Analysis of Exchange Rate, GDP, Inflation, and Ticket Prices on Domestic Flight Demand in Indonesia

Yudha Pratidhina Ayu Maghfirany, Bakhtiar Efendi

Abstract
This study analyzes the influence of the exchange rate, Gross Domestic Product (GDP), inflation, and ticket prices on domestic flight demand in Indonesia from 2010 to 2024. Utilizing the Autoregressive Distributed Lag (ARDLapproach, the research captures short-term dynamics and long-term equilibrium in the context of post-pandemic recovery characterized by exchange rate volatility and inflationary pressures. Bound test results indicate strong cointegration (F-statistic = 26,92995), confirming a long-term relationship between variables. Long-term estimates show that GDP and the exchange rate have a significant positive effect on passenger numbers, while inflation and ticket prices have a significant negative impact, reflecting the high price sensitivity of the Indonesian market . The Error Correction Term (ECT = -0,936690) suggests a rapid adjustment mechanism, where approximately 93.67% of short-term imbalances are corrected within one period. The model is statistically stable, adheres to classical assumptions, and demonstrates high explanatory power (Adjusted R^2 = 0,9277). These findings underscore the critical importance of macroeconomic stability and adaptive pricing policies in ensuring the sustainable recovery of the domestic aviation sector in price-sensitive developing economies.

Keywords: PAXD, Exchange Rate, GDP, Inflation, Ticket Price, ARDL Model

Yudha Pratidhina Ayu Maghfirany[1]
[1]Economic Study Program, Universitas Pembangunan Panca Budi, Indonesia
e-mail: gitammar6910@gmail.com[1]

Bakhtiar Efendi[2]
[2]Departement of Economic, Universitas Pembangunan Panca Budi, Indonesia
e-mail: koneksisaya@gmail.com[2]

Introduction

Indonesia's domestic aviation industry serves as a strategic sector heavily influenced by macroeconomic dynamics, given its vital role in connecting the archipelago, supporting societal mobility, and reflecting national economic performance. Over the past two decades, growth in domestic aviation has been driven by the expansion of the middle class, GDP growth, and sector liberalization. However, this trajectory was disrupted by the shocks of the COVID-19 pandemic and subsequent global economic uncertainty. Although a recovery phase commenced in 2022 with domestic flights rebounding faster than international routes the sector continues to face significant pressure from exchange rate fluctuations, inflation, and rising operational costs, all of which impact airfares and demand [1].

The post-pandemic recovery of Indonesia’s domestic aviation is occurring amidst high-pressure macroeconomic dynamics, particularly the volatility of the Rupiah against the US Dollar triggered by global monetary tightening and geopolitical uncertainty. These exchange rate fluctuations increase airline operating costs due to the dominance of foreign-currency-denominated cost components, thereby driving up ticket prices and influencing public travel decisions. Conversely, while relatively stable GDP growth averaging around 5 percent from 2022 to 2024 should theoretically stimulate aviation demand due to its income-elastic nature, inflationary pressures and high ticket prices mean that aggregate economic growth is not fully reflected in domestic aviation demand [2].

Inflation plays a critical role in shaping domestic aviation demand; its increase not only drives up airline operating costs but also weakens public purchasing power and shifts travel preferences, particularly among price-sensitive passengers who dominate markets in developing nations. In the post-pandemic Indonesian context, inflationary pressures stemming from rising energy and food prices have narrowed the policy space between maintaining price stability and fostering the recovery of the air transport sector. This tension is reflected in rising ticket prices as a representation of overall travel costs. Increased airfares whether triggered by fuel costs, exchange rate depreciation, or tariff policies tend to suppress passenger numbers, especially within a relatively concentrated domestic market structure with limited inter-island transport alternatives[3]. Furthermore, airfare fluctuations, often influenced by inflation, serve as a primary factor affecting tourist behavior and response, potentially destabilizing the tourism sector significantly [4].

Domestic aviation demand in Indonesia is not determined by a single factor but is formed through complex interactions between monetary conditions, economic growth, inflation, and pricing policies. Previous research has often failed to capture these interactions due to partial focuses or a concentration on developed economies. Indonesia’s characteristics as a developing nation with a high dependency on air transport, high demand elasticity, and strong sensitivity to price and income changes result in unique demand dynamics. Post-pandemic empirical findings suggest that exchange rates and inflation now play a more dominant role through pricing mechanisms and economic expectations, whereas the influence of GDP tends to be indirect and contingent upon income distribution and levels of uncertainty, Therefore, an integrated approach is required to analyze these factors simultaneously. [5].

Although the international literature on aviation demand is quite extensive, significant research gaps remain as studies specifically highlighting Indonesia's post-pandemic domestic aviation market are limited, many studies use global macroeconomic indicators that do not adequately reflect local consumer dynamics, and the relationship between exchange rates and inflation on ticket prices is often assumed to be linear without empirical testing in the context of developing countries with oligopolistic market structures. Based on air transport demand theory, domestic aviation demand is influenced by income, prices, and macroeconomic conditions, where the exchange rate influences operational costs through a pass-through mechanism, GDP reflects aggregate purchasing power, inflation indicates price stability, and ticket prices are a direct determinant of travel decisions, making this variable framework relevant for empirical testing and supporting public policy formulation [6]. Therefore, this study aims to comprehensively analyze the influence of exchange rates, gross domestic product, inflation, and ticket prices on domestic aviation demand in Indonesia post-pandemic, taking into account the complex interactions between these variables. [7], [8].

Given the complexity of these dynamics, this research holds a strong sense of urgency to bridge the existing literature gap while offering a substantive contribution to policy formulation and aviation industry strategy. Through an empirical analysis of the effects of exchange rates, GDP, inflation, and ticket prices on domestic flight demand in Indonesia, this study aims to provide a more comprehensive understanding of post-pandemic demand patterns. Furthermore, it serves as a foundation for developing transport and macroeconomic policies that are more responsive, adaptive, and sustainability-oriented [7]. This study also fills a research void by examining the impact of economic crises on the Indonesian domestic market, drawing parallels to the issues highlighted in the context of the Brazilian air transport sector [9].

Literature Review

Domestic Flight Demand

Domestic aviation demand essentially reflects the public's necessity for spatial mobility, which is profoundly influenced by income levels, airfares, and overall macroeconomic conditions. Air transportation is characterized by high income elasticity; specifically, robust economic performance, rising disposable income, or enhanced consumer purchasing power typically leads to a significant surge in passenger volume. In the Indonesian context, an archipelagic nation, aviation plays a strategic role as many regions remain inaccessible without air transport. Nevertheless, this demand remains highly sensitive to airfare hikes and macroeconomic instability [10].

Exchange Rate

From a macroeconomic perspective, exchange rate fluctuations do not directly dictate domestic aviation demand; rather, they operate through the airline industry's cost-transmission channels. Due to a high dependency on foreign-currency-denominated inputs such as aviation fuel, aircraft leases, and maintenance a depreciation of the domestic currency inevitably drives up operational expenditures. This condition is ultimately reflected in upward adjustments of airfares. As ticket prices rise, consumer interest in travel tends to diminish, particularly among price-sensitive passenger segments. Consequently, the exchange rate plays a pivotal role in shaping the demand dynamics of domestic aviation [11].

Gross Domestic Product (GDP)

GDP represents the aggregate income level and the overall intensity of economic activity, which, within the framework of economic theory, maintains a positive correlation with air transport demand. As the economy expands, both societal mobility and business dynamics tend to increase, consequently leading to an expansion in the requirement for domestic aviation. Nevertheless, the impact of GDP on flight demand is not always direct; it is significantly mediated by income distribution and the price levels encountered by consumers when making travel decisions. [12].

Inflation

Inflation plays a critical role in shaping domestic aviation demand by eroding consumer purchasing power and escalating airline operating costs. Rising inflation tends to suppress non-essential consumption, including air travel, while simultaneously driving upward adjustments in ticket pricing. Consequently, inflation exerts a negative pressure on domestic aviation demand through both direct and indirect channels [11].

Ticket price

Ticket price serves as the primary determinant within the framework of aviation demand theory. In accordance with the law of demand, an increase in airfares will lead to a reduction in passenger volume, ceteris paribus. In the price-sensitive Indonesian domestic aviation market, changes in tariffs exert a significant influence on travel decisions, positioning ticket prices as a key variable that bridges macroeconomic conditions with consumer behavior [3]. Fare adjustments implemented by airlines frequently have direct implications for passenger volume, particularly given the heightened sensitivity of consumers toward price fluctuations [13].

Research Methodology

This study employs a quantitative approach utilizing time-series analysis to examine the impact of exchange rates, Gross Domestic Product (GDP), inflation, and ticket prices on domestic aviation demand in Indonesia. The selection of a quantitative methodology is predicated on its capacity to empirically and measurably test causal relationships between variables, while simultaneously capturing the dynamic shifts in economic conditions over time. The analysis focuses on uncovering both short-term and long-term associations, recognizing that the response of aviation demand to macroeconomic fluctuations does not always occur instantaneously, but rather through a gradual adjustment mechanism [14].

The data utilized in this study consist of annual secondary data covering the observation period from 2010 to 2024. Domestic aviation demand is proxied by the total volume of domestic air passengers, while the exchange rate is measured by the Rupiah's exchange rate against the US Dollar. Gross Domestic Product (GDP) serves as the indicator for aggregate income levels and economic activity, inflation reflects price stability and consumer purchasing power, and domestic airfares represent the overall cost of air travel. All data were obtained from official and reputable sources, including the Central Bureau of Statistics (BPS), Bank Indonesia, the Ministry of Transportation, and other relevant institutional publications, ensuring that the data's reliability, validity, and consistency are academically accountable [15].

To examine the interrelationships between the variables under study, this research employs The Autoregressive Distributed Lag (ARDL) approach. The selection of this model is predicated on its superior ability to process datasets with a relatively limited number of observations. Furthermore, the ARDL framework is capable of handling time-series variables with mixed orders of integration, specifically those that are stationary at level I(0) or after the first difference I(1) , provided that no variables are integrated of order two I(2). Additionally, the ARDL model is highly relevant in the context of this study due to its capacity to explicitly distinguish between short-term dynamics and long-term equilibrium. This distinction is crucial, as domestic aviation demand is known to be highly responsive to immediate economic fluctuations and structural shocks [16].

Prior to the estimation process, all variables are subjected to unit root tests using the Augmented Dickey-Fuller (ADF) method to verify their stationarity and ensure that the time-series characteristics satisfy the model's underlying assumptions. Subsequently, the optimal lag length is determined based on information criteria, such as the Akaike Information Criterion (AIC) and the Schwarz Criterion (SC), to achieve the most efficient and stable model specification. To identify the existence of long-term relationships among the variables, the Bounds Testing approach is employed by comparing the F-statistic against the predefined critical values. If cointegration is confirmed, the analysis proceeds with the estimation of long-term coefficients and the formulation of the Error Correction Model (ECM) to observe the short-term adjustment process toward long-term equilibrium [17].

As a verification stage for the estimation results, this study is supplemented by a series of diagnostic tests to ensure that the model satisfies classical assumptions and produces reliable, unbiased estimates. Autocorrelation, heteroscedasticity, and residual normality tests are conducted to evaluate the model's statistical robustness. Furthermore, parameter stability tests using the CUSUM and CUSUM of Squares methods are applied to ensure the consistency of the relationships between variables throughout the observation period. This is particularly crucial given the significant economic dynamics encountered, such as the COVID-19 pandemic and heightened global volatility during the study period.

All stages of data processing and analysis are conducted using statistical software packages commonly employed in economic research, such as EViews and Stata. Subsequently, the estimation results are interpreted from an economic perspective to elucidate the impacts of exchange rate fluctuations, Gross Domestic Product (GDP) growth, inflationary pressures, and ticket price volatility on domestic aviation demand in Indonesia, across both short-term and long-term horizons. These findings are expected to provide a more comprehensive insight and serve as a foundational basis for policy considerations regarding the development of the air transport sector and the management of national macroeconomic policies [14].

Results

Unit Root Tests

Table 1. Unit Root Test Results

Variabel	ADF Statistic	Critical Value	Prob.	Unit Root	Status
PAXD	-3.370689	-2.886101	0.0043	First Difference	Stasioner
Kurs	-3.723054	-2.886101	0.0024	First Difference	Stasioner
PDB	-4.367357	-2.816740	0.0006	First Difference	Stasioner
Inflasi	-3.128170	-2.816740	0.0045	First Difference	Stasioner
HTP	-4.752931	-2.847250	0.0004	First Difference	Stasioner

Source: EViews 13 Output (2026)

Based on the unit root test results, all research variables PAXD, Exchange Rate, GDP, Inflation, and Ticket Price attain stationarity at the first difference level. This is substantiated by the ADF Statistic values, which are lower (more negative) than the critical values, accompanied by probability values below the 0.05 threshold. This indicates the absence of unit root problems following the first differentiation, confirming that the data satisfy the stationarity assumption. Consequently, the dataset is highly appropriate for implementation within the ARDL framework to accurately analyze both short-term dynamics and long-term equilibrium relationships.

Cointegration Analysis: ARDL Bounds Testing

Table 2. ARDL Bounds Test Results for Cointegration

Description		Value
F-Statistic		26,92995
Number of Independent Variables (k)		4
Observation Assumption		Asymptotic (n = 1000)
Significance Level	Lower Bound I(0)	Upper Bound I(1)
10%	2,20	3,09
5%	2,56	3,49
2,5%	2,88	3,87
1%	3,29	4,37

Source: EViews 13 Output, 2026

Referring to the estimation results presented in Table 2, the cointegration test using the ARDL Bounds Testing approach reveals an F-statistic of 26.92995, which is significantly higher than the upper bound critical value of 3.49 at the 5% significance level. This finding indicates that the model satisfies the cointegration assumption. Consequently, it can be inferred that the variables under study share a long-term equilibrium relationship. This long-term association provides a robust foundation for proceeding with further analysis, including the interpretation of economic dynamics and the formulation of more reliable forecasts.

Penentuan Lag Optimum

Table 3. Optimal Lag Test Results

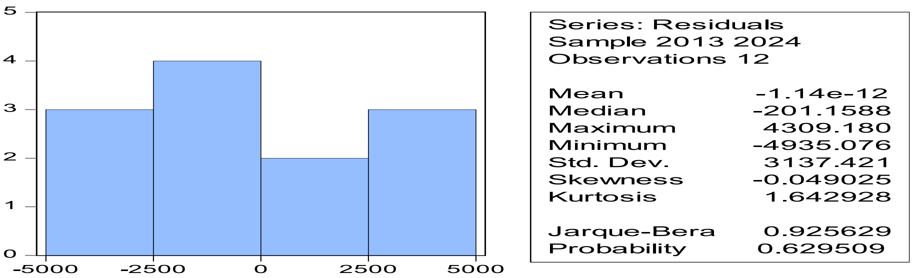
No	Spesifikasi Model	Log-Likelihood	AIC	BIC	HQC	Adjusted R^2
1	ARDL (2,0,0,0,0)	-102.8560	19.9738	20.2270	19.8142	0.9277
2	ARDL (3,0,0,0,0)	-102.0977	20.0178	20.3071	19.8353	0.9160
3	ARDL (1,0,0,0,0)	-114.4891	21.9071	22.1241	21.7703	0.5203

Sumber: Output Eviews, 2026

Based on the model selection results, the ARDL (2,0,0,0,0) specification was identified as the optimal model, as it yields the lowest Akaike Information Criterion (AIC) value (19,9738) compared to other alternatives. This selection is further supported by the Bayesian Information Criterion (BIC) of 20,2270 and the Hannan-Quinn Criterion (HQC) of 19,8142, which are also relatively lower.

Statistically, the model exhibits robust explanatory power with an Adjusted R^2 of 0,9277, indicating that approximately 92,7% of the variation in the dependent variable can be explained by the regressors within the model. This specification implies that the dependent variable is influenced by its values from the two preceding periods, whereas the independent variables exert influence only during the current period. Given the model's parsimony and its strong explanatory capacity, ARDL (2,0,0,0,0) is deemed the most appropriate framework for further analysis.

Classic Assumption Test



Source: EViews Output, 2026

Figure 1. Jarque-Bera Test Results

The output above illustrates the results of the data normality test. The obtained probability value (β-value) is 0.629509, which is greater than the significance threshold of 0.05. This condition indicates that there is no significant distributional deviation; thus, the data in this study is confirmed to be normally distributed and feasible for further analysis.

Table 4. Hetoroskedasticity Test (Breusch-Pagan-Godfrey test)

No	Statistical Test	Value	Probability
1	F-statistic	0,515956	0,7781
2	Obs*R-squared	4,588691	0,5975
3	Scaled Explained SS	0,256093	0,9997

Source: EViews Output, 2026

Based on the output, the heteroscedasticity test results show a probability value of 0,5975. Since this value is greater than the 0,05 significance level, it indicates that the model does not suffer from heteroscedasticity issues. In other words, the residual variance tends to remain constant; thus, the data used in this study fulfills the assumption of homoscedasticity and is considered feasible for further analysis.

Table 5. Serial Correlation LM Test

Statistical Test	Value	Probability
F-statistic	10.91533	0.1321
Obs*R-squared	10.55018	0.1342

Source: EViews Output, 2026

The output results present the findings of the autocorrelation test on the research data. Based on the obtained probability value (p-value) of 0.1342, which is greater than the 0,05 significance level, it can be concluded that the model does not suffer from autocorrelation issues. This indicates that there is no systematic relationship between the residuals of the current period and the previous periods; therefore, the model fulfills the classic assumption regarding autocorrelation and is feasible for further analysis.

Long-Term Analysis

Table 6. Long-Term Coefficient Test Results

Variabel	Coefficient	Std. Error	t-Statistik	Probability
D(PAXD)	0.840376	0.106991	7.854647	0.0005
D(PAXD)	0.777066	0.147402	-5.271738	0.0033
D(KURS)	8.793786	2.899592	3.032766	0.0090
D(PDB)	4510.202	599.5513	7.522629	0.0007
D(INFLASI)	-4322.830	1663.054	-2.599332	0.0283
D(HTP)	0.029422	0.011370	-2.587556	0.0390
Konstanta (C)	6270.915	2173.314	-2.885416	0.0044

Source: EViews Output, 2026

Based on the long-run estimation results of the ARDL model, the number of domestic passengers (PAXD) exhibits a positive and significant effect, indicating a sustainability effect within the dynamics of domestic flight demand. The exchange rate (KURS) and Gross Domestic Product (GDP/PDB) also show positive and significant impacts, confirming that exchange rate stability and economic growth play a crucial role in driving the increase in passenger numbers over the long run.

Meanwhile, inflation (INFLASI) shows a negative and significant effect, and airfare prices (HTP) demonstrate a significant impact with a direction reflecting pressure on demand. This indicates that increases in price levels and ticket tariffs have the potential to restrain the growth of passenger numbers in the long term. The significant constant indicates the contribution of other factors outside the model that influence demand, while simultaneously reinforcing the existence of a long-run relationship (cointegration) among the variables in the ARDL model.

Long-Run Estimation Analysis

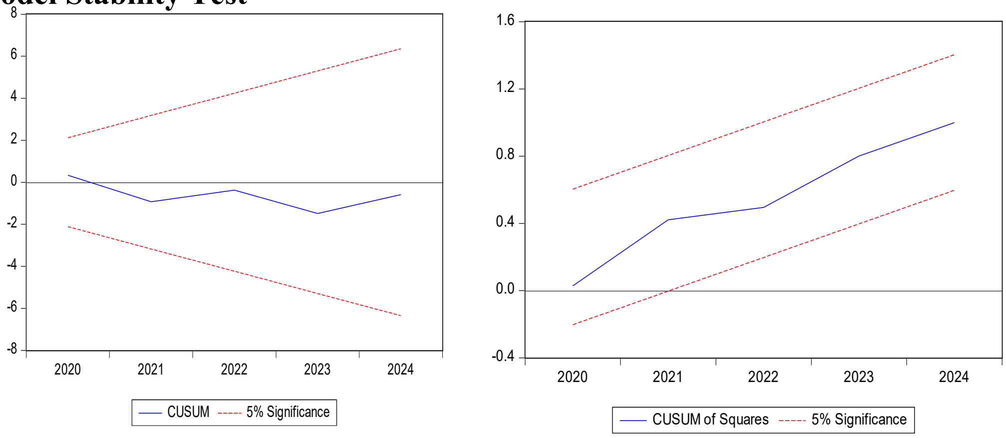
Table 7. Long-Run Estimation Analysis

Variabel	Coefficient	Std. Error	t-Statistik	Probability
PAXD(-1)	0,777066	0,065636	11,83908	0,0001
ECT(-1)	-0,936690	0,052106	-17,97664	0,0000

Source: EViews Output, 2026

The ECT(-1) coefficient of -0.936690, which is highly significant (Prob. 0,0000) indicates that approximately 93.67% of the disequilibrium from the previous period is corrected within a single period. This suggests that the adjustment process toward long-run equilibrium occurs very rapidly and remains stable. Meanwhile, PAXD(-1) shows a positive coefficient of 0.777066 and is significant (Prob. 0,0001), meaning that changes in the number of domestic passengers in the previous period still exert a strong influence on the current period. This confirms the existence of a sustainability effect (persistence) in the short run, although the system quickly reverts to its long-run equilibrium path.

Model Stability Test



Source: EViews Output, 2026

Figure 2. CUSUM and CUSUM of Squares (CUSUMQ) Stability Tests

Based on the stability test results using the CUSUM and CUSUM of Squares methods, the research model is considered stable throughout the observation period of 202002024. This is reflected by the movement of the test lines, which remain within the critical boundaries at the 5% significance level without crossing or intersecting the predetermined limit lines. This condition indicates that there are no significant structural breaks during the study period; therefore, the relationships between variables in the model tend to be consistent over time. Consequently, the model demonstrates a high level of reliability and is feasible to be used as a basis for further analysis and drawing conclusions.

Conclusion

Based on the ARDL estimation results for the 2010-2024 period, this study demonstrates that the exchange rate, GDP, inflation, and airfare prices have significant long-run relationships with domestic flight demand in Indonesia. The Bounds Test results indicate strong cointegration (F-statistic 26.92995 > critical value), suggesting that these variables move together in the long run. Partially, GDP and the exchange rate have positive and significant effects on the number of passengers, confirming that economic growth and macroeconomic stability support increased air mobility. Conversely, inflation and airfare prices exert negative and significant impacts, meaning that rising prices and purchasing power pressures significantly restrain demand growth. In the short run, the adjustment mechanism occurs very rapidly, with an ECT coefficient of -0.936690, indicating that approximately 93.67% of the disequilibrium is corrected within a single period. Furthermore, the model is proven to be stable, free from violations of classical assumptions, and possesses high explanatory power (Adjusted R2 of 0.9277), rendering the estimation results highly reliable.

Future research is encouraged to extend the observation period and utilize higher-frequency data (quarterly or monthly) to capture short-term dynamics in greater detail. Furthermore, incorporating additional variables such as aviation fuel (avtur) prices, airline competition levels, seasonal factors, and price ceiling/floor policies could further enrich the model. Methodological approaches could also be expanded, for instance, by implementing non-linear analysis or structural break tests to capture the specific impacts of economic crises more precisely. Through these developments, future studies are expected to provide a more comprehensive overview of the domestic aviation sector's resilience and responsiveness to economic shocks.

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