



Ability to Pay and Willingness to Pay Analysis Gili Iyang Ferry Crossing Gresik – Bawean

Amayulya Pertiwi^{1*}, Budi Witjaksana², Erni Puspanantasari Putri³
Civil Engineering Master's Study Program, Faculty of Engineering, Universitas
17 Agustus 1945 Surabaya, Indonesia
Corresponding Author: Amayulya Pertiwi, amayulya18@gmail.com

ARTICLE INFO

Keywords: Ability, Pay, Tariff, Respondents, Value.

Received : 27, October
Revised : 29, November
Accepted: 31, December

©2025 Pertiwi, Witjaksana, Putri:
This is an open-access article
distributed under the terms of the
[Creative Commons Atribusi 4.0
Internasional](https://creativecommons.org/licenses/by-sa/4.0/).



ABSTRACT

Average value calculation results Ability to Pay (The respondent's ATP (ATP) is Rp87,907.07. If the value Ability to Pay The average ATP is Rp. 87,907.07 compared to the current Actual Tariff of Rp. 83,000.00, it can be seen that in nominal terms the value Ability to Pay ATP is above the Actual Tariff, with a difference of Rp 4,907.07. The average value Willingness to Pay (The respondents' WTP was recorded at Rp80,514.71. This value, based on the respondents' perceptions of the service, is below the actual tariff of Rp83,000.00. Statistical analysis proves that both Ability to Pay (ATP) average Rp. 87,907.07 or Willingness to Pay (WTP) average of Rp. 80,514.71 is not significantly different from the Actual Tariff of Rp. 83,000.00.

INTRODUCTION

Ferry transportation plays a fundamental role as a "moving bridge" that ensures connectivity between land and water transportation networks, as stipulated in Ministerial Regulation No. 104 of 2017. In particular, the Pioneer Ferry plays a vital role as a manifestation of the government's obligation to increase public mobility and ensure transportation availability in isolated and commercially underserved areas, such as the Bawean-Gresik route. This service, currently operated by the Gili Iyang Ferry Motorboat (KMP), is a Roll-on/Roll-off (RoRo) vessel operated by PT. ASDP Indonesia Ferry (Persero). It is designed to transport passengers and dozens of vehicles, and its primary purpose is to maintain maritime connectivity for the people of Bawean Island. Based on Gresik Regent Regulation Number 52 of 2023 concerning Amendments to Regent Regulation Number 41 of 2013 concerning Integrated Tariffs for Economy Class Passengers, Vehicles, and Heavy/Large Equipment on the Gresik-Bawean route within Gresik Regency, 2023, to ensure service continuity and fare affordability.

Therefore, this study aims to comprehensively analyze two key factors: Readiness to Pay (ATP) and Willingness to Pay (WTP) among users of the KMP Gili Iyang ferry service on the Gresik-Bawean route. The results of this ATP and WTP analysis will serve as a strong basis for formulating sustainable tariff policy recommendations, enabling a reduction in dependence on subsidies, and ensuring that this ferry service can operate more independently without sacrificing purchasing power and providing significant social benefits to the community.

Based on the description of the background of the problem above, the main focus of this research is as follows:

1. How much is the ability to Pay Passengers of the Gili Iyang Motorboat crossing Bawean-Gresik?
2. How much is the willingness to Pay Passengers of the Gili Iyang Motorboat crossing Bawean-Gresik?

Based on the description of the problem formulation, the objectives of this research are as follows:

1. Calculate and analyze Ability to Pay passengers of the Gili Iyang Motorboat crossing Bawean-Gresik;
2. Calculate and analyze Willingness to Pay Passengers of the Gili Iyang Motorboat Crossing Bawean-Gresik.

This research is expected to make a significant scientific contribution to educational institutions and the academic community. The results will enrich scientific knowledge, particularly in the fields of transportation and public subsidy management, and serve as a reference for the development of further academic studies.

The findings of this study can serve as valuable considerations and information for relevant institutions in broadening their knowledge and understanding of the effectiveness of pioneer ferry subsidies. Institutions can use these results to improve subsidy management policies and strategies to be more targeted and efficient.

This research serves as an evaluation tool for the government and stakeholders in managing the pioneer ferry subsidy program. With in-depth data and analysis, the government can identify weaknesses and potential improvements to increase the efficiency and effectiveness of subsidy provision, thus optimizing transportation services in underdeveloped areas.

The results of this study are expected to be a comprehensive reference source for subsequent researchers who wish to conduct further studies related to the provision of pioneer ferry transportation subsidies.

To clarify this research, a review was conducted of various similar studies that had been conducted previously. This review focused on studies that were related in terms of both the scope of discussion and the methodological approach used.

Previous research is the researcher's attempt to find comparisons and subsequently find new inspiration for further research. Furthermore, previous studies help position the research and demonstrate the originality of Triono's (2019) research. In this section, the researcher lists various previous research results related to the proposed research and then summarizes them, both published and unpublished. The following is a list of previous studies related to the theme being studied.

THEORETICAL REVIEW

The research by Arnika Syamsul, Mislihah, A. St. Chairunnisa, Abd. Haris Djalante and Wihdat Djafar (2021) entitled "Study of Transportation Tariffs for the Bira-Sikeli-Tondasi Crossing Route Based on Vehicle Operational Costs (BOK) and Ability to Pay (ATP)" aims to calculate the minimum tariff using the Required Freight Rate (RFR) method based on vehicle operational costs (BOK) as per PM 66 of 2019 and the Ability to Pay (ATP) method. The analysis results show that the annual Vessel Operating Cost (BOK) for the Bira-Tondasi route is IDR 3,701,164,843, resulting in a minimum tariff of IDR 116,911 per Passenger Unit (SUP). This minimum tariff is higher than the current tariff of IDR 105,000 per SUP.

The research by Endah Ayu Lestari and Muhammad Djaya Bakri (2023) is entitled "Analysis of Passenger Transport Fares for Ferry Transportation on the Tarakan-Tanjung Selor Route." The purpose of this study was to determine the fare level by considering passengers' ability to pay and willingness to pay. The method used in this study was based on vehicle operating cost (VOC) analysis, ability to pay (ATP) analysis, and willingness to pay (WTP) analysis. The results of this study showed an average VOC value of Rp182,386.96, an average ATP value of Rp165,128.25, and an average WTP value of Rp126,735.00.

Ability to Pay (ATP) is the financial capacity or ability of a community to pay the travel fare charged. The approach generally used to determine the ATP value is the Household Budget Method (Tamin et al., 1999). The approach used in ATP analysis is based on the allocation of transportation costs and income received. In other words, ATP is the community's ability to pay for the travel costs they take (Tamin et al., 1999).

Willingness to Pay, according to Tamin et al. (1999), is the willingness of service users to pay a fee (fare) for the transportation services they receive. The approach used in Willingness to Pay analysis is based on user perceptions of the fares of public transportation services. In transportation issues, Willingness to Pay functions as a psychological threshold for the price that users accept.

Validity is a key indicator that demonstrates a research instrument's ability to accurately and precisely measure its intended measurement objectives (Sugiyono, 2010). Validity also refers to the degree of precision of measurement results. A valid instrument will produce accurate data (close to the true value) and reflect the actual conditions or realities occurring in the field for the object being studied.

Reliability analysis is a crucial statistical procedure for evaluating the consistency and stability of measurements from questionnaires completed by respondents. A research instrument, such as a questionnaire, can be said to be reliable if the collected answers are able to reveal reliable, stable, and consistent data over time, and are in accordance with the reality or construct being measured. In practice, one of the most commonly used methods to test the internal reliability of an instrument is by calculating the Cronbach's Alpha coefficient (α). Based on guidelines frequently referenced in research (such as Ghozali in Slamet, 2020, which refers to Ghozali).

In simple terms, this formula compares the variance caused by differences between items to the total variance of the entire questionnaire. The smaller the variance between items compared to the total variance, the higher the internal consistency, and the higher the α value. The general criteria for determining reliability based on Cronbach's Alpha (α) are:

1. A variable is declared reliable (accepted) if the Cronbach's Alpha (α) value is ≥ 0.7 . The questionnaire data is worthy of further analysis and the findings are reliable; 2. The variable is declared unreliable (rejected) if the Cronbach's Alpha (α) value ≤ 0.7 . This indicates inconsistency between items. If this occurs, researchers need to revise or remove problematic items (after reviewing the Item-Total Correlation or repeating the pilot test) before proceeding with the main analysis. Using the SPSS (Statistical Package for Social Sciences) program, to easily determine the level of consistency of the questionnaire in this study, see Table 1. below:

No	Correlation Coefficient	Relationship Level
1.	0.00 - 0.19	Very Low
2.	0.20 - 0.39	Low
3.	0.40 - 0.59	Currently
4.	0.60 - 0.79	Strong
5.	0.80 - 1.00	Very strong

Source :Andini & Utamajaya, Iklasia (2023)

A statistical method is a method or science that is a collection of rules for collecting, processing, estimating, and drawing conclusions from statistical data in the form of quantitative or qualitative numbers (Rasdhihan Rasyad, 2003).

Descriptive statistics describe a situation or problem, while inferential statistics are divided into two, namely estimation theory and hypothesis testing, which is the decision-making of population characteristics based on samples. This descriptive analysis is carried out through descriptive hypothesis testing. The result of the analysis is whether the research hypothesis can be generalized or not. If the null hypothesis (H_0) is accepted, it means that the research results can be generalized. This descriptive analysis uses one or more variables but is independent, therefore this analysis does not take the form of comparisons or relationships. The type of statistical technique used to test descriptive hypotheses must be appropriate to the type of data or variables based on their measurement scale, namely nominal, ordinal, or interval/ratio.

To ensure the validity and reliability of the instruments used, validity and reliability tests can be conducted on questionnaires or other data collection instruments. Validity measures the extent to which an instrument measures what it is intended to measure, while reliability measures the consistency of the measurement results.

Administrative areas related to the Bawean-Gresik Crossing, namely the Gresik Ferry Port as the location for distributing questionnaires to service users. The research was conducted in Semester III of 2025.

The main instruments used in this research consist of three types to collect financial data, perception data, and policy data comprehensively, namely:

1. The questionnaire is the main instrument for collecting primary data from service users at Gresik and Bawean Ports, which is specifically designed to measure two key variables: Service Quality which must be in accordance with the Minimum Service Standard indicators in PM 62 of 2019, and Ability to Pay Willingness to Pay community regarding the nonsubsidized tariff scheme.
2. The Secondary Data Recapitulation Form is used as a structured recording instrument, namely the Gresik Regent Regulation Number 52 of 2023 concerning Amendments to the Regent Regulation Number 41 of 2013 concerning Integrated Tariffs for Ferry Transportation for Economy Class Passengers, Vehicles, Heavy/Large Equipment Crossing Gresik - Bawean in Gresik Regency, 2023.

The data collection procedure in this research will be carried out through three main detailed stages, adjusted to the type of data (secondary, qualitative, and primary quantitative) required for the feasibility analysis of the commercial transition of the Bawean-Gresik Crossing as follows:

Primary Data

The method used to collect primary data is observation, which is conducted through direct field observations to determine actual conditions. The data obtained through this observational method in this study are as follows:

- a. Documentation data of questionnaire activities to service users and documentation. This method is the main objective of the research to be conducted, namely to obtain data on service user satisfaction at the Gresik Ferry Port, using the Customer Satisfaction Index (CSI) method;

- b. The questionnaire method was conducted to obtain data regarding user satisfaction with the Gili Iyang Motorboat Ferry service using the Likert Scale;

Secondary Data (Cost Analysis)

The initial step is to coordinate with the Surabaya branch of PT. ASDP Indonesia Ferry (Persero) and relevant regulatory agencies. This procedure aims to obtain specific secondary data, namely ferry tariffs.

Analysis (Quantitative)

1. Technical analysis Ability to Pay The aim is to calculate the maximum financial limits of the community by collecting income and expenditure data. The key is to determine the Affordability Ratio, which is the percentage of reasonable income allocated to the tariff, which is then used to calculate the value of the Ability to Pay for each individual. These values are averaged to form the Average Ability to Pay, which serves as an upper limit for the regulator: if the proposed commercial rate exceeds this limit, the rate these are considered financially unaffordable by most of the population (Tamin et al. 1999, Transportation Planning and Modeling);
2. Data Willingness to Pay analyzed descriptively to determine the average public willingness to pay non-subsidized tariffs. This value serves as an indicator of public purchasing power;
3. To analyze validity, each score on each item is correlated with the overall score. If the calculated $r \geq$ table r , then the instrument or question items are significantly correlated to the total score or are declared valid. (Sadika et al., 2023:38, instrument testing (validity and reliability). The formula that can be used for validity testing uses the Product Moment correlation technique;
4. Reliability to facilitate knowing the level of consistency of the questionnaire in the research. (Ghozali in Slamet, 2020);
5. Statistical methods (Rasdhian Rasyad, 2003 Descriptive Statistical Methods for the General Public).

RESULTS AND DISCUSSION

Rates Ability to Pay analyzed based on the average monthly income, percentage of transportation costs from home to the port, percentage of costs for using ferry transportation, and the frequency of respondents. In discussing the cost of ferry travel per month and specifically discussing the frequency of travel using the Gili Iyang ferry, it is assumed that all of the respondents' transportation costs are allocated for the Gili Iyang ferry.

Assumption $P_t = 1$ or 100%

1. Calculating Average Ability to Pay (ATP) Given:
 - a. I_x (Average Income): Rp 2,860,500
 - b. P_p (Percentage of Transportation Costs from Income): 0.1652
 - c. P_t (Assumed Percentage for Public Transportation): 1.00
 - d. F_r (Average Trip Frequency): 5,375 times

Ability to Pay The average respondent's fare was Rp 87,907.07 per trip. This figure represents the highest level of financial capacity for people to pay fares. Ability to Pay higher than the current Actual Tariff of IDR 83,000, this shows that financially, the average respondent is able to pay the tariff and still has the purchasing power to accept the tariff increase.

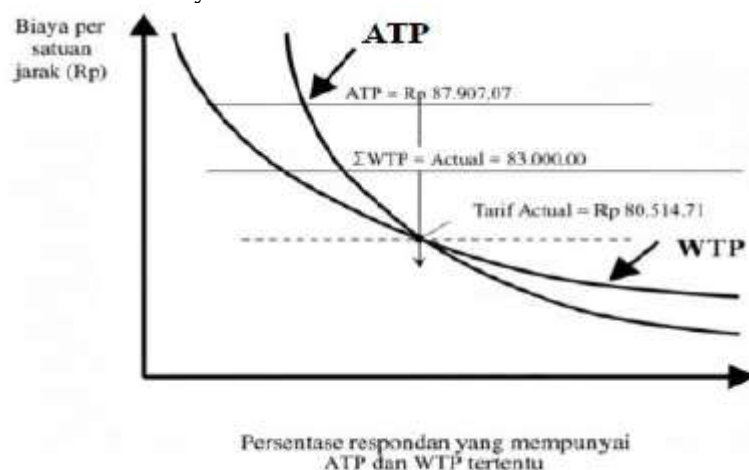
Rates Willingness to Pay was analyzed based on KMP rates. Gili Iyang, according to respondents and additional costs for increasing or improving services. The results of the calculation of the value of willingness to pay are presented in Table 2 as follows:

Table 2. Median Values of Cost Categories

No	Price Offered	Frequency	xi. fi
1.	Rp. 50,000	95	Rp. 4,750,000
2.	Rp. 75,000	80	Rp. 6,000,000
3.	Rp. 85,000	75	Rp. 6,375,000
4.	Rp. 100,000	50	Rp. 5,000,000
5.	Rp. 125,000	30	Rp. 3,750,000
6.	Rp. 150,000	10	Rp. 1,500,000
Total		340	Rp. 27,375,000

Source: Researcher's Process, 2025

Willingness to Pay The average respondent price was Rp 80,514.71 per trip. This value represents the highest price people are willing to pay based on their perceptions of the value and quality of current services. Willingness to Pay is below the current Actual Tariff of IDR 83,000, this indicates that respondents consider the current tariff to be not commensurate with the quality of service they receive.



Source: Researcher's Process, 2025

Analysis Ability to Pay and Willingness to Pay

1. **Ability to Pay** The average respondent fare was Rp 87,907.07 per trip. This figure indicates that people have sufficient purchasing power and can afford to pay more than the current fare of Rp 83,000. This

situation opens up opportunities for operators to raise fares to the limit of their financial capacity.

2. Average Willingness to Pay The price of Rp 80,514.71 is below the actual tariff of Rp 83,000. This indicates a gap between quality and price, where respondents feel that the current tariff is not commensurate with the value or quality of the service they receive, thus limiting their willingness to pay.
3. Even though respondents are able to pay more Ability to Pay Rp 87,907 operators must consider improving service quality. This quality improvement will make Willingness to Pay society rises and exceeds current rates, so that future rate increases are acceptable.

This study, the population used is service users at the Gresik Ferry Port during the peak season during Eid al-Fitr and National Holidays in 2024, as can be seen in table 3 below:

No	Month	Passenger
1.	March	1967
2.	April	1305
3.	May	1528
	Amount	4800

Source: Data from the Kamal and Gresik Ferry Port Implementation Unit (2024)

Therefore, the total sample size required for this study is 100. These samples were randomly selected from a total population of 4,800 service users. This total population was obtained by summing passenger numbers over three months during the peak season of Eid al-Fitr and national holidays in 2024.

Average value calculation results Ability to Pay (The respondent's ATP (ATP) is Rp87,907.07. This value reflects the respondent's financial ability to allocate transportation costs based on their income and travel frequency. If the value Ability to Pay The average ATP is Rp. 87,907.07 compared to the current Actual Tariff of Rp. 83,000.00, it can be seen that in nominal terms the value Ability to Pay ATP is above the Actual Tariff, with a difference of Rp 4,907.07. Although there is a nominal difference, the statistical t-test proves that there is no significant difference between Ability to Pay ATP respondents with Actual Rates. This indicates that current rates are affordable for the majority of respondents.

Meanwhile, the average value of Willingness to Pay (The respondents' WTP was recorded at Rp80,514.71. This value, based on the respondents' perceptions of the service, is below the actual tariff of Rp83,000.00. However, the t-test results also showed that there was no significant difference between the Willingness to Pay Respondents' WTP with Actual Tariffs. Statistical analysis proves that both the Ability to Pay (ATP) average Rp. 87,907.07, and the Willingness to Pay (WTP) average of Rp. 80,514.71 is not significantly different from the Actual Tariff of Rp. 83,000.00. According to Tamin et al. (1999), if the value Ability to Pay ATP is greater than the value Willingness to Pay it shows that most of the passengers are group-schooled riders, where the ability to pay for

public transportation services is relatively higher than their desire to pay for the services received.

CONCLUSION

Based on the results of research on Load Factor Analysis of Motorized Ferry Transportation for the Gili Iyang Crossing Gresik - Bawean, the following can be concluded as follows:

1. Results of the calculation of the average value Ability to Pay (The respondents' ATP was Rp87,907.07. This value reflects the respondents' financial ability to allocate transportation costs based on their income and travel frequency.
2. Average value Willingness to Pay (The respondents' WTP (Worthy of Payment) was recorded at Rp80,514.71. This value, based on respondents' perceptions of the service, is below the actual tariff of Rp83,000.00.

RECOMMENDATION

The suggestions that the author can provide based on the conclusions above include:

1. This research is limited only to aspects of Ability to Pay and Willingness to Pay. Therefore, future research should be reviewed from the perspective of Ferry Transport Tariffs.
2. To perfect this research, additional studies are needed regarding the analysis method for Ferry Transportation Tariffs, in accordance with the Regulation of the Minister of Transportation (PM) Number 66 of 2019 concerning the Mechanism for Determining and Formulating Calculations for Ferry Transportation Tariffs.

FURTHER STUDY

Future research is recommended to explore the factors influencing the gap between Ability to Pay (ATP) and Willingness to Pay (WTP) among users of the Gili Iyang Crossing motorized ferry service. Further studies could examine how service quality attributes, travel purpose, frequency of use, and socio-economic characteristics affect passengers' willingness to pay fares that reflect operational costs. In addition, longitudinal research may assess how improvements in service reliability, comfort, and safety influence changes in WTP over time. Expanding the analysis to include load factor optimization and alternative tariff schemes could also provide valuable insights for developing more sustainable and user-oriented ferry transportation policies for the Gresik-Bawean route.

REFERENCES

- Afrhiani, S. A., Pharmawati, K., & Nurprabowo, A. (2020). Potential Application of Water Conservation in the Dean's Building of University X. *Journal of Environmental Science and Technology*, 12(2), 100-109.
- Biyanto, T. R., Fisika, J. T., & Industri, F. T. (2016). Implementation of Water Management. *Integration of Integrated Water Treatment in Green Buildings*.

- Bobo, N. M. P., Bella, P. A., Tjung, L. J., & Pribadi, I. G. O. S. (2023). RAINWATER RUNOFF MANAGEMENT IN GREEN BUILDINGS (STUDY OBJECT: ALTIRA BUSINESS PARK). *Journal of Science, Technology, Urban Design, Architecture (Stupa)*, 5(2), 1989–2000. <https://doi.org/10.24912/stupa.v5i2.24357>
- Bangka Belitung Public Works and Housing Agency. (2023). Document of the Domestic Wastewater Management System Master Plan for the Bangka Belitung Islands Province 2023-2043. Bangka Belitung Public Works and Housing Agency.
- Faradila, R., Huboyo, H. S., & Syakur, A. (2023). Domestic Wastewater Treatment Engineering Using a Combined Filtration Method to Reduce Water Pollutant Levels. *Indonesian Journal of Environmental Health*, 22(3), 342–350. <https://doi.org/10.14710/jkli.22.3.342-350>
- Farida, A., & Aryuni, V. T. (2020). Surface Runoff Analysis Around the Muhammadiyah University of Sorong Campus, Sorong City. *Journal of Environmental Science & Technology*, 12(2), 146–161.
- Hayatining Pamungkas, T., Infantri Yekti, M., & Adi Alit Putra, I. G. (2023). Rainwater Harvesting System Planning to Meet Water Needs in Nusa Penida. *Journal of Watershed Management Research*, 7(1), 59–76. <https://doi.org/10.59465/jppdas.2023.7.1.59-76>
- Republic Info. (2022, September 22). Ministry of Public Works and Public Housing Committed to Realizing Access to Safe Drinking Water and Sanitation. <https://Infopublik.Id/Kategori/Nasional-Ekonomi-Bisnis/665122/Index.Html> <accessed November 15, 2025>.
- Jaya, I. E. E., Press, T. U., Pertama, C., & Km, J. P. D. (2024). Water Resources Development. Brebes: Muhadi Setiabudi University.
- Mardiaman, M., & Siahaan, T. A. V. (2024). Evaluation of Office Building Water Efficiency During the Dry Season in Green Building Planning. *Civil Talent Journal*, 7(1), 335–343.
- Marwoto, M., Setiawan, A., & Aziz, U. A. (2021). Design of a Rainwater Storage Tank to Utilize Rainwater as a Reserve Water Source for Residential Areas. *Surya Beton: Journal of Civil Engineering*, 5(2), 31–40.
- Movva, S. S. (2023). An Overview of Smart Irrigation Systems Using IoT. *Journal of Technological Innovations*, 4(4).
- Otorita IKN. (2024). Technical Guidelines for Smart Water & Smart Wastewater Management: Utilization of Smart Technology in Clean Water and Wastewater Management for the Indonesian Capital City. Directorate of Green Transformation, Deputy for Green and Digital Transformation, Indonesian Capital City Authority.
- Tiwery, C. J., Magrib, N. I. D., & Sahetapy, E. P. (2022). Analysis of Rainwater Utilization and Planning of a Rainwater Harvesting System to Meet Household Water Needs (Case Study: Jln. Chr. M. Tiahahu, RT 008, Masohi City, Central Maluku Regency). *Manumata: Journal of Engineering Sciences*, 8(1), 66–74.