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Policy Paper

Analysis of Transjakarta Bus Fare Adjustment Based on the Ability to Pay (ATP) Method

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Abstract

TransJakarta's (TJ) fixed fare policy of Rp 3,500, supported by subsidies from the Jakarta Provincial Government (PSO), has kept public transportation fares in Jakarta affordable for the public. However, this policy has also gradually worsened the finances of the Jakarta's Provincial Government and TJ's own going concern. This study analyzes various fare schemes by comparing users' Ability to Pay (ATP), user travel behavior by survey, and ticket revenue implications to encourage the formulation of new regulations by the Governor of DKI Jakarta on sustainable fares. This analysis uses primary data from the 2023 TransJakarta User Mobility Survey, supplemented by data from the 2021–2022 National Socioeconomic Survey (SUSENAS) and origin-destination (OD) analysis based on Geographic Information Systems (GIS). The methodology used in this study is the Travel Cost Method calculation, which calculates user ATP with the assumption that 10% of household income is spent on transportation. The average travel distance per trip per day is 11.7 km, resulting in an ATP value of Rp 1,237/km. Based on the analysis, the most balanced outcome of the tested scenarios was found to be a tiered fare system based on distance, with a fare of Rp 4,000 for the first 10 km, Rp 416 for each additional kilometer, and a maximum of Rp 14,477. This system increases ticket revenue while maintaining fair and reasonable prices. The study emphasizes the importance of gradual adoption and ongoing monitoring to ensure effective and equitable fare reform.

Keywords: Fare; Tariff; Ability to Pay; Public Transportation; Trans Jakarta; Public Service Obligation.

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1. Introduction

Public transportation systems in developing countries must deal with two problems: low ridership and budget limitations. With the introduction of regional authority in Indonesia (as required by Law No. 22/1999 and updated by Law No. 23/2014), regional governments are now in charge of running and paying for public transportation. This created new problems for cities like Jakarta, where more people are moving into the cities, and traffic is getting worse, putting pressure on local governments to expand and improve transportation services and facilities.

The Jakarta Provincial Government addresses urban transport challenges through the Public Service Obligation (PSO) funding scheme, supporting companies like PT. Transportasi Jakarta (TJ), PT. Moda Raya Terpadu Jakarta (MRT), and PT. Lintas Raya Terpadu Jakarta (LRT) to keep fares low. Since its start in 2004, Transjakarta has become the largest public transportation company in the city, with annual ridership consistently increasing except during the COVID-19 pandemic. (Transjakarta, 2025) Today's developing cities are expected to have reliable public transportation systems, including bus rapid transit (BRT), a common public transportation system worldwide. Several strategies that can be implemented to improve these facilities include dedicated lane services, park-and-ride services, intermodal services, and intelligent transportation system-based applications (Ishaq and Cats, 2020; Devi et al., 2021). The implementation of these strategies is expected to contribute to the anticipated increase in overall passenger numbers.

Even though more people are taking Transjakarta, the prices have not changed, as the intention is to keep public transportation affordable. However, this approach has placed considerable strain on the budget. The ongoing reliance on Public Service Obligation (PSO) funding is particularly significant because it persists despite increasing pressure on municipal finances, leading to concerns about the long-term sustainability of the system (Dhany, 2025). As city budgets become more constrained, the continued provision of PSO subsidies without adjustments raises questions about the viability of maintaining current service levels and fare structures. Therefore, a critical review of fare rates and the allocation of subsidy funds is essential to assess the effectiveness of these policies and determine an appropriate path forward.

At present, the most extensive coverage of public transportation services in DKI Jakarta is the Transjakarta bus service. The annual number of TJ passengers has shown an increasing trend from year to year, as seen in picture 1 below, except during the pandemic in 2020 and 2021. This trend can be influenced by the fact that the fare has not been adjusted since the TJ service started operating. According to Vuchic (2005), the fare is an important factor that affects the demand for public transportation services. The fare is the price of transportation services that users have to pay, either through leasing agreements, negotiations, or government regulations (Warpani, 2002).

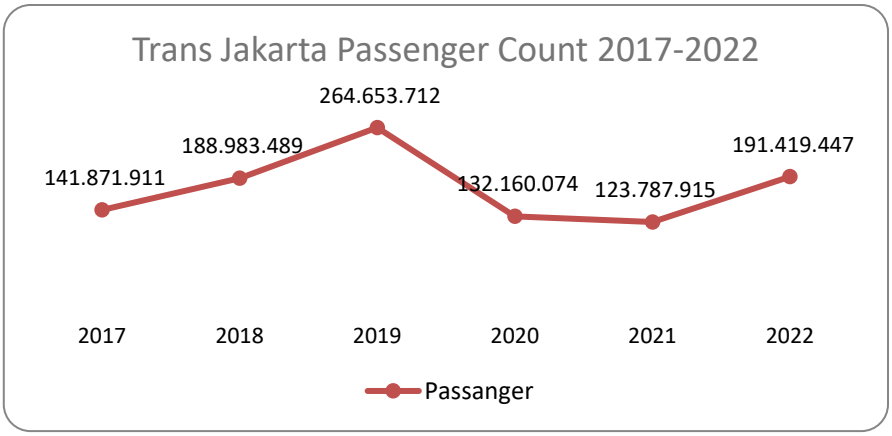

Figure 1. Trans Jakarta Passenger Count Graph 2017-2022, source: PT. Trans Jakarta

The data from the Transjakarta in Picture 2 below shows that the PSO subsidy to Transjakarta tends to increase. On the other hand, the challenge faced is the increasingly limited to fiscal capacity of the Jakarta Provincial Government. Based on this situation, the Jakarta Provincial Government is reevaluating the PSO subsidy to Transjakarta, considering it from the perspective of fare policies closely related to the increase in revenue of state-owned regional transportation providers. In this regard, analyzing public transportation fare subsidies is highly relevant, allowing the government to balance the public's need for

affordable fares with the operational cost efficiency of public transportation provided by the government in the form of subsidies (Gerika, 2025).

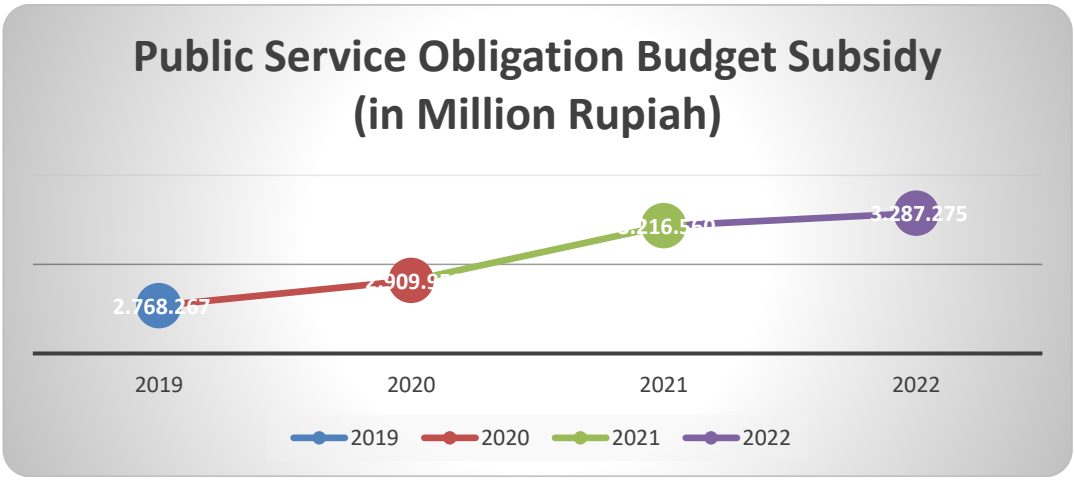

Figure 2. Trans Jakarta PSO Subsidy Trend for 2018-2022, source: Department of Transportation, data processed.

Transjakarta's revenue is derived from fares (farebox), non-fare revenue (non-farebox), and Public Service Obligation (PSO) subsidies from the Jakarta Provincial Budget (APBD). Fare revenue (farebox) represents PT. Transportasi Jakarta's income, consisting of ticket revenue derived from the Transjakarta Public Transport Service fares set by the Governor. Income from tickets is related to the fares and fare system in place. On the other hand, non-farebox represents business income received from various TJ ventures, excluded from subsidy calculations. PSO subsidy revenue from the Jakarta Provincial Budget (APBD) is obtained by deducting the production costs from the ticket revenue (income). These production costs are referred to as production costs, and there is a significant annual increase in these costs.

The revenue from Transjakarta service tickets is highly dependent on the established fare rates. The current fare policy, as per Governor's Decision Number 1912 of 2005, sets the fare at Rp2,000 per passenger from 05:00 to 07:00 AM WIB and Rp3,500 per passenger after 07:00 AM WIB, regardless of the distance traveled. Additionally, based on the Decision of the Head of the Transportation Agency of DKI Jakarta Number 297 of 2018, there are microtrans (public minivans) managed by Transjakarta with a fare of zero (0) rupiah. Adwitiya (2025) argues that the biggest challenge facing Transjakarta is its unchanged fare policy, which is unable to cover increasing operational costs. A comprehensive subsidy calculation is needed to improve the quality of public transportation services.

The impact of fare structures and subsidies on public transportation has been extensively studied in both developed and developing countries. Key insights from the literature include the following:

Vuchic (2005) emphasized that fare levels play a significant role in determining public transportation use. Research on fare elasticity generally indicates that fare reductions tend to increase ridership, although the literature on this effect varies depending on the context. For example, Paulley et al. (2006) conducted a meta-analysis that revealed that average fare elasticities range from -0.2 to -0.6, suggesting that moderate fare cuts encourage more people to use public transportation. In low-income areas, where affordability is a major issue, fare changes can have a greater impact. Public Service Obligation (PSO) subsidies are commonly implemented to ensure access to transportation for low-income residents who might otherwise not be able to afford it. However, Cervero (2013) cautioned that while subsidies promote affordability and equity, they can also reduce incentives for innovation and create financial burdens for transportation providers if not managed properly. Decentralization in urban transportation governance offers both benefits and challenges. Boex and Yilmaz (2010) argue that delegating greater control to regions can result in policies that better align with local needs, but differences in financial resources across regions can result in inconsistent service quality. Transjakarta is often highlighted as a successful example of a bus rapid transit (BRT) system in Southeast Asia. Studies by ITDP (2017) indicate that this system has effectively encouraged a shift from private vehicles to public transportation. However, these studies also note that maintaining quality and expanding network coverage are crucial to supporting ridership growth.

This research focuses on examining Transjakarta fares and revenues, and gaining insight into its user profile, including travel habits and descriptive demographic characteristics. The research also includes an analysis of revenue projections based on various fare options, each capped at a maximum.

While fixed fare systems and performance-based subsidies are widely discussed, there is a significant lack of research in Indonesia that integrates user affordability measured as Ability to Pay (ATP) with fare policy design and fiscal sustainability. Most existing studies tend to focus on fare efficiency or general willingness-to-pay metrics, without basic fare decisions on the actual economic capacity of public transport users. Devi et al. (2021) highlight that current ticket revenue is still far from sufficient to cover operational costs, thus reliance on subsidies remains high. Given that Transjakarta services only reach a portion of the population, it is urgent to examine Ability to Pay (ATP)-based fare adjustments to create fiscal space for expanding coverage without sacrificing affordability for low-income communities.

This research fills this critical research gap for developing public transport funding strategies that balance economic feasibility with social and financial equity. The findings of this study aim to support data-driven fare policymaking and provide valuable guidance for cities facing financial and equity challenges. While numerous studies on Jakarta's public transport fare system exist, few offer a quantitative assessment of fare affordability based on users' actual ability to pay. Furthermore, there is a lack of integrated analysis linking distance-based fare models with household transport expenditure and travel behavior data. This study addresses these gaps by combining ATP modeling with detailed mobility survey information to propose a socially just and financially sustainable fare adjustment framework for Transjakarta.

2. Methods

The objective of the research to be examined is how a company can objectively determine fare rates so that they are attractive to service users, allowing the company to achieve its goals in line with the vision and mission of stakeholders, both in the short, medium, and long term. This study employs a mixed-methods approach, according to Creswell et al (2017). This approach is used when researchers collect and analyze data, integrate findings, and draw inferences through a combination of qualitative and quantitative methods.

2.1 Method of Collecting Data

The collection of data methods used in this research is as follows:

- Primary survey, which involves collecting primary data through the distribution of questionnaires to Trans Jakarta users, conducted from May 19 to June 2, 2023, then examined and processed according to the research needs.
- National Socioeconomic Survey for the years 2021 and 2022, processed to fit the research requirements.
- Secondary survey, collecting secondary data related to the research theme obtained from various valid sources.
- Interviews with several relevant stakeholders.

2.2 Data Analysis

According to Neuman W. Lawrence (2011), Primary data collection by surveys is qualitative research in which the researcher asks several respondents about their beliefs, opinions, characteristics of an object, and past or present behavior. Data collection is done online through the Jak Survey (self-report) by distributing questionnaire links on the JAKI application, social media, and direct information. This research uses a qualitative descriptive analysis method, where the data obtained is processed and then described descriptively to generate policy recommendations for an appropriate tariff structure to be applied to Trans Jakarta.

Sampling of respondents is done using the accidental sampling technique, which involves taking samples based on convenience. Anyone willing to fill out the questionnaire, whether in person or virtually with survey personnel, and deemed suitable as a data source, can be used as a respondent sample. The total number of people who filled out the questionnaire was 8.372, but after data cleansing, the number of respondents considered suitable for further analysis was 6.673. Out of this number, 5.037 respondents

(75%) stated that they were Trans Jakarta/Mikrotrans Jaklingko users, and the remaining 1.636 (25%) stated that they were not Trans Jakarta/Mikrotrans Jaklingko users.

Recent studies by Gerika et al. (2025) and Ismail et al. (2025) prove that the ATP and WTP approaches provide a more accurate picture in determining fair tariffs than simply referring to Vehicle Operating Costs.

The Ability to Pay (ATP) analysis technique uses the Travel Cost Method (TCM). The TCM method can examine the ATP value with the assumption that each family/household will always allocate a portion of their income for mobility needs (Dwi Novirani, 2007). Another literature stated that TCM classified by income class into low-income and middle-high income to ensure simplicity, and it was found that factors observed influencing TCM variations included age, monthly income, gender, and the number of private cars or motorcycles owned by the household (Sugiarto, 2021).

The calculation of the ATP value can be formulated as follows:

ATP = Monthly Income x Percentage of Transportation Costs Total kilometers traveled by passengers per month

3. Results and Discussions

3.1 Characteristics of Trans Jakarta User Respondents Based on Trans Jakarta User Mobility Survey Data

3.1.1 Based on Gender

As shown in Picture 3 below, out of a total of 5.037 respondents, 3.059 are female, and 1.987 are male. Furthermore, based on the age of the respondents, the age groups of 17-25 years and 26-35 years dominate the total number of Trans Jakarta users.

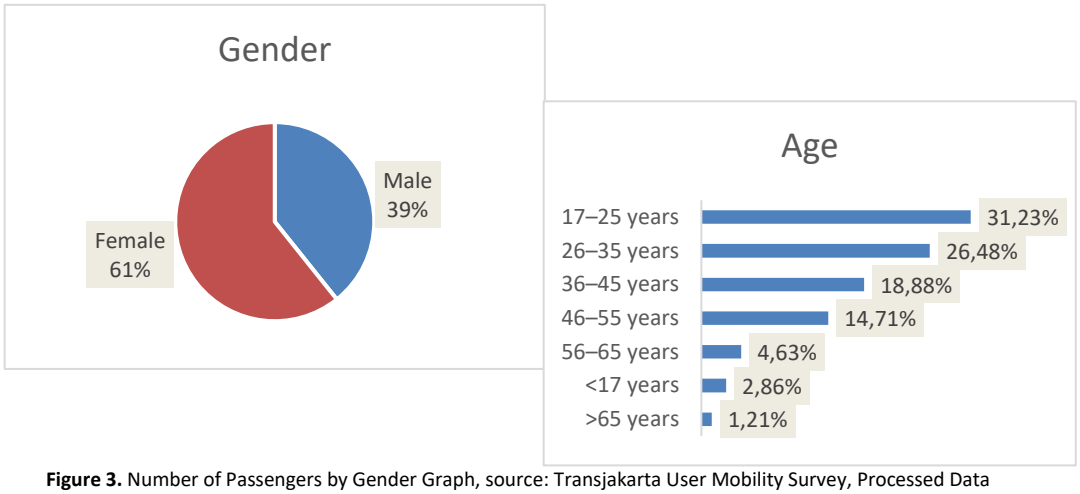

Figure 3. Number of Passengers by Gender Graph, source: Transjakarta User Mobility Survey, Processed Data

3.1.2 Based on Education

As shown in Figure 4 below, the educational backgrounds of Trans Jakarta service users vary widely, ranging from not completing elementary school to holding a master's degree. Graduates with a bachelor's degree or Diploma and high school education dominate, around 90,39 percent of the total number of respondents

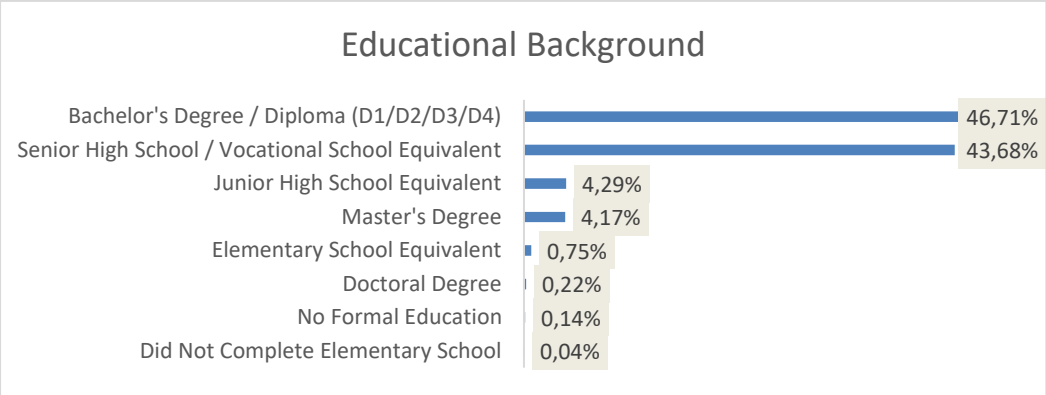

Figure 4. Respondent Education Characteristics Graph, source: Transjakarta User Mobility Survey, Processed Data

3.1.3 Based on Type of Occupation

As shown in Figure 5 below, that 1.622 people, or 32,2% of the total respondents, work as private company employees, 830 people, or 16,5%, are housewives, and 814 people (16,2%) are students. Additionally, 431 people (8,6%) work as civil servants. There are 264 respondents (5,2%) who are not employed, and the rest come from various professions.

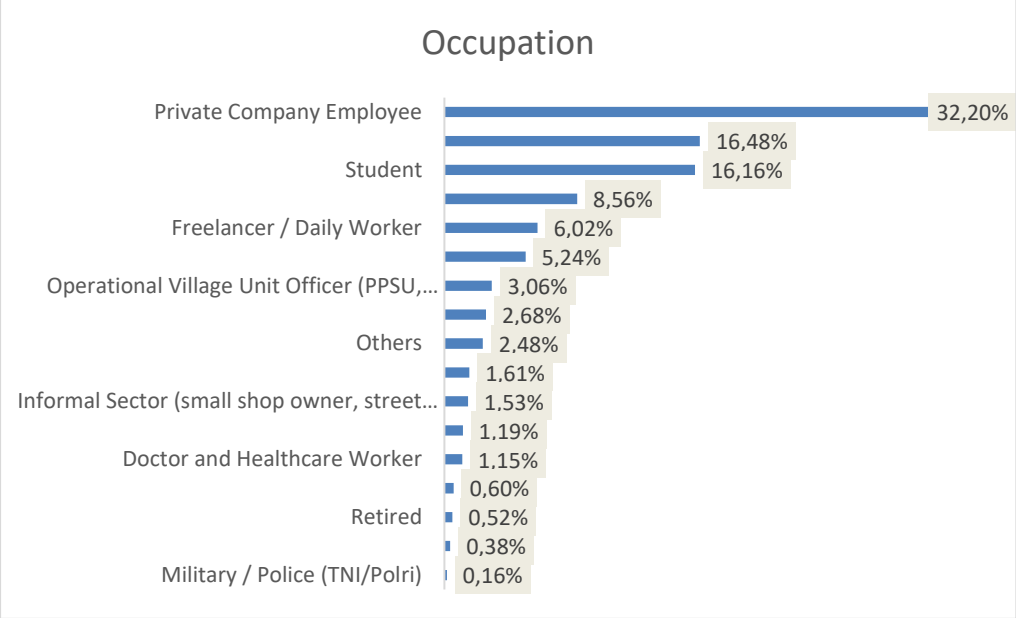

Figure 5. Respondents' Occupation Characteristics Graph, Source: TJ User Mobility Survey, Processed Data

3.1.4 Based on Income

As shown in Figure 6 below, that 1.119 people (22,2%) of the total respondents have an income in the range of 2,2 million – 4,9 million, 1.109 people (22%) do not have any income, 1.055 people (20,9%) earn in the range of 4,9 million - 8 million, and 611 people (12,1%) have an income below Rp 715.000

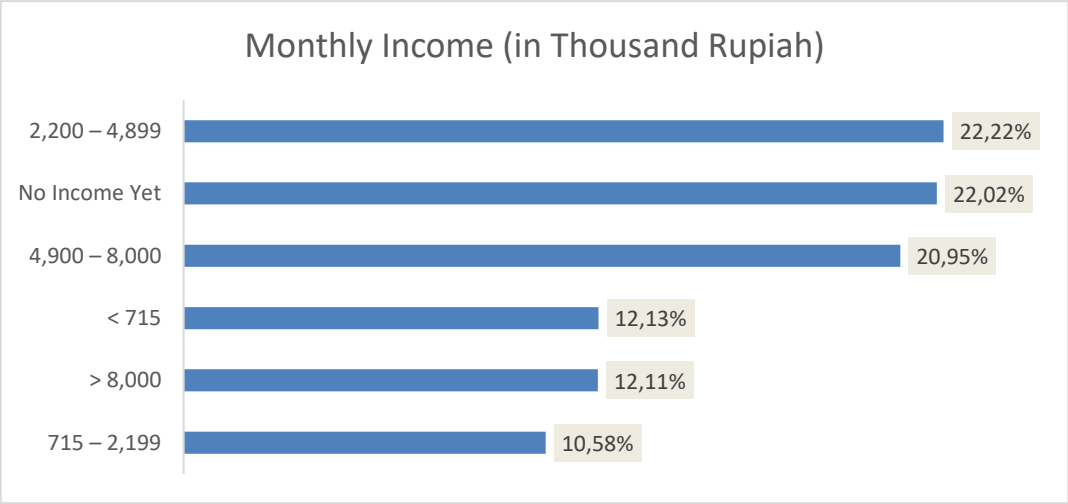

Figure 6. Respondents' Monthly Income Characteristics Graph, Source: TJ User Mobility Survey, Processed Data

3.1.5 Fare Rate Based on Gender, Age Categories, and Professions

Figure 7 below shows an analysis of fare based on gender and age, with 3 major fare options proposed by the respondents. A total of 51,67% of the respondents chose an increase in Trans Jakarta fare to Rp 4.000, with the highest proportion in the 26-35 age group, including 7,96% of women and 7,27% of men.

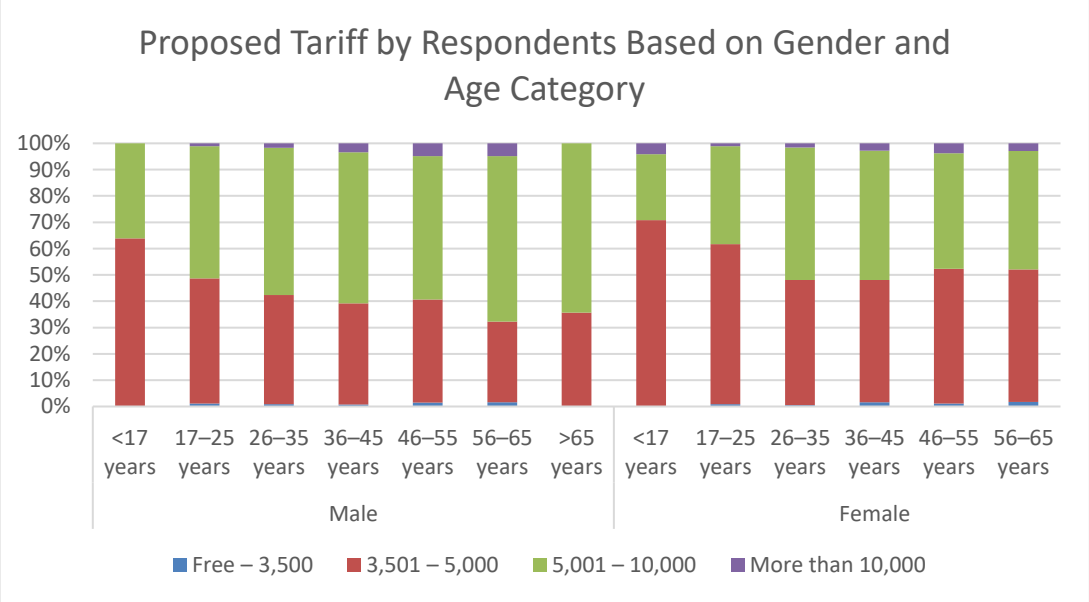

Figure 7. Fare Rate Based on Gender and Age Category Graph, source: survey of Transjakarta user mobility, Processed Data

Meanwhile, 37,36% of the respondents prefer the fare to be increased to Rp 5.000, with the highest concentration of voters being both men and women in the 26-35 age group at 15,23% and the 17-25 age group at 14,04%. The fare changes to Rp 4.500 ranks third, chosen by 4,44% of the respondents, with the largest proportion in the 17-25 age group at 1,46% and the 26-35 age group at 1,42%.

An interesting finding from this survey is that the proposed fare increase is mainly concentrated among the working-age population, including the age categories 17-25, 26-35, 36-45, and 46-55, with a higher proportion of female respondents than male.

The following picture shows fare based on professions, where there are 17 respondent professions in the Trans Jakarta user mobility survey. The results indicate that Private Company Employees, Housewives, and Civil Servants (both government and non-

government) are the three largest professional groups proposing fare increases, with percentages of 38,8%, 14,54%, and 10,11%, respectively.

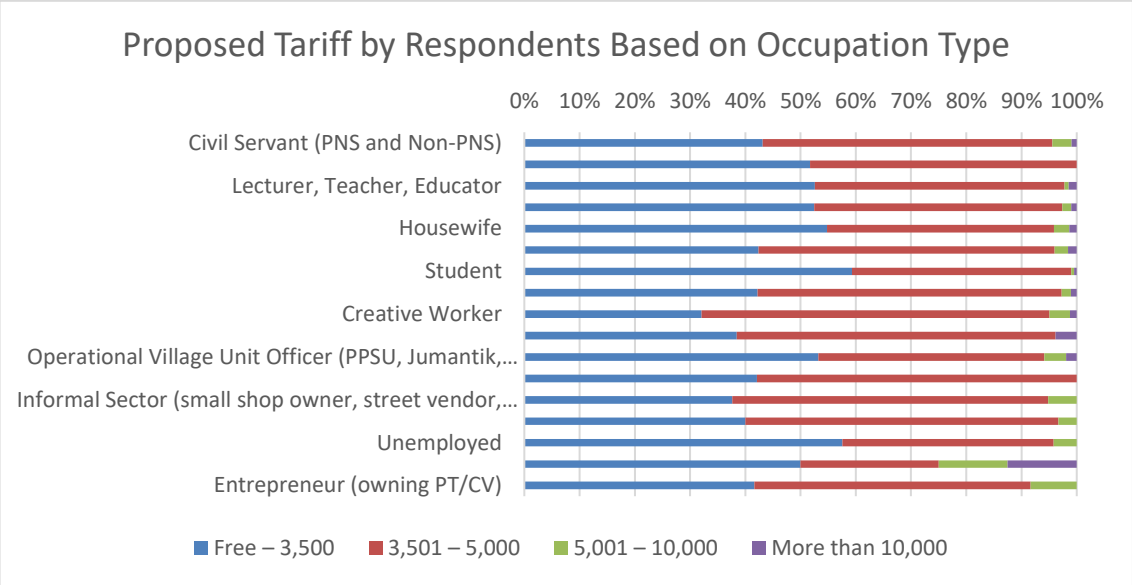

Figure 8. Fare Chart by Profession, source: Transjakarta user mobility survey, Processed Data

3.2 Ability to Pay (ATP)

This study uses two complementary approaches:

1. **Actual transport expenditure per trip** from the Mobility Survey, producing a value of Rp 328/km, measured as actual out-of-pocket spending, not ATP, and applicable per trip.
2. **Economic ATP per month** using the Travel Cost Method (TCM) with Susenas 2022 data, yielding ATP values of Rp 416/km (minimum), Rp 1,237/km (average), and Rp 4,670/km (maximum).

Both approaches use different data structures; therefore, the ATP values vary in scale and meaning.

3.2.1 Actual Transport Expediture (Per Trip Cost Basis)

Based on the data from the TransJakarta user mobility survey, it is known that the average distance traveled by respondents, as estimated by themselves during the survey, is 18 km, as shown in the following picture:

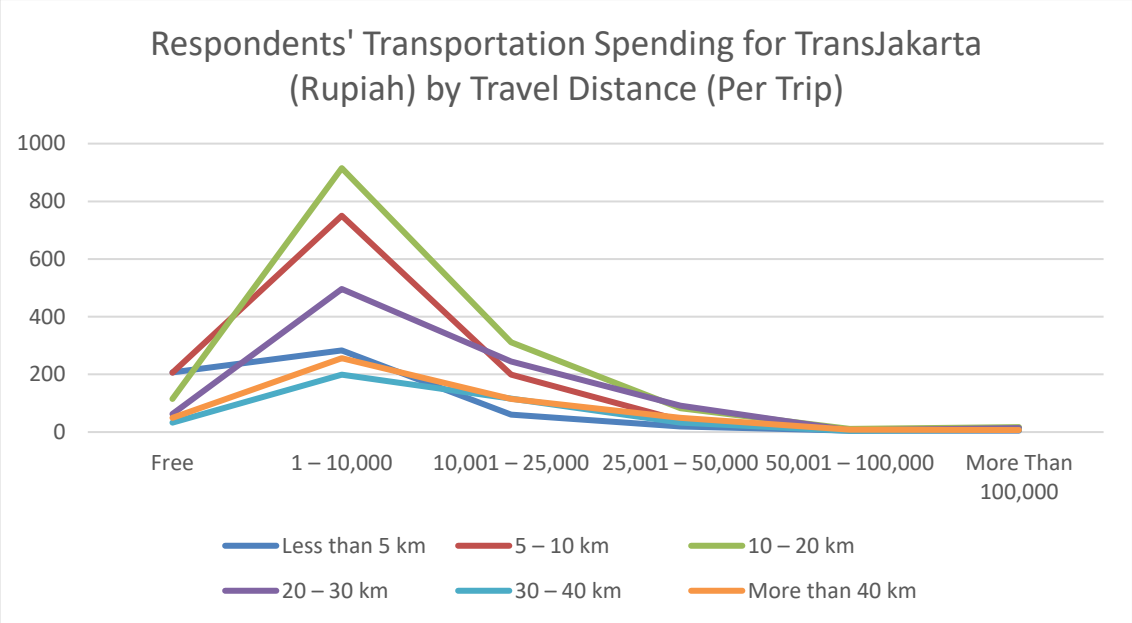

Figure 9. Respondents' Self-Estimated Travel Distance Graph, source: Transjakarta User Mobility Survey, Processed Data
Transportation Expenses Based on Travel Distance, source: Diskominfotik, 2023, Processed Data

Based on the above graph, it can be concluded that the ability of some respondents to pay for transportation costs in a single trip range from 1 to 10.000 rupiah, with an average of 1.200 rupiah per kilometer. Meanwhile, the ability of most respondents to pay for a Trans Jakarta journey in a single trip range is 3.500 rupiah, with median of expected distance by responden is 10,67 km, is around 328 rupiah per kilometer. In terms of distance, with a price of 328 rupiah per kilometer compared to the current Trans Jakarta fare of 3.500 rupiah, Trans Jakarta can cover 10,67 km of respondents' trip, which is 59% of the average travel distance.

Derived cost per kilometer:

$$\text{Cost per KM} = \frac{\text{Rp } 3.500}{10{,}67} = \text{Rp } 328/\text{Km}$$

This value represents actual travel spending, reflecting subsidized TJ fares and integrated travel patterns It cannot be interpreted as ATP, but it shows that current subsidized fares significantly reduce passenger costs. It indicates that the flat fare of Rp 3,500 subsidizes ~59% of a typical perceived trip length.

3.2.2 ATP Based on Monthly Income (TCM Approach)

In the calculation of ATP using the second alternative, several pieces of data were used: expenditure data from the National Socio-Economic Survey (SUSENAS) 2022 and user travel data from the Trans Jakarta User Mobility Survey 2023.

Based on the characteristics of Trans Jakarta passengers' journeys, using data from the Trans Jakarta User Mobility Survey, a frequency distribution of Trans Jakarta passenger journeys was created. This analysis involved examining the starting point of respondents' activities (origin/starting neighborhood) and their final destination (destination/ending neighborhood). The origin to destination (OD) data was processed using Geographic Information System (GIS) applications, which can be seen in Figure 10 below:

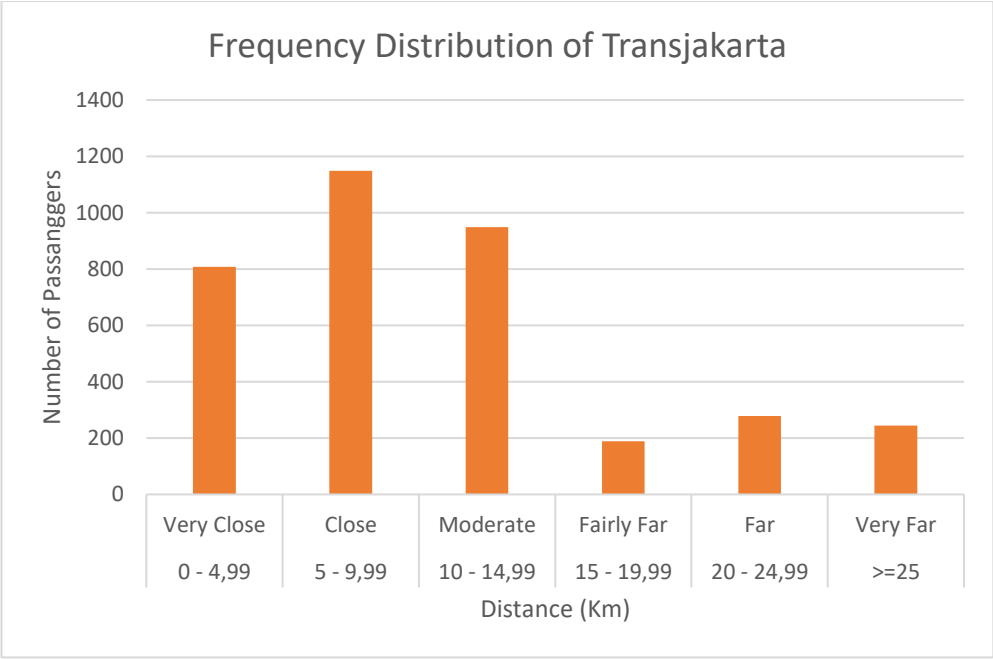

Figure 10. Distribution Frequency of TJ Passengers, source: TJ User Mobility Survey, data processed by the author

From the data distribution of TJ passenger kilometers above, it is known that shorter journeys are more frequent with a length of 5 to 9,99 kilometers. The average journey length of Transjakarta users as a whole from the survey is 11,7 kilometers, and if they travel round trip in a month (30 days), the average journey length for very short distances is 702 km/month. Passengers with very short distances were found to have an average journey length of 3,1 km/trip, and if they travel round trip in a month, the average journey length is 186 km/month. Meanwhile, passengers with very long distances were found to have an average journey length of 34,8 km/trip, and if they travel round trip in a month, the average journey length is 2,088 km/month.

Based on data from Susenas in 2021 and 2022, the calculated results are as follows:

Table 1: Calculation of the Community's Ability to Pay for Transportation Expenses

Province/City/County		Expend/ Income per month	Income Threshold for transportation (10%) (month)	Average Travel Distance (in month =30 days) From TJ's User Mobility Survey	ATP (Total Income per Month* Income Threshold for Transport Exp (10%))/ Average Travel Distance per Month per Km	Average the nearest Travel Distance (in month=30 days) From TJ's User Mobility Survey	ATP (Total Income per Month* Income Threshold for Transport Exp (10%))/ Average Travel Distance per Month per Km	Average the longest Travel Distance (in month =30 days) From TJ's User Mobility Survey	ATP (Total Income per Month*Income Threshold for Transport Exp (10%))/ Average Travel Distance per Month per Km
City/ County	Kepulauan Seribu	4.895.297	489.530	702	697	186	2.632	2.088	234
	Jakarta Selatan	9.438.018	943.802	702	1.344	186	5.074	2.088	452
	Jakarta Timur	7.758.750	775.875	702	1.105	186	4.171	2.088	372

Province/City/County		Expend/ Income per month	Income Threshold for transportation (10%) (month)	Average Travel Distance (in month =30 days) From TJ's User Mobility Survey	ATP (Total Income per Month* Income Threshold for Transport Exp (10%))/ Average Travel Distance per Month per Km	Average the nearest Travel Distance (in month=30 days) From TJ's User Mobility Survey	ATP (Total Income per Month* Income Threshold for Transport Exp (10%))/ Average Travel Distance per Month per Km	Average the longest Travel Distance (in month =30 days) From TJ's User Mobility Survey	ATP (Total Income per Month*Income Threshold for Transport Exp (10%))/ Average Travel Distance per Month per Km
	Jakarta Pusat	6.541.971	654.197	702	932	186	3.517	2.088	313
	Jakarta Barat	9.875.539	987.554	702	1.407	186	5.309	2.088	473
	Jakarta Utara	11.353.616	1.135.362	702	1.617	186	6.103	2.088	544
Province	DKI Jakarta	8.687.238	868.724	702	1.237	186	4.670	2.088	416

Source: Susenas 2022 data processed by the author

Table 1 above provides information that the average monthly household expenditure in the Jakarta Special Capital Region in 2022 is Rp 8.687.238, -. Using the household expenditure threshold for transportation at 10%, the average monthly household expenditure for transportation is Rp 868.724. The average passenger trip length on Transjakarta, based on mobility survey data, is approximately **11.7 kilometers per trip** (one way) Therefore, if assumed passenger trips over a month (30 days), the total monthly travel distance is approximately 702 kilometers. The Ability to Pay (ATP) for the Jakarta Special Capital Region is estimated to be Rp 1.237 per kilometer per month based on figures 11.

Using Origin Destination (OD) based travel distance obtained from the mobility survey:

Table 2: Calculation of ATP by classifiaction of user distance

Group	Monthly Distance (Km)	ATP (Rp/Km)
Average User	702	1,237
Short-distance travelers	186	4,670
Long-distance travelers	2,088	416

Source: mobility data survey processed by the author

When calculating ATP based on the nearest distance with a transportation expenditure threshold of 10% of income, the ATP for Jakarta Province is estimated to be Rp 4.670 per kilometer. However, when calculated based on the farthest distance, the ATP value is Rp 416 per kilometer. Using the minimum ATP value of Rp 416 per kilometer, it means that all Transjakarta passengers, constituting 100%, can still afford to pay even if the fare changes. Given the average passenger trip length of approximately 11.7 kilometers per trip, this would result in a fare of Rp 4.867, -. On the other hand, if we use the ATP value of Rp 4.670 per kilometer, it implies that only around 56,13% of current Transjakarta passengers would be able to use the service if the fare increases. This research is conducted to determine alternative fare increase policies for Transjakarta based on academic calculations and

analysis, with the aim of ensuring that passengers do not feel burdened and can still afford to pay in case of a fare increase. The ATP calculation is presented in Figure 11 below.

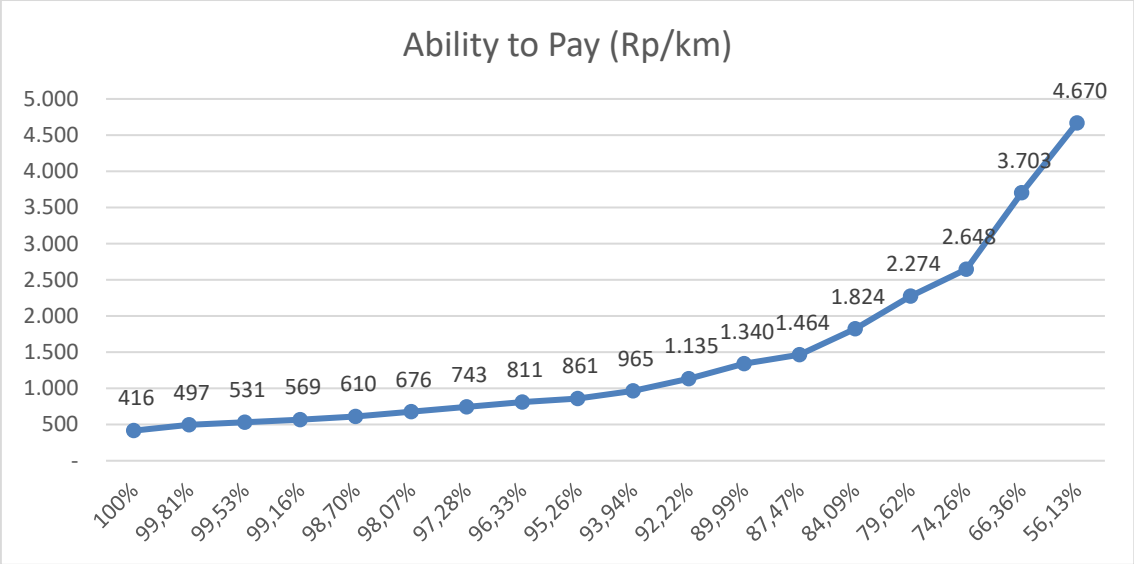

Figure 11. Ability to Pay (ATP) per Kilometer for Passengers in Jakarta Graph, source: survey of TJ users' mobility, data processed by the author

3.2.3 ATP: Model, Assumptions, Sensitivity and Confidence Intervals

A. ATP Formula (Travel Cost Method) (Sarwandy, 2019)

The Travel Cost Method Approach (TCM) defines:

$$\text{ATP per KM} = \frac{\text{Monthly Transport Budget}}{\text{Monthly Travel Distance}} = \frac{\text{Rp 868.724,-}}{702} = \text{Rp 1.237}$$

The monthly transport budget is defined as:

$$\text{Monthly Transport Budget} = \alpha \times \text{Household Monthly Income}$$

α is the share of income allocated to transport

B. ATP per Kilometer per Month:

- Monthly Travel Distance = Average trip distance × Round trips per month
- Monthly Travel Distance = 11.7 km × 2 × 22 days = 514.8 km/month

Thus, **ATP per kilometer** is derived by dividing the monthly transport budget by the total monthly travel distance.

For example, with **10% transport expenditure**:

- ATP per month = Rp 868,724 (transport budget per month)
- ATP per kilometer = Rp 868,724 ÷ 514.8 km = Rp 1,687/km

C. Sensitivity Analysis for α = 8–15%

Empirical references consistently show that urban households spend between **8–15%** of income on transportation:

1. **Indonesian Ministry of Transportation (2016)** – Urban household transport expenditure typically **8–12%** of income.
2. **BPS SUSENAS 2022** – Transport share ranges **7–14%** for urban middle-income households.
3. **World Bank (2019), Urban Mobility Review** – Low- and middle-income households in Asian megacities allocate **8–15%** to commuting.
4. **OECD (2015)** – Global benchmark for affordable transport is <15% of household income.

Thus, we can adopt α = 8%, 10%, 12% dan 15%

Table 3: Sensitivity Analysis Test

α (%)	Monthly Transport Budget (Rp)	ATP per km (Rp/km)	ATP per trip (Rp/day)
8%	694.979,-	990	23.166
10%	868.724,-	1.237	28.958
12%	1.042.468,-	1.485	34.749
15%	1.303.086,-	1.856	43.436

Source: data processed by the author

Interpretation

- ATP ranges from **990–1,856 Rp/km**, depending on assumed budget share.
- The baseline **1,237 Rp/km** is stable and falls within the empirically supported band from Indonesian and international studies.

Author will simulate the results of the maximum fare calculation, which will serve as the upper limit in the alternative policy formulation to be created. As it is known, the minimum ATP value is Rp 416 per kilometer. If we use a distance-based fare structure, the initial fare is Rp 0, and for each additional kilometer, there will be increment of Ro 416 per kilometer. So, for the farthest travel distance of 34,8 kilometers, passengers would need to pay Rp 14.477,as tariff maximal as upper fare limit, inline with A theoretical *upper willingness-to-pay bound in a theoretical sense* not an actual operational fare cap. This means it's based on the minimum ATP and maximum distance but doesn't necessarily reflect a fare that would be considered realistic or affordable in an operational context. This value does not necessarily reflect the realistic fare that would be charged by the operator. Instead, it represents an upper boundary for what could be considered the theoretical maximum amount a rider might be willing to pay for a long-distance trip. If this value were used as the actual fare cap, it could result in a fare that is too high for many users, especially those with lower income, leading to reduced ridership or inequitable access to the service. The purpose of this value as *willingness-to-pay bound* is to ensure that any distance-based system includes a cap preventing overcharging for extreme trips, and it shown in the graph below.

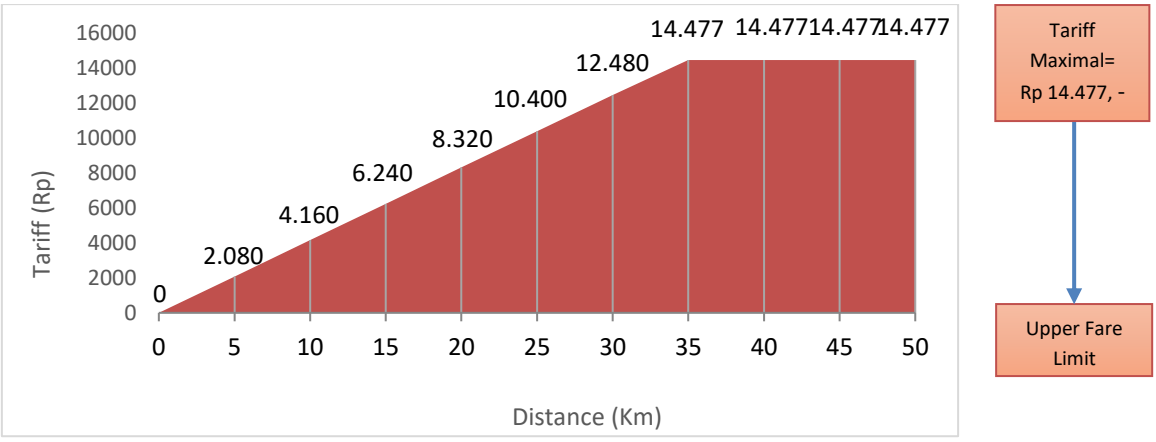

Figure 12: The determination of the maximum fare is based on a survey of TransJakarta user mobility, data processed by the author

D. Implications for Outlier Trips

The implementation of a fare of Rp14,477 has a significant impact on outlier trips, which are long travel journeys with durations exceeding the average (as illustrated in the curve above). Although the frequency is relatively low, the cost burden for this long-distance mobility increases disproportionately compared to short trips. For users traveling distances over 30 kilometers, this pricing structure risks becoming a disincentive that hinders service utilization. In this case, low-income groups are the most vulnerable to being affected, considering their limited purchasing power in the face of rising public transportation costs. Therefore, the issue of fairness regarding access to Transjakarta services has emerged as a vital problem. To maintain inclusiveness in access to this transportation service, intervention is needed through policies such as a tiered fare scheme or special subsidies for long-distance travel so that economic inequities do not limit citizens' mobility.

E. Farebox Revenue Projection & Distance-based Fare Scheme

The transition from a fixed-fare system to a distance-based fare system will often increase Transjakarta's revenue potential. This is due to a fundamental shift in cost calculation logic; the proposed fare model will be based on distance travel. This projected revenue increase stems from at least two key factors: the tendency of the distance-based system to charge higher fares for long-distance trips while offering discounts to short-distance passengers, and the redistribution of revenue streams across different trip categories. Ultimately, this distance-based fare system can optimize Transjakarta's total revenue.

Table 4: The Projection of Revenue Impact with Distance-Based Fare Scheme

Fare Type	Total Passengers (May 2023)	Avg Fare (Rp)	Revenue (Rp)	Revenue Increase (%)
Flat Fare (Rp 3,500)	22,430,216	3,500	78,505,756,000	-
Flat Fare (Rp 4,000)	22,430,216	4,000	89,721,864,000	+14.3%
Flat Fare (Rp 5,000)	22,430,216	5,000	112,151,080,000	+25%
Distance Based Fare (Rp 416/Km) with assumption average passenger journey is 20 Km	22,430,216	8,320		+66.4%

Source: processed by the author

F. Annual Conversion Method: Converting Monthly Passenger Numbers to Annual Estimates

To convert the monthly ridership data (22,430,216 passengers in May 2023) into annual figures, we need to account for:

- **Days of Operations per year**: Typically, public transportation operates daily around 360-365 days per year.
- **Seasonality**: Depending on the region and the nature of the service, demand may peak during certain months (e.g., during holidays or school vacations), and fall during others (e.g., off-peak periods).
- **Ridership Growth**: The rate of passenger growth that is often assumed, based on data from previous years or projections of future economic conditions.

Steps to Calculate Annual Passenger Numbers::

1. **Calculate Monthly Passenger Numbers per Day**:
   Assuming 22,430,216 passengers in May 2023, we can calculate the daily ridership:

$$\text{Daily Ridership} = \frac{22{,}430{,}216}{31} = 723{,}877 \text{ passengers/day (for May)}$$

2. **Estimate Total Annual Passenger Number**:
   Multiply the average daily ridership by the estimated operating days per year. For simplicity, assume the system operates 365 days per year:

$$\text{Annual Ridership} = 723{,}877 \times 365 = 264{,}215{,}105 \text{ passengers/year}$$

This gives an estimate of **264.22 million passengers annually**, based on the average ridership in May.

3. **Counting for Seasonality**:
   If the service has strong seasonal fluctuations (e.g., a **20% increase in ridership** during peak months), we can adjust the annual projection:

$$\text{Adjusted Annual Ridership} = 264{,}215{,}105 \times (1 + 0.2) = 317{,}058{,}126 \text{ passengers/year}$$

This assumes a **20% growth** in ridership during peak periods, which can be calculated based on historical trends.

4. **Counting for Growth**:
   If a **3% annual growth rate** in ridership is anticipated:

$$\text{Future Annual Ridership} = 317{,}058{,}123 \times (1 + 0.03) \quad = 326{,}569{,}866 \text{ passengers/year (next year)}$$

Some considerations that can be included in the formulation of alternative tariff structure policies are as follows:

a. The fare for the farthest route or maximum distance should be less than Rp 14.477, -.
b. The initial fare is Rp 4,000, based on the average passenger trip distance of 11.7 km, with a minimum ATP of Rp 416/km. The initial fare applies to the first 10 km, and any additional distance beyond 10 km will incur an extra charge of Rp 416/km
c. Distance-based fare, where each additional kilometer will be charged at Rp 416/km
d. The initial fare is Rp 4,000 for the first 10 km, with an additional charge of Rp 1,500 for every subsequent 5 km travel.

e. The initial fare is Rp 5,000 for the first 10 km, with an additional charge of Rp 1,000 for every subsequent 5 km travel.

Based on the above considerations, with a total of 723.877 passengers per day and an assumption of an average passenger journey of 20 km, applicable to all TJ modes, the ticket revenue (farebox) for several alternative fare structure policies with distance characteristics is as follows:

Table 3: Alternative Fare Structures and Ticket Revenue Estimates

Alternative	Annual Revenue (Rp/Year)	The additional farebox (ticket) revenue difference with RKA audited 2022
Flat Fare Structure Rp 3.500	Rp 942.069.072.000, -	Rp 554.750.072.000, -
Flat Fare Structure Rp 4.000	Rp 1.076.650.368.000, -	Rp 689.331.368.000, -
Flat Fare Structure Rp 5.000	Rp 1.345.812.960.000, -	Rp 958.493.960.000, -
Distance-Based Fare Structure Rp 416/km	Rp 5.038.723.722.240	Rp 4.651.404.722.240, -
Distance-Based Fare Structure with an initial fare of Rp 4.000 for the first 10 kilometers and an adjustment fare of Rp 416/km.	Rp 2.196.366.750.720, -	Rp 1.809.047.750.720, -
Distance-Based Fare Structure with an initial fare of Rp 4.000 for the first 10 kilometers and an adjustment fare of Rp 1.500 per 5 kilometers.	Rp 1.884.138.144.000, -	Rp 1.496.819.144.000, -
Distance-Based Fare Structure with an initial fare of Rp 5.000 for the first 10 kilometers and an adjustment fare of Rp 1.000 per 5 kilometers.	Rp 1.884.138.144.000, -	Rp 1.496.819.144.000, -

Source: TJ User Mobility Survey and 2022 Susenas Data processed by the author

In the following figure 13, The comparison shows the structure of flat fare and distance-based fare, where the blue line represents a flat fare structure of Rp 3,500, and the red line represents a flat fare structure of Rp 5,000, both remaining constant throughout the journey. The green line represents the distance-based fare structure. The red line indicates the point where the two lines meet, showing that at a distance of 8 km, the fare value is the same between the flat fare of Rp 3,500 and the distance-based fare. Meanwhile, using the Rp 5,000 flat fare results in a meeting point between the two lines, indicated by the black line, which shows that at a distance of 12 km, the fare value is the same.

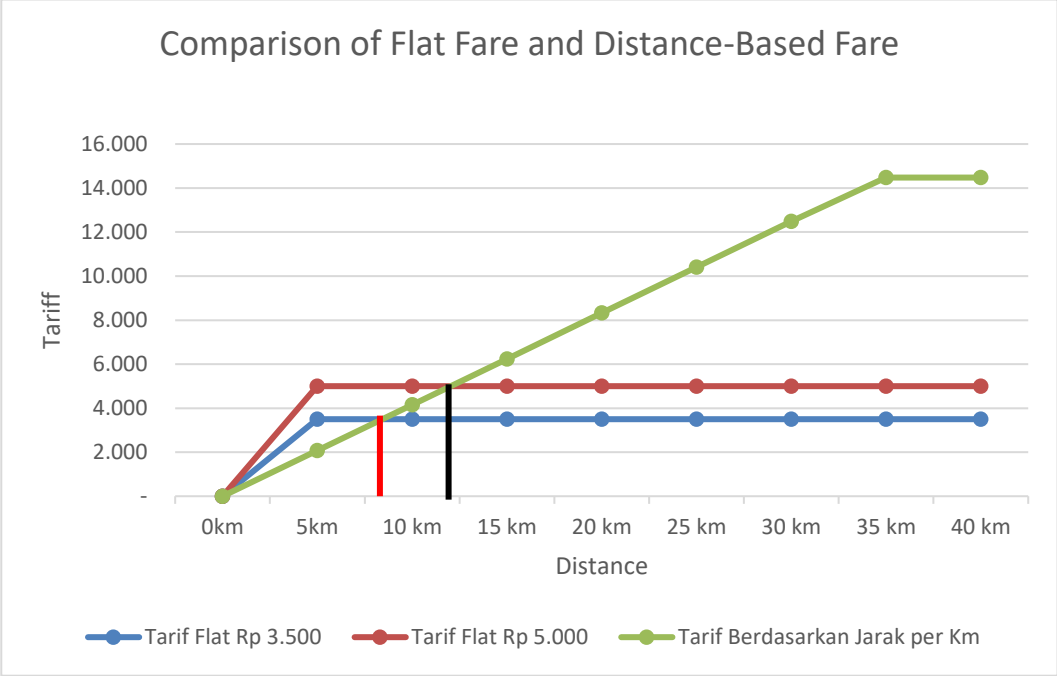

Figure 13: Comparison of flat fare and distance-based fare, source: survey of TJ users' mobility, data processed by the author

Conclusion

Based on a mobility survey conducted among TransJakarta (TJ) users from May 19 to June 2, 2023, this study assessed the feasibility of implementing various fare structures through an analysis of respondents' Ability to Pay (ATP) for TJ fares. The survey results indicate that with the existing fare scheme of Rp 3,500 and a median trip (estimated by respondents) of 10.67 km, the fare per kilometer is Rp 328, equivalent to 59% of the respondents' total trip distance. This data confirms that most trips can be accommodated affordably under this scheme. Furthermore, passengers who rely solely on TJ services for their mobility enjoy cost savings of up to 72.5% compared to those who combine TJ with other modes of transportation.

This underscores TJ's crucial role as an economical mass transportation option in Jakarta. A more in-depth analysis integrating 2022 Susenas data with Geographic Information System (GIS)-based trip frequency mapping revealed that allocating a maximum of 10% of monthly household income for transportation would yield Rp 868,724. Given that the average distance traveled by respondents in DKI Jakarta is 11.7 kilometers per trip per day and 702 kilometers per round trip per month, the estimated ATP would be Rp 1,237 per kilometer per month. However, a striking difference is found for short-distance users, where the ATP reaches Rp 4,670/km, while for long-distance users, it drops sharply to only Rp 416/km. This range reflects the diversity of financial situations and travel patterns among Jakarta residents. Importantly, if a floor fare of Rp 416/km is implemented, all TJ users (100%) are guaranteed to be able to afford it. In contrast, using a fare based on the ATP ceiling of IDR 4,670/km would only be affordable for approximately 56.13% of users, risking a decline in ridership and limited access for low-income groups.

Referring to these findings, six alternative tariff structures are proposed. The first two models use fixed fares of IDR 4,000 and IDR 5,000 per trip, with projected annual revenue for TJ of approximately IDR 1.08 trillion and IDR 1.35 trillion, respectively. While offering simplicity in implementation, these models do not reflect true equity in terms of distance travelled.

Meanwhile, a purely distance-based fare of IDR 416/km is projected to generate the highest TJ revenue, approximately IDR 5.04 trillion per year, but requires a more sophisticated and complex system to detect user travel patterns and distances. As a compromise to balance fairness and financial and economic feasibility, a tiered fare structure is feasible. One scheme is a base fare of IDR 4,000 for the first 10 kilometers, followed by an additional IDR 416 per kilometer thereafter, which is estimated to contribute

IDR 2.19 trillion in annual TJ revenue. Another tiered option, with an additional Rp1,500 or Rp1,000 for every 5 kilometers after the initial distance, is projected to generate Rp1.88 trillion annually.

The proposed fare structure is designed to seamlessly integrate with various modes of public transportation, from large, medium, and small buses to Microtrans services. This fare system will be active from the first card tap-in on a Microtrans vehicle in the area closest to the user's residence and will continue for all transit stages, provided the trip is completed within two hours. This integration is key to maintaining affordability and convenience, while also encouraging people from various socioeconomic segments to use public transportation.

In conclusion, this study demonstrates that proper planning and proper fare structure design will result in a Transjakarta fare policy that ensures financial sustainability while maintaining accessibility for people across all economic strata. The proposed and explored fare options offer various trade-offs between revenue targets, user affordability, and technical complexity, all of which need to be carefully considered by policymakers to align with Jakarta's sustainable mobility goals. This is in line with the findings of Asplund & Pyddoke (2020) who emphasized that fare optimization must be balanced with service frequency to achieve sustainable bus transportation system efficiency.

Recommendation

Based on the researcher's analysis, which yielded several possible alternative fare schemes based on primary data from the TransJakarta User Mobility Survey (May 2023) and the 2022 Susenas (National Survey), this study analyzes the implementation of a distance-based TransJakarta (TJ) fare system as an initial proposal, considering public affordability, social equity, and optimization of TJ revenue. The most ideal model is a base fare of IDR 4,000 for the first 10 kilometers, with an additional fee of IDR 416 per kilometer for subsequent distances. This scheme is regulated by the Ability to Pay (ATP) threshold identified in the previous TJ user mobility study, thus ensuring that all current users, without exception, can still access TJ services. In other words, the inclusiveness of residents in TJ mobility services is maintained.

To reduce the financial burden on long-distance passengers, especially those traveling from surrounding areas (Bogor, Depok, Tangerang, and Bekasi), this policy requires a maximum fare limit of IDR 14,477. This upper limit is determined based on the ATP threshold and the average distance traveled by residents. This serves as an inclusive policy for low-income groups against the risk of extreme increases in TransJakarta service fares. With this price cap, the transportation system remains equitable despite significant variations in travel distance.

From an economic and financial perspective, a tiered fare model with an additional Rp416 per kilometer has the potential to generate annual TJ ticket revenue of up to Rp2.2 trillion. This table shows a substantial increase of Rp1.8 trillion compared to the audited 2022 RKA revenue realization. Conversely, while a fixed fare scheme—such as Rp3,500 or Rp5,000—offers administrative convenience, there are concerns that this model will fail to accurately reflect actual service usage and risks inefficiency. For example, a fixed fare of Rp3,500 would only generate approximately Rp942 billion in revenue per year, an amount predicted to be insufficient to support the operational sustainability and future infrastructure development of TransJakarta.

The implementation of this policy relies heavily on comprehensive integration across all TJ service modes, from large buses and small buses to microtransports. Ideally, fare calculation begins when the card is first scanned on a microtransit vehicle serving residential areas and would be valid throughout the transit period, lasting for two hours. Furthermore, if this proposed fare scheme is to be implemented, a gradual transition period should be implemented through pilot projects to monitor public response and the technical readiness of the TJ system.

As a final recommendation, the proposed TJ fare adjustment should be preceded by a comprehensive public communication strategy and a targeted subsidy scheme for priority groups. The subsidy scheme, already implemented by Jakarta in accordance with Gubernatorial Regulation No. 133 of 2018 concerning Free TransJakarta Services and Free Buses for the Public, remains optimal. This effort ensures that the transition to a more dynamic and sustainable fare policy does not undermine the principle of fairness and reduce public transportation ridership. The Jakarta Provincial Government should also conduct regular

evaluations to ensure this distance-based fare model can adapt to economic fluctuations and dynamic mobility trends.

Policy Design & Implementation

The proposed tiered fare structure, based on the analysis and recommendations, is a base fare of Rp. 4,000 for the first 10 kilometers, with an additional fare of Rp. 416 for each subsequent kilometer, and a maximum fare cap of Rp. 14,477, is considered a consistent and integrated policy response that is cost-effective for affordable tariff fare and operational sustainability. While the analytical foundation of this model is very strong, its effectiveness in practice will depend heavily on the quality of its technical implementation. Therefore, a carefully designed transition strategy is crucial to ensure passengers can adapt to the new system smoothly, while ensuring operators can manage technological changes without significant service disturbance. The proposed policy recommendations in this study are in accordance with other literature from Liu et al (2017), which states that a progressive tariff structure strategy is the most desirable tariff structure when viewed from the perspective of the highest social welfare and passenger demand.

As a risk mitigation step, it is recommended to have a 3 to 6-month pilot project phase in selected corridors that represent the diversity of travel patterns and demand levels. During this phase, key performance indicators (KPIs) such as passenger volume fluctuations, queue duration during peak hours, error rates in the tap-in/tap-out system, and customer complaint volume must be closely monitored and addressed. A stable passenger linkage rate and minimal system errors will be key indicators that the public has adapted properly to the new fare scheme that will be proposed.

The Jakarta Provincial Government, as the policymaker, and TransJakarta itself need to conduct more extensive outreach and communication strategies with stakeholders through various digital and non-digital communication channels to encourage positive public acceptance of the new TJ fare policy. If the transition from a fixed fare to a distance-based system is to be implemented, the Jakarta Provincial Government's efforts must involve all parties, as this represents a significant paradigm shift. Therefore, transparent and easily understood information is essential. The communication strategy must explain the fare calculation procedures, how the distance-based fare system works, and the existence of a fare ceiling to protect long-distance users from high or unaffordable costs. The importance of public understanding is supported by a study by Zhang et al (2018), which shows that changes in fare policies, if managed with appropriate data, can significantly impact the level of shared public transport use and the mode shift patterns of urban communities.

One of the success factors for this fare change also depends heavily on technological readiness with an integrated system. When distance is used as the basis for fare calculation, precise distance validation using reliable GPS-based technology is required, and trials are necessary before implementing this distance-based fare in the field. The implementation of this distance-based fare will be integrated across all TransJakarta modes, including large buses, small buses, feeder buses, and Microtrans, into a single, integrated system with a two-hour timeframe. Transfers between TJ modes within two hours of the initial tapping should be automatically recognized by the system, as many low-income users live in peri-peri areas and are highly dependent on changing modes of transportation.

Based on the subsidy/Public Service Obligation policy, this distance-based fare scheme can provide more relevant and reliable subsidy cost calculations, ensuring more targeted and efficient subsidy requirements. Implementing distance-based fares will increase ticket revenues, as expected, and reduce subsidy costs. This is expected to create room for improving service quality or offering additional special subsidies for vulnerable groups. Once this new fare policy is implemented, ongoing monitoring and evaluation will remain essential to ensure that efficiency does not compromise the rights of all citizens to public transportation services, especially those most in need.

Limitations

This study calculates the determination of new TransJakarta (TJ) fares based on the Ability to Pay (ATP) variable and a mobility survey of TJ users. Several limitations need to be acknowledged and addressed in future research. The mobility survey data was collected over a relatively short period, from May to June 2023, and as a result, the survey results are insufficient to fully capture seasonal variations, disasters, or special events in Jakarta in travel behavior, or long-term trends. Furthermore, the use of a non-probabilistic sampling method for TJ users, which relies on respondents' willingness to participate,

also has the potential to introduce selection bias, thus somewhat limiting the representativeness and diversity of the overall TJ user population. Of the 8,372 initial respondents, only 6,673 were considered valid after data cleaning, with 75% of respondents identified as active TJ/Mikrotrans users.

Furthermore, the reliance on self-reported data via digital and social media poses a risk of bias and increases the likelihood of respondents misinterpreting survey questions. These issues will pose challenges for planners and researchers in developing recommendations. Combining multiple data sources, including the 2021–2022 Susenas and GIS-based origin-destination analysis, also presents its own challenges. Variations in methodology, timeframe, and operational definitions among these data sources can compromise the overall accuracy of the data as a database.

From an economic perspective, the Travel Cost Method (TCM) premise that households allocate a portion of their income to transportation costs often overgeneralizes the complexities involved in household budgeting decisions and the Willingness to Pay (WTP) factor for each individual. The ATP formula used also relies heavily on the accuracy of household income reporting and travel distances, which are inherently susceptible to perceptual inaccuracies. Furthermore, the 10% income threshold for transportation costs, although widely adopted, may introduce data bias that does not represent people's financial priorities.

Some of the fare model recommendations developed in this study also do not comprehensively incorporate behavioural responses to price fluctuations, such as potential reductions in trip frequency or switching to other transportation modes, which may be considered more practical and adaptable. Qualitative factors such as service quality, comfort, and safety, which psychologically influence customer satisfaction and consideration, are also beyond the scope of this analysis. The two-hour integration scheme initiated with Mikrotrans does not yet accommodate broader and more complex multimodal travel patterns for certain users, such as switching from Mikrotrans to ride-hailing and then using Transjakarta buses to reach their destinations. Finally, several economic factors, such as fluctuations in income levels and inflation after data collection, may affect the relevance of ATP estimates over time. Therefore, these limitations must be periodically and continuously evaluated in developing policy recommendations.

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