) by introducing service and operations changes. For example, public transport ridership gains may stem from service improvements (which make riding buses and trains faster and more convenient); riders and potential riders react according to the theory of fare elasticity to fare changes, and new fare payment opportunities can speed vehicle boarding (reducing dwell times) and make public transport more attractive for passengers.

In the largest example in recent years of significant fare reform, the public transport system in Tallinn, Estonia stopped charging fares to city residents in January 2013. This article articulates the goals for the fare-free public transport scheme and explores the degree to which the explicit and implicit program goals have been met, since previous analyses did not adequately assess the degree to which the program accomplishes its goals. The article also explores reasons why a comprehensive evaluation of this innovative public transport finance reform, which could be highly useful to cities and public transport systems everywhere, has not been conducted, given program design and operating characteristics of this politically-motivated reform of Tallinn's public transport system.

2. Background and context

Although most public transport systems require operating subsidies, a typical budgeting process includes establishing a per-rider cost and passenger fare. The price that each passenger pays toward the cost of his or her consumption of public transport service (the passenger fare) can be paid in one of three ways. First, the passenger can pay the full fare (which is rare in Western countries) to cover operating costs. Second, the public transport system (or "provider") can pay the full passenger operating cost, however "free" public transport systems are uncommon (De Witte et al.,

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2006). Most passenger fares are subsidized to some degree, meaning that the passenger pays a share—representing partial cost recovery—and the balance is subsidized (creating a hybrid of the first two options). Finally, a "third-payer" can pay the full cost, an arrangement in which an external party contributes to the public transport system to cover the fare cost of passengers.[1] This happens, for example, when employers pay costs for employees, when social service agencies pay costs for clients, and when universities pay costs for students (Brown et al., 2001).[2]

Given these various fare payment arrangements, transport managers aim to set passenger fares as low as possible (to maintain existing riders and entice new riders) but high enough to cover necessary operating costs. Occasionally, passenger fares have been completely eliminated, reducing out-of-pocket expense for riding public transport to zero. In such cases, passenger fares are of necessity replaced with another funding source. It is no surprise that the notion of fare-free public transport is highly appealing, due to benefits for riders, for cities, and for the environment. Fare-free public transport transforms local buses and trains from a user fee-based service into a tax-payer-supported "public good" like libraries and parks. Everyone pays to support public transport (through taxes), and benefits accrue to users (directly, by not having to pay a fare) and everyone (indirectly).

Sensitivity of passengers to price in the public transport industry has been well studied (Cervero, 1990) and findings suggest that riders are more sensitive to service change than to price change. That is, service modifications that reduce travel time (including wait time and transfer time) are more likely to positively affect ridership than fare reductions (Hess et al., 2002). Consequently, it would be wise for a public transport agency to introduce significant service changes to retain existing riders and attract new riders. This seldom happens, however, since transport managers often cannot resist the idea of reducing passenger fares even though the practice is known to have less impact on ridership than service enhancements (Cervero, 1990). Furthermore, behavior change comes about more readily in response to price changes in complementary travel modes (automobile driving) more than price changes in public transport.

Fare elasticities, which estimate how price changes affect public transport ridership, can be used to predict ridership impacts on removal of public transport fares (Cervero 1990; Hodge et al., 1994; Litman, 2012). An elasticity function, also known as the Simpson & Curtin rule, expresses the relative change in consumption resulting from a unit change in price (when other factors are held constant) (Hodge et al., 1994). A higher elasticity value suggests that a good is price-sensitive: a small change in price produces a large effect on consumption (and, conversely, a lower elasticity value suggests that a large change in price produces a small effect on consumption) (Litman, 2013). For example, public transport riders who are sensitive to fares, such as university students, may increase their ridership likelihood significantly when fares are lowered (Litman, 2004); conversely, public transport-dependent riders are less price sensitive than discretionary riders. A study in the United States found higher price elasticities in smaller cities (FTA, 2001), while a *meta*-analysis in Europe found that public transport elasticities are comparable or higher to those in the United States (Nijkamp and Pepping, 1998).

Price elasticity theory can be used to predict ridership and revenue effects of changes in public transport fares, including elimination of fares. A typical fare elasticity predicts that a 3 percent fare increase results in a 1 percent ridership decrease (Hodge et al., 1994). Following this mathematical rule, fare elimination should result in a 30 percent ridership increase (Yaden, 1998), although some researchers argue that traditional fare elasticities cannot accurately predict ridership changes from fare elimination (Chen et al., 2011).

2.1. Experimentation with fare changes

Past experimentation with steep reduction [through "deep discounting" of fares (Nuworsoo 2004, 2005)] or elimination (Perone, 2002) of public transport fares offers insight to the pursuit of fare adjustment strategies to increase public transport ridership and achieve other goals. Fare reform can be motivated by various goals for transport managers related to access, mobility, sustainability, environmental protection, and social equity.

When public transport becomes free for riders through pre-paid fares, significant ridership adjustments may occur. Based on models and previous cases, the elimination of fares on public transport is expected to produce ridership increases of 20 percent to 60 percent within a few months (Hodge et al., 1994; Volinski, 2012). Of new riders drawn to public transport systems with fare removal, 5 to 30 percent are likely to shift from other motorized travel modes and the balance are likely to shift from walking and bicycling (Volinski, 2012). Price sensitive riders (including low income people, students, and older adults) have lower fare elasticities and can be expected to react strongly to the elimination of transport fares; for example, students at North American universities increased their riding by 71 to 200 percent after university fare-free programs were introduced with local public transport agencies (Brown et al., 2001).

2.2. Fare elimination precedents

City leaders and administrators have long considered the possibility of implementing fare-free public transport, and some public transport systems have piloted fare elimination. In the United States, the federal government subsidized a number of pilot programs beginning in the 1970s. The chief motivation for doing so was demand management and travel behavior shift toward public transport and away from automobiles (McCollum and Pratt, 2004). Transport agencies in the United States are considered good candidates for elimination of passenger fares since high operating costs (for labor and maintenance) result in low farebox recoveries (Perone, 2002).[3] ("Farebox recovery ratio" refers to the share of operating costs collected from fares.) A well-known experiment occurred in Austin, Texas in the early 1990s, achieving a short-term ridership increase of 75 percent (Nuworsoo, 2005; Perone, 2002). The Austin fare-free program followed several short-lived attempts at fare elimination in the 1970s, including two in the United States (Denver, Colorado and Trenton, New Jersey) and one in Italy (Rome) (Hoffman, 1971; Perone, 2002). Public transport ridership increased at the expense of walk trips. More examples have occurred in recent years in Europe and elsewhere as climate change emerges as an important part of policy agendas.

In Table 1, characteristics of major fare-free public transport programs are shown in which passenger fares were eliminated systemwide for a period of one year or more.[4] (Only occasionally is fare-free public transport a permanent strategy (and not a demonstration project),

[1] Transit fare reduction for rider subgroups, especially youth, older adults, university students, and people with disabilities, can be effective. In England, people 60 years of age and older became eligible to ride local buses without paying a fare (during off-peak times) (Mackett, 2015). The goal of the "Freedom Pass" was to enhance mobility and increase independence [thereby redressing transport exclusion (Jones et al., 2013)]. Evaluations confirm an increase in ridership and lower obesity odds after this subgroup became eligible for concessionary fares (Webb et al., 2012).

[2] In the latter case, for example, unlimited access programs have been shown to dramatically increase public transport ridership among university students, a subpopulation thought worthy of incentivizing to ride public transport, given the potential benefits of nurturing lifelong travel habits, and as an incentive to experience life and engage with a city/region in a metropolitan area beyond a university campus.

[3] Fare-free travel also removes the transaction cost of fare collection, and savings can be significant.

[4] Not included in Table 1 are free shuttle buses, transit systems that are fare free only at select times, on select services, or for select rider groups, bus systems in remote towns or resort areas, and short-term fare-free pilot programs. Consequently, fare-free public transport programs that operated only during off-peak hours (Denver, Colorado and Trenton, New Jersey) or on select services (Chengdu, China) do not appear in the list. Also absent from Table 1 are fare-free public transport programs in resort areas and rural communities, because these are usually not replicable in other settings. In some cases, college or university campus bus systems have been intertwined with public transport for small cities and towns, where campus bus systems (with subsidized fares for students) also serves the public, who also do not pay a fare (Brown et al., 2001; Hodge et al., 1994).