**Indonesian Journal of Multidisciplinary Sciences (IJoMS)**
**Vol. 5 No. 1 2026, 409-420**
**E-ISSN: 2963-7635 | P-ISSN: 2986-2426**
**Publisher: CV. Era Digital Nusantara**

# Analysis of Exchange Rate Fluctuations on Airfares and Domestic Flight Demand in Indonesia

**Yudha Pratidhina Ayu Maghfirany*, Bakhtiar Efendi, Annisa Ilmi Faried**
Pembangunan Pancabudi University, Jl. Jend. Gatot Subroto KM 4.5 Sei Sikambing, Medan, Sumatera Utara
Corresponding email* : gitammar6910@gmail.com

**ARTICLE INFO**

**Article History**
Submission : 05-05-2026
Received : 07-05-2026
Revised : 25-05-2026
Accepted : 26-05-2026

**Keywords**
exchange rate;
airfares;
domestic aviation demand;
simultaneous equations (2SLS);
purchasing power

**DOI:**
10.59066/ijoms.v5i1.2366

**ABSTRACT**

This study analyzes the impact of exchange rate fluctuations on airline ticket prices and domestic air travel demand in Indonesia within a simultaneous equation model framework that integrates macroeconomic and airline operational factors over the post-pandemic period of 2013–2024. A quantitative approach using the Two-Stage Least Squares (2SLS) method is employed to address the endogeneity between ticket prices (HTP) and passenger demand (PPD). The main variables include the rupiah exchange rate, aviation fuel prices, airline operational costs, and consumers' purchasing power. Estimation results indicate that the model is overidentified and satisfies all classical assumptions, with normally distributed residuals (p-value 0,9659 and 0,9763), homoscedasticity (p-value 0,3399 and 0,1422), and an absence of autocorrelation (p-value 0,2226 and 0,2489). Simultaneously, flight demand and operating costs exert an effect on ticket prices, with very high explanatory power ($R^2$ 0,9982; Prob F 0,0000), while the exchange rate serves as a cost transmission channel through the exchange rate pass-through mechanism. On the demand, ticket prices, exchange rates, and purchasing power significantly affect the number of passengers ($R^2$:0,9782 and Prob F 0,000001), confirming a bidirectional causal relationship between price and demand after addressing endogeneity. These findings suggest that Rupiah depreciation and rising operating costs drive up ticket prices, which potentially suppresses demand; however, this impact can be mitigated by strengthened purchasing power and domestic economic recovery. Consequently, macroeconomic stability remains a pivotal factor for the sustainability of Indonesia's domestic aviation demand in the post-pandemic era.



## Introduction

The air transportation sector plays a strategic role in Indonesia's economic and social integration as an archipelagic state, linking economic activities, tourism, labor mobility, and inter-regional logistics distribution. However, over the past five years, the national aviation industry has faced macroeconomic pressures due to Rupiah exchange rate fluctuations, rising aviation fuel prices, and weakening post-COVID-19 purchasing power (Sentosa et al., 2021). Bank Indonesia data shows a depreciation of the Rupiah from IDR 14,147 per USD in 2019 to approximately IDR 15,750 in 2024, which has intensified pressure on airline profitability due to the heavy reliance on foreign currency transactions for aircraft leasing and maintenance (Herho et al., 2025; Danil, 2022; Manihuruk et al., 2024). The surge in aviation fuel prices—the largest component of operating costs—has driven up airfares and suppressed passenger demand (Bilondatu et al., 2019; Astadewi & Pramesti, 2022; Ginting et al., 2023). Given that a significant portion of operating expenses is USD-denominated, a depreciation of IDR 1,000 per USD potentially increases costs by 5-7% (Mofokeng et al., 2020; Kevin et al., 2019). The spike in domestic aviation fuel prices from IDR 8,700 per liter in 2019 to IDR 15,700 in 2024, following the rise in global crude oil prices from USD 53 to USD 81 per barrel, has further exacerbated these cost pressures (Akhmad et al., 2023).

A 165% increase in aviation fuel costs since 2016, accounting for 35–45% of total operating expenses, has pushed domestic airfares to levels that sometimes exceed international flight prices; such tariff adjustments have become unavoidable due to tax policies and distribution margins (Bilondatu et al., 2019; Danil, 2022; Dieaconescu et al., 2022; Belvadiyanti et al., 2022). The impact is reflected in a 26% increase in average domestic airfares between 2019 and 2024, a decline in the Consumer Confidence Index from 123.0 in 2022 to 117.5 in 2023, and a growing tendency among consumers to postpone air travel. This occurs alongside additional post-pandemic health protocol costs and a domestic passenger recovery that has yet to return to pre-pandemic levels (Utari & Sumarna, 2024; Sari et al., 2020). Furthermore, the oligopolistic market structure allows airlines to pass cost pressures directly to consumers, thereby further dampening demand (Gayle & Lin, 2020; Nuryakin et al., 2019).

The vulnerability of the aviation industry to exchange rate fluctuations aligns with phenomena observed in other emerging economies, where approximately 60% of global airline operating costs and 65% of national airline costs are USD-denominated. Consequently, the depreciation of domestic currencies inevitably drives up operating expenses and airfares; in Asia, for instance, every 5% depreciation in exchange rates typically results in a 2–3% increase in ticket prices (IATA, 2023; Lee et al., 2022; Wang et al., 2018; Kristanti, 2021). The COVID-19 pandemic, which caused a passenger volume collapse of over 80% at Soekarno-Hatta Airport in 2020, further exacerbated the financial strain on airlines through massive losses, asset inefficiencies, and widespread flight cancellations. These disruptions had a cascading effect on national GDP, logistics distribution, and the tourism sector (Wangi & Achdiat, 2022; Kristanti, 2021; Dewi, 2023; Yulianingtiyas, 2022; Ibrahim, 2021). An analysis of these trends based on Indonesian aviation industry data will be conducted to provide a comprehensive overview

The subtitle is centered in capital letters at the beginning of each word except for conjunctions (Times New Roman 12, bold). For sub-headings, it is written left-aligned with capital letters at the beginning of each word except for connecting words. For the third level subtitle, it is written in capital letters and in bold, only at the beginning of the sentence, and so on.

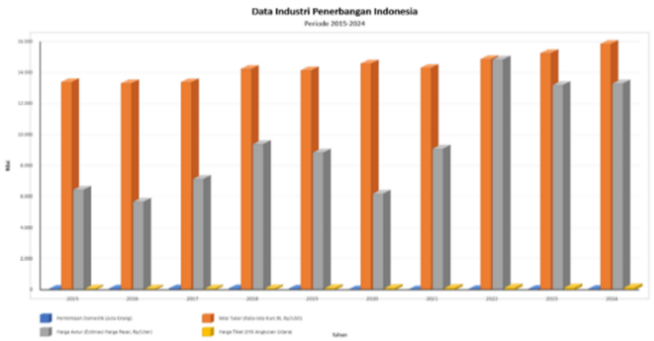


**Figure 1. Trends in the Indonesian Aviation Industry**
Source: BPS, BI, IATA

Data from the 2015–2024 period indicate that the Indonesian aviation industry grew steadily, driven by increasing interest in domestic air travel. Despite fluctuating aviation fuel prices and a weakening Rupiah, airlines have not fully transferred rising costs to airfares, keeping price hikes relatively controlled. The exchange rate acts as an exogenous variable influencing ticket prices via the exchange rate pass-through mechanism, triggered by increased import and fuel costs (Gayle & Lin, 2020). Air travel demand in Indonesia is categorized as price-elastic; thus, price increases tend to reduce passenger volume, particularly among middle-income groups (Prayogo & Sukim, 2021; Sarjono et al., 2025; Susanto & Keke, 2020). However, rising per capita income and stable economic growth may diminish price sensitivity (Suryan, 2017). The overall recovery of the transportation sector has not been fully mirrored in air transport due to the pandemic's lingering impact, diminished purchasing power, mobility restrictions, and high operating costs, all of which underscore the sector's vulnerability to economic shocks (Rianda, 2021; Aulia et al., 2021; Iriyadi & Purba, 2022; Bilondatu et al., 2019).

This research addresses the limitations of existing empirical studies, which remain partial and have yet to integrate macro and micro factors—specifically exchange rates, aviation fuel prices, airfares, purchasing power, and flight demand—into a single comprehensive framework in Indonesia. Utilizing a simultaneous equations model based on panel and time-series data, this study identifies economic factors affecting passenger volume while incorporating the structural impacts of COVID-19 on consumer behavior, operating costs, and the volatility of exchange rates and energy prices (Kayhan et al., 2023; Suryan, 2017; Khafidli & Choiruddin, 2022; Zahra & Prastuti, 2023). Empirical evidence suggests that macroeconomic variables and real sector performance significantly influence economic stability and growth; thus, a simultaneous econometric approach is vital for explaining economic policy transmission mechanisms comprehensively (Efendi et al., 2023).

Furthermore, the role of structural indicators, such as the Human Development Index and industrial labor, has been proven to significantly impact regional economic growth, reinforcing the importance of integrating macro variables and the real sector within a system of simultaneous equations (Efendi et al., 2024). Grounded in the theory of derived demand, this study examines the interconnectedness of economic activity, income, airfares, and air transport demand, with purchasing power serving as a moderating variable. This research is expected to provide both theoretical and empirical contributions to the Indonesian transport economics literature and serve as a basis for policies concerning price stabilization, operational efficiency, and the post-pandemic recovery of the aviation sector (Muryani & Swastika, 2018; Domestik et al., 2014; Ginanjar & Lafani, 2021; Fitri et al., 2020; Dewi, 2023).

## Method

This study employs a quantitative approach within a positivistic paradigm to examine the causal relationships between exchange rate fluctuations, aviation fuel prices, operating costs, and consumer purchasing power on airfares and domestic flight demand through a simultaneous equations model. Previous studies highlight the importance of addressing such interdependencies using simultaneous models.

Macroeconomic policy variables have been found to significantly influence economic performance when estimated using the Two-Stage Least Squares (2SLS) method, highlighting the importance of addressing endogeneity in empirical analysis (Faried et al., 2020). Consistently, cost structures, market dynamics, and income formation are closely interrelated, thereby supporting the use of an integrated analytical framework (Faried, 2020; Faried et al., 2023).The bidirectional relationship between airfares and demand is analyzed using the Two-Stage Least Squares (2SLS) method to address endogeneity and obtain unbiased estimates (Gujarati & Porter, 2020; Wooldridge, 2022). Furthermore, economic development approaches based on the agri-food sector and sustainable economics emphasize that integrating socio-economic variables and regional policies provides a more comprehensive explanation of regional economic performance (Faried, 2025).

Consequently, this study incorporates key macroeconomic variables into a structural simultaneous equations framework to examine causal relationships and ensure that the resulting estimates reflect the endogenous interactions among economic variables in a more realistic and empirical manner. The analysis is performed using EViews through a systematic process involving model identification, estimation, goodness-of-fit testing, and classical assumption diagnostics. These steps aim to generate robust empirical evidence regarding the impact of exchange rate and energy price fluctuations on the cost and demand dynamics of Indonesia's domestic aviation industry in the post-pandemic era (Fitri et al., 2020; Sari et al., 2020; IATA, 2023; IMF, 2024). The dataset covers both low-cost and full-service carriers for the 2013–2024 period, sourced from official national and international institutions, representing the pre-pandemic, COVID-19, and post-pandemic phases (Utari & Sumarna, 2024).

The data analysis technique in this study employs an econometric approach using a simultaneous equations model, reflecting the bidirectional relationship between airfares and domestic flight demand; specifically, prices influence demand, while demand simultaneously informs airline pricing strategies. Gujarati & Porter (2020) state that simultaneous models are necessary when a dependent variable in one equation functions as an independent variable in another. In such instances, the use of Ordinary Least Squares (OLS) is prone to producing biased and inconsistent estimates due to endogeneity. Consequently, this study applies the Two-Stage Least Squares (2SLS) method, which estimates endogenous variables through instrumental variables in the initial stage prior to performing the simultaneous estimation.

The analytical model employed in this study is a system of simultaneous equations specified as follows:

Equation (1): Airfare Determination Model (HTP) :

$$LOG(HTP)=C(10)+C(11)*LOG(KURS)+C(12)*LOG(HAV)+C(13)*LOG(BOP)+\varepsilon 1$$

| | |
|---|---|
| HTP | : Domestic Airfare (Rupiah/passenger) |
| KURS | : Rupiah Exchange Rate against the US Dollar (IDR/USD) |
| HAV | : Domestic Aviation Fuel Price (Rupiah/liter) |
| BOP | : Airline Operating Costs (Billion Rupiah per year) |
| C (10-13) | : Estimation constants (intercepts) |
| $\alpha_0$-$\alpha_4$ | :Regression coefficients representing the elasticity of each independent variable |
| $\varepsilon_1$ | : Structural error term for Equation (1) |

Equation (2) : Domestic Air Travel Demand Model (PPD)

$$LOG(PPD)=C(20)+C(21)*LOG(HTP)+C(22)*LOG(DBM)+C(23)*LOG(KURS)+\varepsilon 2$$

| | |
|---|---|
| PPD | : Domestic Flight Demand (Number of passengers per month) |
| HTP | : Domestic Airfare (Rupiah per passenger) |
| DBM | : Consumer Purchasing Power (Consumer Confidence Index) |
| KURS | : Rupiah Exchange Rate against the US Dollar (IDR/USD) |
| C(20-23) | : Estimation constants (intercepts) |
| $\beta_0$-$\beta_3$ | : Regression coefficients representing the elasticity between variables |
| $\varepsilon_2$ | : Structural error term for Equation (2). |

## Results and Discussion

### Order Condition Test

The identification status of the model is determined using the order condition test, which classifies the system into three distinct categories. If the value of $K - k > m - 1$, the model is over-identified. If the condition $K - k = m - 1$ is satisfied, the model is considered exactly identified. Conversely, if $K - k < m - 1$, the model is unidentified and cannot be estimated. The detailed results of this identification test are summarized in Table 1.

**Table 1. Model Identification Via Order Condition**

| Equation | K - k | Condition | m - 1 | Identification |
|---|---|---|---|---|
| HTP | (6 - 4) = 2 | > | (2 - 1) = 1 | *Overidentified* |
| PPD | (6 - 4) = 2 | > | (2 - 1) = 1 | *Overidentified* |

Source: Authors' calculation (2026)

### Classical Assumption Tests

Classical assumption testing is a crucial step to ensure that equations (1) and (2) produce valid and unbiased estimates. Within the framework of simultaneous equation models, the required diagnostic tests include normality, heteroskedasticity, autocorrelation, and multicollinearity tests.

### Normality Assumption

This test is performed to verify whether the error terms (residuals) are normally distributed, which is essential for valid statistical inference.

**Table 2. Normality Test Results**

| Equation | P-Value | Description / Decision |
|---|---|---|
| HTP | 0,965945 | Fail to reject $H_0$ |
| PPD | 0,976328 | Fail to reject $H_0$ |

Source: Authors' calculation (2026)

The results of the Jarque-Bera test in Table 2 show p-values of 0.965945 for the Domestic Airfare (HTP) equation and 0.976328 for the Domestic Flight Demand (PPD) equation. Since both values exceed the 0.05 significance level, the null hypothesis ($H_0$) is not rejected. This confirms that the residuals in both equations are normally distributed.

### Heteroscedasticity Assumption

The heteroscedasticity test is conducted to ensure that the variance of the residuals remains constant across observations (homoscedasticity). In this study, this assumption is examined using the Breusch-Pagan-Godfrey Test.

**Table 3. Heteroscedasticity Test Results**

| Equation | P-Value | Description / Decision |
|---|---|---|
| HTP | 0,3399 | Fail to reject $H_0$ |
| PPD | 0,1422 | Fail to reject $H_0$ |

Source: Authors' calculation (2026)

Based on the Breusch-Pagan-Godfrey test results in Table 3, the p-values for the HTP and PPD variables are 0.3399 and 0.1422, respectively. Given that both values surpass the 0.05 threshold, we fail to reject ($H_0$). This indicates that both Equation (1) and Equation (2) satisfy the homoscedasticity assumption and are free from heteroscedasticity issues.

### Autocorrelation Assumption

The autocorrelation test is performed to detect whether there is a correlation between residuals across observations in the model. This analysis utilizes the Lagrange Multiplier (LM) Test.

**Table 4. Autocorrelation Test Results**

| Equation | P-Value | Info |
|---|---|---|
| HTP | 0,2226 | Fail to reject $H_0$ |
| PPD | 0,2489 | Fail to reject $H_0$ |

Source: Authors' calculation (2026)

Based on Table 4, the Breusch-Godfrey Serial Correlation LM Test results yield p-values of 0.2226 for the HTP variable and 0.2489 for the PPD variable. Since both values are greater than 0.05, the null hypothesis is not rejected. This proves that both Equation (1) and Equation (2) are free from autocorrelation problems.

### Multicollinearity Assumption

The multicollinearity test is performed to detect whether strong correlations exist between the predictor variables in the model. One common method of identification is analyzing the correlation matrix; if a correlation coefficient is found to be excessively high (typically above 0.90), it indicates the presence of multicollinearity.

**Table 5. Correlation Matrix for the HTP Equation**

| | HTP | PPD | KURS | HAV | BOP |
|---|---|---|---|---|---|
| HTP | 0,3429 | 0,4867 | 0,2572 | 0,5803 | 0,2805 |
| PPD | 0,3867 | 0,3042 | 0,2227 | 0,3276 | 0,4412 |
| KURS | 0,4572 | 0,3227 | 0,3564 | 0,6563 | 0,3488 |
| HAV | 0,5803 | 0,6276 | 0,4563 | 0,3457 | 0,4626 |
| BOP | 0,3805 | 0,4412 | 0,3488 | 0,4626 | 0,2315 |

Source: Authors' calculation (2026)

**Table 6. Correlation Matrix for the PPD Equation**

| | PPD | HTP | KURS | DBM |
|---|---|---|---|---|
| PPD | 0,3425 | 0,4867 | 0,5227 | 0,4148 |
| HTP | 0,2867 | 0,1463 | 0,3572 | 0,3816 |
| KURS | 0,5227 | 0,4572 | 0,2316 | 0,2361 |
| DBM | 0,2148 | 0,6816 | 0,5361 | 0,4352 |

Source: Authors' calculation (2026)

The analysis results in Tables 5 and 6 demonstrate that no values in the correlation matrices exceed 0.90. This proves that the regression models are free from multicollinearity issues, thereby satisfying the required assumptions for both equations. Overall, this comprehensive suite of classical assumption tests confirms that the HTP (1) and PPD (2) models within the simultaneous equation system estimated via the Two-Stage Least Squares (2SLS) method—yield valid and representative estimates.

Indonesian Journal of Multidisciplinary Sciences (IJoMS)
Vol. 5 No. 1 2026, 409-420

**Simultaneous Equation Model Results**

**Estimation Results for the Airfare (HTP) Model**

The comparison between Ordinary Least Squares (OLS) and Two-Stage Least Squares (2SLS) estimations for the HTP equation is presented in Table 7.

**Table 7. OLS and 2SLS Estimation Results for the HTP Model**

| Variabel | OLS Coefficient | OLS Significance | 2SLS Coefficient | 2SLS Significance |
|---|---|---|---|---|
| LOG(HTP) | 0.0979 | 0.0013 | 1.4917 | 0.0301 |
| LOG(KURS) | 0.8851 | 0.0368 | 0.0183 | 0.0293 |
| LOG(DBM) | 84.1247 | 0.3038 | 0.3186 | 0.0432 |
| Constant | 69430.28 | 0.0047 | 11.3211 | 0.0473 |
| Number of Observations | 12 | 12 | 12 | 12 |
| F-Statistic | 127.4581 | | 113.7863 | |
| Prob > F / chi2 | 0.0000 | | 0.000001 | |
| R-Squared | 0.9795 | 0.9795 | 0.9782 | 0.9782 |
| Root MSE | 1058.079 | 1058.079 | 0.0133 | 0.0133 |
| Instrumented | | | LOG(HTP) | LOG(HTP) |
| Instruments | | | Log(Kurs), Log(Hav), Log(Bop), Log(Dbm) | Log(Kurs), Log(Hav), Log(Bop), Log(Dbm) |

Source: Authors' calculation (2026)

The simultaneous estimation using 2SLS demonstrates a valid and consistent model with exceptionally high explanatory power. Partially, PPD and BOP exert a positive and significant influence on HTP, indicating that increased domestic demand and higher airline operating costs drive airfare hikes within the interconnected system. While KURS shows a positive effect, it is not dominant, and HAV remains statistically insignificant. The minimal discrepancy between OLS and 2SLS coefficients suggests that endogeneity has been effectively corrected, making the 2SLS estimates a stable representation of the structural relationship.

**Estimation Results for the Domestic Flight Demand (PPD) Model**

**Table 8. OLS and 2SLS Estimation Results for the PPD Model**

| Variabel | OLS Coefficient | OLS Significance | 2SLS Coefficient | 2SLS Significance |
|---|---|---|---|---|
| LOG(HTP) | 0.0979 | 0.0013 | 1.4917 | 0.0301 |
| LOG(KURS) | 0.8851 | 0.0368 | 0.0183 | 0.0293 |
| LOG(DBM) | 84.1247 | 0.3038 | 0.3186 | 0.0432 |
| Constant | 69430.28 | 0.0047 | 11.3211 | 0.0473 |
| Number of Observations | 12 | 12 | 12 | 12 |
| F-Statistic | 127.4581 | | 113.7863 | |

| | | | | |
|---|---|---|---|---|
| Prob > F / chi2 | 0.0000 | | 0.000001 | |
| R-Squared | 0.9795 | 0.9795 | 0.9782 | 0.9782 |
| Root MSE | 1058.079 | 1058.079 | 0.0133 | 0.0133 |
| Instrumented | | | LOG(HTP) | LOG(HTP) |
| Instruments | | | Log(Kurs), Log(Hav), Log(Bop), Log(Dbm) | Log(Kurs), Log(Hav), Log(Bop), Log(Dbm) |

Source: Authors' calculation (2026)

The 2SLS estimation results indicate that LOG(HTP) has a positive and significant impact on PPD ($p<0,05$), suggesting a strong causal link after correcting for endogeneity. LOG(KURS) and LOG(DBM) are also significant, though their economic contributions are relatively smaller. The high $R^2$ (0.98) and significant F-statistic confirm the model's goodness-of-fit. The substantial difference between OLS and 2SLS coefficients for HTP confirms the presence of endogeneity, establishing 2SLS as the more consistent method for explaining the simultaneous relationship between airfares and flight demand.

## Conclusion

This study concludes that the simultaneous equation model between domestic airfares (HTP) and domestic flight demand (PPD) in post-pandemic Indonesia is econometrically valid and consistent. The model is categorized as over-identified and successfully passed all classical assumption tests. Specifically, the residuals are normally distributed (p-values of 0.9659 and 0.9763), free from heteroscedasticity (p-values of 0.3399 and 0.1422), and exhibit no autocorrelation (p-values of 0.2226 and 0.2489).

The 2SLS estimation reveals that in the HTP equation, flight demand and operating costs have a positive and significant impact, while the exchange rate exerts a positive but relatively moderate effect. An $R^2$ value of 0.9982 and a significant F-statistic (Prob. 0.0000) confirm the model's robust ability to explain variations in ticket prices.

In the PPD equation, ticket prices, exchange rates, and public purchasing power significantly influence demand, with an $R^2$ of 0.9782 and a significant F-statistic (Prob. 0.000001). This indicates a bidirectional causal relationship between price and demand after correcting for endogeneity. Economically, these results suggest that exchange rate depreciation and rising operating costs drive up airfares, which subsequently pressures demand. However, this effect can be mitigated by improvements in public purchasing power, highlighting macroeconomic stability as a key driver for the sustainability of domestic aviation demand

. Future research is encouraged to extend the observation period and incorporate additional macroeconomic variables, such as global oil prices, inflation, and interest rates, to provide a more comprehensive explanation of cost and demand dynamics. Furthermore, employing dynamic approaches such as the Vector Error Correction Model (VECM) or Panel Simultaneous Model is recommended to capture long-term relationships and heterogeneity across different airlines or flight routes. Such advancements would yield more precise policy implications for tariff stabilization and the overall efficiency of the national aviation industry.

## References

Arifin, Y. (2018). Pengaruh Harga Minyak Dunia, Nilai Tukar dan Inflasi terhadap Pertumbuhan Ekonomi Indonesia. Economics Development Analysis Journal, 5(4), 474. https://doi.org/10.15294/edaj.v5i4.22184

Danil, D. (2022). Perlindungan konsumen atas penetapan tarif maskapai penerbangan bumn dan swasta di makassar. Jurnal Meta Yuridis, 5(1), 73. https://doi.org/10.26877/m-y.v5i1.8486

Dewi, N. L. M. A. (2023). Komparasi faktor dominan mempengaruhi perilaku pembelian tiket wisatawan nusantara ke bali (sebelum pandemi – era pandemi). Jurnal IPTA, 10(2), 281. https://doi.org/10.24843/ipta.2022.v10.i02.p12

Dieaconescu, R. I., Belu, M. G., & Gheorghe, M. (2022). Impact of Oil Price Evolution on Logistics Industry. The Romanian Economic Journal, 84. https://doi.org/10.24818/rej/2022/84/01

Efendi, B., & Jannah, A. R. (2023). Pengaruh ekspor terhadap pertumbuhan ekonomi di Indonesia. Jurnal Ilmiah Edunomika, 8(4).

Efendi, B., Nasution, D. P., Rusiadi, & Pratiwi, D. (2024). The impact of human development index and industrial labor on economic growth in North Sumatra Province. Jurnal Ilmiah Akuntansi Kesatuan, 13(3). https://doi.org/10.37641/jiakes.v13i3.3560

Efendi, B., Nasution, L. N., & Pratama, M. F. (2023). Transformasi digital ekonomi dalam mendukung inklusi keuangan di Indonesia. MUQADDIMAH: Jurnal Ekonomi, Manajemen, Akuntansi dan Bisnis, 3(1). https://doi.org/10.59246/muqaddimah.v3i1.1184

Faried, A. I. (2020). Analisis meredam angka kemiskinan melalui pendekatan ekonomi hijau. Ekawan: Jurnal Ekonomi dan Pembangunan, 5(1), 1–10. https://jurnal.umsu.ac.id/index.php/ekawan/article/view/3425

Faried, A. I., Nasution, L. N., & Nasution, D. P. (2020). Efektivitas kebijakan fiskal dan moneter dalam mengatasi kemiskinan di Provinsi Sumatera Utara. Jurnal Kajian Ekonomi dan Kebijakan Publik, 5(1), 73–77. https://jurnal.pancabudi.ac.id/index.php/jepa/article/view/856

Faried, A. I., et al. (2023). Analysis of KUR financing on MSMEs income. Ekonomika45: Jurnal Ilmiah Manajemen, Ekonomi Bisnis, Kewirausahaan. https://doi.org/10.30640/ekonomika45.v12i2.4555

Fatah, F. A., Gayatri, I. D. A. D., & Kalbuana, N. (2024). Faktor-Faktor Yang Mempengaruhi Pemilihan Maskapai Penerbangan: Harga, Pelayanan Dan Promosi. Journal of Social Science and Humanities Research, 3(1), 159. https://doi.org/10.56854/jsshr.v3i1.368

Gayle, P. G., & Lin, Y. C. (2020). Cost pass-through in commercial aviation: theory and evidence. Economic Inquiry, 59(2), 803. https://doi.org/10.1111/ecin.12949

Herho, S. H. S., Kaban, S. N., & Nugraha, C. (2025). 100-Day Analysis of USD/IDR Exchange Rate Dynamics Around the 2025 U.S. Presidential Inauguration. https://doi.org/10.48550/ARXIV.2506.18738

Kayhan, S., KİRACI, K., & Yaşar, M. (2023). Relationship between Airline Ticket Price, Demand and Business Model: A Worldwide Analysis. Aksaray Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 15(3), 211. https://doi.org/10.52791/aksarayiibd.1234849

Kevin, K., Situngkir, E. S., Diana, E. S., Tenrigangka, R., Syaputri, A. R., Hartanti, D., & Kurniadi, A. (2019). Efektivitas bank sentral dalam menjaga kestabilan nilai tukar. Equity Jurnal Ekonomi, 7(2), 1. https://doi.org/10.33019/equity.v7i2.4

Khafidli, M. K., & Choiruddin, A. (2022). Forecast of Aviation Traffic in Indonesia Based on Google Trend and Macroeconomic Data using Long Short-Term Memory. 220. https://doi.org/10.1109/icodsa55874.2022.9862894

Kristanti, D. S. (2021). Manajemen Strategi PT Garuda Indonesia (Persero) Tbk di tengah Masa Pandemi. Jurnal Bisnis Dan Kajian Strategi Manajemen, 5(1). https://doi.org/10.35308/jbkan.v5i1.3057

Mofokeng, T. J., Mativenga, P., & Marnewick, A. L. (2020). Analysis of aircraft maintenance processes and cost. Procedia CIRP, 90, 467. https://doi.org/10.1016/j.procir.2020.01.115

Nuryakin, C., Kusumaatmadja, R., Massie, N. W. G., Lumbanraja, A. U., Hambali, S., & Anindita, D. (2019). The Sky in Blues: On the Recent Development of Indonesian Airlines Industry. RePEc: Research Papers in Economics. https://ideas.repec.org/p/lpe/wpaper/201941.html

Prayogo, D., & Sukim, S. (2021). Determinan Daya Beli Masyarakat Indonesia Selama Pandemi Covid-19 Tahun 2020. Seminar Nasional Official Statistics, 2021(1), 631. https://doi.org/10.34123/semnasoffstat.v2021i1.987

Rianda, F. (2021). Pemodelan Intervensi Untuk Menganalisis dan Meramalkan Jumlah Penumpang Pesawat di Bandara Soekarno-Hatta Akibat Pandemi Covid-19. Seminar Nasional Official Statistics, 2021(1), 283. https://doi.org/10.34123/semnasoffstat.v2021i1.857

Sari, M., Saribanon, E., & Ghafar, A. (2020). Kartel dan Tarif Tiket Perusahaan Penerbangan Terhadap Persaingan Usaha Penerbangan di Indonesia. Jurnal Manajemen Bisnis Transportasi Dan Logistik, 6(2), 145. https://doi.org/10.54324/j.mbtl.v6i2.525

Sarjono, H., Alvian, C., & Marcelino, K. (2025). The Effects of COVID-19 on Garuda Indonesia Airlines. Golden Ratio of Data in Summary, 5(3), 425. https://doi.org/10.52970/grdis.v5i3.1164

Suryan, V. (2017). Econometric forecasting models for air traffic passenger of indonesia. Journal of the Civil Engineering Forum, 3(1), 303. https://doi.org/10.22146/jcef.26594

Susanto, P. C., & Keke, Y. (2020). Implementasi Regulasi International Civil Aviation Organization (ICAO) pada Penerbangan Indonesia. Aviasi Jurnal Ilmiah Kedirgantaraan, 16(1), 53. https://doi.org/10.52186/aviasi.v16i1.23

Utari, D. T., & Sumarna, Z. M. P. (2024). Enhancing Air Travel Analysis: Forecasting Domestic Flight Activities in Indonesia based on Aircraft Types using MLP. EKSAKTA Journal of Sciences and Data Analysis, 17. https://doi.org/10.20885/eksakta.vol5.iss1.art3

Wang, K. (2023). The Impact of Soaring Crude Oil Prices on the Air Transportation Industry Index. Highlights in Business Economics and Management, 19, 651. https://doi.org/10.54097/hbem.v19i.12110

Yulianingtiyas, E. T. (2022). Analisis kinerja keuangan perusahaan transportasi yang terdaftar di Bursa Efek Indonesia sebelum dan masa pandemi covid 19. Fair Value Jurnal Ilmiah Akuntansi Dan Keuangan, 4(9), 3798. https://doi.org/10.32670/fairvalue.v4i9.1554

Zahra, J. S., & Prastuti, M. (2023). Peramalan Jumlah Penumpang Pesawat Domestik di Bandara Soekarno-Hatta pada Masa Pandemi Covid-19 Menggunakan ARIMAX dengan Model Intervensi. Jurnal Sains Dan Seni ITS, 12(1). https://doi.org/10.12962/j23373520.v12i1.100847