



Redistributive effects of consumption and income from subsidies to passenger transportation in the Brazilian economy

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Abstract: Urban mobility is understood as the ease of movement of goods and people in urban agglomerations and is fundamental for the development of social and economic activities. In this context, Urban Public Transport (UPT) system is essential to ensure access to opportunities, especially for the middle and low-income population. In Brazil, transport is included as a social right among other rights (e.g., education, health, food, job, housing, leisure) only in 2015 with the Proposed Constitutional Amendment nº 74, emphasizing the service as a vector of development related to productivity and to the quality of life of individuals (Erundina, 2013; Senado, 2015).

The cost of the UPT that reaches the consumer through the tariff price is often high and the quality of the transport service is low, contributing to a reduction in consumption by the population of public transport and its intermodal replacement for private transport. This contributes to the fact that, with the reduction in demand, the cost of tickets rises and the quality drops, culminating in a vicious cycle towards the unsustainability of the UPT service (Carvalho and Pereira, 2012; Oliveira Filho, 2018). An increase in urban fares for passenger transport directly affects household incomes, and may also affect the cost structure and competitiveness of passenger transport industries. The high cost of transport would end up affecting the poorest households more intensely, a situation that worsens in periods of decline in the real income of households. Between 1995 and 2003, for example, there was a drop in the volume of



paying passengers, users of public transport, due to the loss of purchasing power of the minimum wage in the Brazilian economy (Carvalho and Pereira, 2012).

In recent years, a rising trajectory has been observed in final fuel prices in the Brazilian economy, raising the cost of living for society as a whole and contributing to the downturn in economic activity. In the UPT the impact of an increase in diesel oil, the sector's basic input responsible for, on average, 23% of companies' operating costs, has an effect on transport tariffs, pushing them upwards. In this activity, the recurring price adjustments for this fuel, in 2021, further aggravated the existing crisis in the sector, which accumulated 11.75 BRL billion in losses in the period from March 2020 to February 2021, in the Covid-19 pandemic, with a drop in passenger demand and a reduction in revenues (NTU, 2021; NTUrbano, 2021). According to Pozzobon et al. (2017), changes in fuel prices generate changes in expenditures with the transport sector, influencing, in turn, the choice of consumers in the demand for travel.

Fuel taxes, in turn, make these prices (urban transport fares) even higher. An increase in urban bus fares, for example, tends to increase inequality, especially in urban areas due to household budget constraints. Among the elements that make up the final price of gasoline, diesel oil and ethanol are federal and state taxes. It appears that 40.6% of the price of gasoline and 21.4% of diesel, both sold to consumers, is due to the tax burden incurred in the operation (Petrobras, 2021). Such taxes are used by governments with the aim of restricting consumption or increasing revenues for the budget, being common in several countries. In addition, attempts are also made by governments with the purpose of containing the inflationary pressures of successive increases in fuel prices, whose oscillation has generated problems for various sectors such as road transport, food, energy and urban transport tariffs. This is what is currently happening in Brazil, especially with the policy adopted by Petrobras of changing prices according to the price of the international barrel of oil. Since 2016, Petrobras has adopted the Import Parity Pricing (IPP) on the grounds of generating return for the company's shareholders and avoiding distortions in the Brazilian market when dealing with a commodity (NTUrbano, 2021). A correction of these tax distortions or an exemption of these fuel taxes could affect the economy through multiple channels, including positive impacts on the job offer, utility, production and the household welfare.

In addition, in the last two decades, with regard to passenger transport policies, Brazil has prioritized transport by cars and motorcycles (private transport), particularly



due to the strong policy of attracting investments from the automobile industry that began in the mid-1990s. Policies were created to stimulate private transport, such as the reduction of the tax on industrialized products, the low price of licensing and taxes on motor vehicle ownership, credit expansion for households, in addition to subsidies such as free parking on public roads. In this way, public transport subsidies are an important option for reducing ticket prices and improving the quality of the service provided. For the specific case of public transport, the government concession aims to maintain fares at prices that are affordable by the population (Carvalho and Pereira, 2012).

Transport has become a typical consumption item in the Brazilian household budget, reaching a higher share than that spent on food. The most recent household budget surveys for 2017-2018 by the Brazilian Institute of Geography and Statistics show evidence that Brazilian households commit 17.5% to food expenses, while transportation expenses occupied 18.1% (IBGE, 2018). Despite the data, the burden of transport is higher for high-income households. According to the survey, while the poorest (the first three income strata) committed 9.58% of their expenses with transport, this percentage was much higher (23.09%) in the budget of households with higher income (10° more rich) (IBGE, 2018). However, low-income Brazilian households are the greatest demanders of public transport and the ones who waste more time commuting home-to-work-to-home, as they live on the outskirts of urban areas, far from their workplaces. In 2013, for example, travels by the poorest took 20% longer than those of the richest (Pero and Mihessen, 2013).

Since households have spending and income links from different sources with other economic institutions (government, firms, rest of the world), the economic consequences of policies in passenger transport services are also transmitted directly and indirectly in the production system from the country. Thus, the present paper aims to analyze and project the economic effects of subsidies granted to passenger transport activities on the Brazilian economy, as well as the redistributive effects on consumption and income of typical households. Recent studies have applied computable general equilibrium modeling (CGE) to address tax policy issues and policy implications. Most studies focus on the increase or decrease in world fuel prices and oil subsidies (see, for example, O’Ryan et al., 2005; Arndt et al., 2008; Yusuf and Resosudarmo, 2008; Henseler and Maisonnave, 2018; Dartanto, 2013; Alshehabi, 2012; Rahiminia and Moghadam, 2015). However, there is a lack of empirical studies



for the Brazilian economy that carry out analyzes related to passenger transport subsidies using CGE models and, therefore, this research in particular directs attention to these pertinent policy issues. The subsidy policy for the provision of passenger transport services can lead to a substitution between public and private transport, affecting the Brazilian productive system. With the aim of reconciling applied economic theory and relevant empirical studies for policy makers, we use the CGE models as a methodology for the analysis.

Thus, it is necessary to discuss the role of subsidies to public transport, as well as the evaluation of the impact of the subsidy policy on the redistribution of household income, taking into account the peculiarities of different groups by income level. These effects can be captured by a national Dynamic Computable General Equilibrium (CGE) model, with a Social Accounting Matrix (SAM) as a data structure, detailing the generation and appropriation of income by different sources and expenditure structures, as well as the breakdown of 5 representative households and 4 passenger transport services. To evaluate the potential of the built model, this research performs the application involved with the redistributive and economic effects of subsidies in selected activities of urban public transport of passengers in the Brazilian economy. The conclusive results indicate that policies related to subsidies contribute positively to the economy, in addition to generating positive effects for the internal market of the Brazilian economy by favoring typical households in the middle and lower positions of the composition of income and consumption. Regarding sectoral results, the increase in household income contributes to an increase in the production of those sectors that are more related to household consumption, mainly due to the consumption profile of households in lower income strata, contributing to the increase in production and investment sector. The reduction of the impact of transport on the income of individuals and households contributes to the redistribution of income in the consumption of other goods, mainly those related to food and services.

Keywords: Passengers transportation; subsidies; SAM; Dynamic CGE model; household income distribution.

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