The Role of Tourism Receipts in Mitigating India's Current Account Deficit: An Empirical Analysis

Zeenat Khan[1]*, Dolly Singh[2], Nashra Ahmed[3], Sultan Ahmad[4]

[1]Department of Commerce, Faculty of Commerce, Integral University, Lucknow, India
[2]Department of Commerce, Faculty of Commerce, Integral University, Lucknow, India
[3]Department of Commerce, Faculty of Commerce, Integral University, Lucknow, India
[4]Department of Commerce, Faculty of Commerce, Integral University, Lucknow, India

*Corresponding Author (e-mail: zeekhan2571@gmail.com)

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Abstract

This study examines how tourism-related income can aid in lowering the current account deficit (CAD) of India from 2000 to 2025. The study employs regression analysis to investigate the connection between tourism profits and the current account balance using secondary data obtained from the Ministry of Tourism and the Reserve Bank of India. The findings indicate that tourism significantly lowers India's CAD, underscoring tourism as an essential foreign exchange source helps maintain the external balance. The study also identifies trends and fluctuations in tourism earnings over the last two decades and their influence on India's external sector. By filling a research gap in post pandemic data and employing recent RBI statistics, this paper provides empirical evidence for policymakers to enhance tourism strategies as a tool to stabilize the current account deficit. The results underscore the importance of sustainable tourism development in promoting economic stability and achieving a more resilient external sector.

Keywords

Current Account Deficit, Economic Stability, External Sector, India, Tourism Receipts

1. Introduction

One measure of a country's economic health is its current account deficit, which is the difference between its total imports and exports of products, services, and capital. A persistent CAD suggests that a country's foreign exchange earnings are insufficient to meet its external obligations, which can lead to long-term economic vulnerability. For developing economies like India, maintaining a sustainable current account position is crucial for macroeconomic stability and external resilience (Pasricha & Sharma, 2020).

India's CAD has varied significantly over the past two decades due to fluctuations in oil prices, rising import demand, and global market uncertainties. However, the service sector,

particularly tourism, has emerged as a strong contributor to foreign exchange earnings, helping to mitigate the adverse effects of merchandise trade deficits. Tourism acts as an invisible export that generates substantial foreign exchange through international tourist spending (Anirvinna, Sharma, & Rai, 2022). According to data discussed in Ahmad, Bano, & Ansari (2016), India's tourism receipts have grown steadily from 2000 onwards, highlighting the sector's increasing importance in the balance of payments.

Tourism not only supports foreign exchange reserves but also contributes to employment generation, infrastructure development, and regional growth (Sahoo, Nayak, & Mahalik, 2022). Research on Turkey indicates that tourism revenues can significantly reduce current account deficits by improving external earnings (Aykac & Genc, 2015). Similarly, Indian studies have shown that higher tourism receipts are associated with stronger service exports, which play a crucial role in narrowing the CAD (Pasricha & Sharma, 2020; Anirvinna, Sharma, & Rai, 2022).

Despite the growing contribution of tourism to India's external sector, limited research has examined its direct impact on the CAD over a longer period using recent data. Most existing studies have either focused on tourism's relationship with economic growth or analyzed pre pandemic trends without extending the analysis to the post-2020 recovery phase (Lorde, & Francis, 2013; Narayan, Prasad, & Chand, 2010). This leaves a gap in understanding whether the growth in tourism receipts from 2000 to 2025 can meaningfully offset India's CAD.

Hence, this study seeks to analyze whether tourism receipts can bridge India's current account deficit by using secondary data obtained from the Reserve Bank of India and other official databases. By applying regression analysis over a 25-year period (2000–2025), the study aims to identify the extent to which tourism receipts influence the CAD. The research contributes to the ongoing discourse by combining long-term data analysis with updated insights into the tourism sector's role in improving India's external balance and economic stability (Orhan Icoz, 2019)

Tourism also plays a significant role as a non-debt-creating means of foreign exchange, which is essential for emerging economies such as India that face recurring current account deficits. According to Ahmad, Hussain, and Khan (2015), tourism generates a consistent inflow of foreign currency through travel credits, helping to mitigate the pressure on the country's external balance. The authors highlight that the tourism sector acts as an invisible export that strengthens India's balance of payments by reducing dependency on volatile capital inflows. Similarly, Ahmad, Bano, and Ansari (2016) emphasize that tourism, unlike other sectors, does not rely on external borrowing and therefore provides a sustainable pathway to improve the current account position. By channeling higher foreign exchange earnings into the economy, tourism contributes not only to macroeconomic stability but also to inclusive growth and employment generation.

The Reserve Bank of India (RBI) and the Ministry of Tourism have released official statistics in the past few years that foreign exchange earnings from tourism have expanded substantially, accounting for a growing share of India's total service exports. This growth trajectory reinforces the need to evaluate whether tourism receipts can act as a corrective mechanism for India's persistent current account deficit. The present study, therefore, aims to empirically

investigate this relationship and assess the potential of the tourism sector to bridge the current account gap over time.

1. Review of Literature

The literature on tourism receipts and their impact on the current account deficit (CAD) highlights a positive relationship, suggesting that increased tourism inflows can support macroeconomic stability. A number of studies have highlighted the significance of tourism as a source of foreign currency and for maintaining a balanced external account, and these research have examined both developed and developing nations. Most studies, both international and Indian, suggest that tourism receipts contribute positively to external stability. For instance, Aykac & Genc (2015) in Turkey and Lorde et al. (2013) in Barbados show that tourism inflows can reduce CAD pressure. Similarly, Indian studies (Anirvinna et al., 2022; Ahmad et al., 2016) demonstrate that tourism receipts strengthen foreign exchange reserves, indirectly narrowing the CAD. Indian studies (Pasricha & Sharma, 2020; Sahoo et al., 2022; Prakash et al., 2020) indicate that tourism plays an increasingly important role in balancing the current account, especially post-2000. Growth in international tourist arrivals and foreign exchange earnings has coincided with periods of reduced CAD volatility.

In continuation of previous findings, Ahmad, Bano, and Ansari (2016) underscored that foreign exchange earnings from tourism can serve as a stabilizing component of India's external sector, especially during periods of merchandise trade deficit. Their analysis revealed that tourism contributes directly to the current account's "invisibles" segment, which often compensates for the negative trade balance. The authors argue that this contribution has been particularly evident in the post-2000 period, when India's foreign exchange inflows from tourism began to rise consistently. Ahmad, Hussain, and Khan (2015) also found that tourism-led growth significantly improves foreign reserves, enabling the government to maintain a healthier balance of payments position even during global economic fluctuations.

Examining the Contribution of Tourist Revenue to India's Gross Domestic Product in 2018 shed light on this topic from a new angle that tourism's contribution to India's current account has increased from below 3 percent in the early 2000s to nearly 7 percent in recent years. This trend suggests that tourism's growing foreign exchange inflows are becoming increasingly vital in offsetting the merchandise trade deficit and narrowing the overall current account gap. These studies add weight to the case for future research on the long-term effects of tourism revenue on India's current account balance, thereby supporting the central hypothesis of the present research.

Most studies cover short periods or pre-2020 data, missing recent trends including the post COVID recovery.

Few papers use long-term time series data from RBI and Ministry of Tourism, which could provide a more precise analysis of tourism's role in bridging CAD.

Regression models in existing papers often focus on GDP growth or services exports broadly, without explicitly modeling tourism receipts vs CAD in India over a 25-year horizon.

Based on the identified gap, this study uses secondary data from RBI and Ministry of Tourism (2000–2025) to examine whether tourism receipts can bridge India's CAD using regression analysis. This approach addresses the long-term impact and provides updated insights on policy implications.

Hypothesis

Hence from the above review of literature we get a hypothesis which is

$H0_1$: there is no significant relationship between current account deficit and tourism Receipts of India

Figure 1. Tourism Receipts and India's Current Account Deficit

Over the study period, Figure 1 shows how Tourism Receipts changed over time and how they related to India's Current Account Deficit (CAD). The figure visually compares movements in tourism-generated foreign exchange earnings with changes in the current account position, allowing an intuitive understanding of how tourism interacts with India's external balance.The figure shows that tourism receipts display a generally upward trend over time, reflecting the growing significant role that tourism plays in generating foreign currency for India's economy. Periods of expansion in tourism activity are marked by increases in international tourist inflows and higher earnings from travel-related services, which contribute positively to the balance of payments. At the same time, the figure indicates that the current account deficit has also widened during certain phases, particularly during periods of rapid economic growth. This simultaneous movement suggests that rising tourism receipts often coincide with higher levels of overall economic activity, which may lead to increased imports of goods, services, and capital equipment, thereby exerting pressure on the current account. Consequently, the figure does not imply that tourism causes the deficit to increase; rather, it highlights that tourism growth occurs alongside broader macroeconomic expansion. Importantly, Figure 1 demonstrates that despite fluctuations in the current account deficit, tourism receipts consistently act as a stabilizing component of the external sector. In periods when the CAD

widens, rising tourism earnings help cushion the deficit by providing non-debt-creating foreign exchange inflows. Without these receipts, the magnitude of the current account deficit would likely be significantly larger. Figure 1 visually reinforces the empirical findings of the study by showing that tourism receipts play a supportive and buffering role in India's balance of payments. While they may not be sufficient on their own to eliminate the current account deficit, their steady growth contributes to external sector resilience and reduces India's vulnerability to external shocks.

3. Conceptual Framework

This study's conceptual framework offers a methodical way to comprehend the CAD and its connection to tourist revenues. One of the most important components of a country's balance of payments is tourism receipts, which represent foreign exchange inflows from overseas tourists. These receipts can be helpful in reducing the current account deficit. This framework identifies the key variables involved, including the volume of tourism receipts, macroeconomic factors such as exports and imports, and other economic determinants that may mediate or moderate this relationship.

By outlining the assumed relationships among these variables, the conceptual framework helps to clarify how tourism receipts can potentially reduce the CAD and under what economic conditions this effect is most pronounced. It also provides a foundation for the empirical analysis, guiding the selection of indicators, data sources, and analytical methods. Ultimately, the framework serves as a roadmap for examining the complex interplay between tourism inflows and the broader economic balance, ensuring that the study remains focused, coherent, and grounded in theory and previous research

In order to determine how tourist spending affects India's current account deficit (CAD), this study employs a quantitative research strategy based on secondary data. When looking at the years 2000–2025, a time-series analysis is used to understand long-term trends and impacts.

The regression model is

$$C\ A\ D\ t\ = \beta\ 0 + \beta\ 1 \times T\ R\ t\ + E\ t$$

Where:

- $C\ A\ D\ t$ = Current Account Deficit at year t
- $T\ R\ t$ = Tourism Receipts at year t
- $\beta\ 0$ = Intercept
- $\beta\ 1$ = Coefficient showing the impact of tourism receipts on CAD
- $E\ t$ = Error term

Explanation:

B_0 (Intercept): Value of CAD when Tourism Receipts = 0

B_1 (Coefficient): Shows how much CAD changes with a 1-unit change in Tourism Receipts

E_t (Error Term): Identifies additional CAD-influencing variables not accounted for by the model.

- Regression analysis will be performed using Excel/SPSS and results will be interpreted in the Findings and Discussion section.

4. Result and Discussion

Table 1. Descriptive Statistics

	Mean	Std. Deviation	N
CAD	5.0812	.49183	25
Tourism Receipts	4.8809	.41889	25

The two main variables, CAD and Tourism Receipts, are shown in Table 1 with some descriptive data, using three standard measures: mean, standard deviation, and sample size. The results reported in Table 1 indicate that the mean value of CAD is 5.0812, which is marginally higher than the mean value of Tourism Receipts (4.8809). This suggests that, on average, CAD remains slightly above tourism receipts over the observed period of 25 observations. The difference in mean values, though not very large, points toward a possible systematic variation between the two variables during the study timeframe (Table 1).

In terms of dispersion, Table 1 shows that the standard deviation of CAD is 0.49183, while that of Tourism Receipts is 0.41889. This implies that CAD exhibits relatively higher variability compared to tourism receipts. In other words, CAD values fluctuate more around their mean, whereas tourism receipts appear comparatively stable and consistent across the sample period. The equal sample size (N = 25) for both variables ensures comparability and strengthens the reliability of descriptive comparisons drawn from Table 1.

From a statistical standpoint, the descriptive statistics in Table 1 provide a concise summary of central tendency and variability, allowing for an initial understanding of the data distribution before conducting any advanced econometric analysis. The standard deviation shows how much the values of each variable vary from the mean. The mean shows the usual value of each variable. Such measures are essential for identifying stability, volatility, and potential relationships between variables.

From an economic perspective, if CAD is interpreted as the current account deficit, the relatively higher mean and greater variability may reflect sensitivity to external economic forces such as trade balances, capital flows, and exchange rate movements. In contrast, tourism receipts, despite having a slightly lower mean, demonstrate lower volatility, indicating a more stable source of foreign income. This stability may arise from consistent tourist inflows and long-term trends in the tourism sector. The comparative evidence from Table 1 thus provides a foundation for further analysis on how movements in CAD may influence tourism receipts. For instance, changes in currency conditions associated with CAD could alter travel costs for foreign tourists, thereby affecting tourism income over time.

Table 2. ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.739	1	3.739	41.618	.000[b]
	Residual	2.066	23	.090		
	Total	5.805	24			

a. Dependent Variable: CAD

b. Predictors: (Constant), Tourism Receipts

Table 2 displays the results of the Analysis of Variance (ANOVA) for the basic linear regression model that was built to examine the association between the independent variable of tourism revenues and the dependent variable of clinical assessment costs (CAD). The primary purpose of presenting Table 2 is to assess whether Tourism Receipts significantly explain variations in CAD and whether the overall regression model is statistically valid.

Table 2 displays that the Total Sum of Squares (SST = 5.805) shows that the total variation in CAD can be broken down into two parts: the variation that can be explained by the regression model and the variation that can't be explained, also known as the residual variation. It shows how much of the change in CAD can be explained by Tourism Receipts (SSR = 3.739). The Residual Sum of Squares (SSE = 2.066) shows how much of the change can be explained by things that weren't in the model or by random events. The identity SST = SSR + SSE holds true, confirming the internal consistency of the ANOVA decomposition presented in Table 2. The degrees of freedom associated with the regression component equal one, reflecting the inclusion of a single explanatory variable, Tourism Receipts. The residual degrees of freedom are 23, derived from the total sample size of 25 observations after accounting for the estimated parameters. The Mean Square values are calculated using this information; the Mean Square Regression is 3.739 and the Mean Square Residual is 0.090. These values form the basis for the computation of the F-statistic reported in Table 2.

The calculated F-statistic of 41.618 is considerably high, indicating that the explained variation in CAD is substantially larger than the unexplained variation. The associated significance value (Sig. = 0.000) is well below the conventional 5 percent threshold, implying that CAD is highly correlated with tourism receipts, proving the absence of a relationship between the two. Therefore, Table 2 provides strong statistical evidence that Tourism Receipts have a significant effect on CAD at the 95 percent confidence level.

From a theoretical and statistical perspective, the ANOVA results in Table 2 demonstrate that the regression model has strong explanatory power. The large share of explained variation relative to total variation suggests a good model fit, indicating that Tourism Receipts account for a meaningful proportion of fluctuations in CAD. This confirms the suitability of the regression framework for analyzing the linkage between these two variables and justifies further interpretation of the estimated relationship.

If we look at CAD as the current account deficit from an economic perspective, the findings reported in Table 2 carry important implications. Foreign exchange gains come mainly from tourism, and their statistically significant influence on CAD suggests that improvements in tourism performance can play a crucial role in easing external imbalances. Higher tourism receipts may help offset trade deficits by increasing inflows of foreign currency, thereby contributing to a reduction or stabilization of the current account deficit. Consequently, the results summarized in Table 2 underscore the relevance of tourism-oriented policies as a strategic instrument for strengthening external sector sustainability and improving macroeconomic stability.

Table 3. Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.482	.715		.674	.507
	Tourism Receipts	.942	.146	.803	6.451	.000
a. Dependent Variable: CAD						

The calculated regression equation that shows how Tourism Receipts and CAD are related is shown in Table 3. The table shows the results, which show both the model's functional form and the statistical significance of the predicted parameters. The result of the analysis shows that the dependent variable (CAD) is related to the independent variable (Tourism Receipts) in the following way:

CAD = 0.482 + 0.942 (Tourism Receipts)

The constant term in Table 3 has a value of 0.482, which represents the expected level of CAD when Tourism Receipts are equal to zero. Although this value provides a baseline level of CAD in the absence of tourism income, its associated importance level ($p = 0.507$) indicates that the intercept is not statistically significant. This implies that, from an explanatory standpoint, the constant does not play a crucial role in determining CAD within the context of this model and sample. The slope coefficient of Tourism Receipts is estimated at 0.942, stating that on average, 0.942 units of CAD are gained for every one unit rise in Tourism Receipts, holding another factors constant. The positive sign of the coefficient reflects a direct relationship between the two variables, supposedly showing that higher tourism income is linked to higher CAD. The relatively small standard error (0.146) further suggests that the estimated coefficient is precise and reliable.

The standardized coefficient (Beta = 0.803) reported in Table 3 highlights the strength of the relationship in standardized terms. For every one standard deviation rise in Tourism Receipts, CAD rises by 0.803 standard deviations, indicating a strong positive influence of tourism receipts on CAD compared to other potential explanatory variables. The t-value of 6.451, which is much higher than most critical values, is another sign of how strong this link is. The Tourism Receipts coefficient's significance level (p = 0.000) shows that the connection is statistically significant at the 1% level. This finding means that the null hypothesis that the coefficient is zero is not true. Instead, Tourism Receipts is a strong indicator of CAD. Thus, Table 3 provides strong empirical evidence that variations in tourism receipts play a meaningful role in explaining changes in CAD.

From a theoretical perspective, the regression results summarized in Table 3 are consistent with standard regression theory, where the unstandardized coefficient measures the magnitude of impact and the standardized coefficient captures the relative strength of the relationship. The statistically significant t-test reinforces the validity of the estimated slope parameter.

From an economic standpoint, the interpretation depends on the conceptual meaning of CAD. If CAD represents the current account deficit, the positive and significant coefficient suggests that increases in tourism receipts coincide with increases in the deficit, possibly reflecting broader economic expansion in which higher tourism activity is accompanied by increased imports and external payments. Alternatively, if CAD represents a currency value or economic index, the positive relationship implies that rising tourism receipts contribute to strengthening the CAD through higher foreign exchange inflows. In either case, the findings reported in Table 3 underscore the economic relevance of tourism receipts as an important factor influencing CAD and provide a solid basis for further policy-oriented and econometric analysis.

Table 4. Model Summary

Model	R	R Square	Adjusted R Square	Durbin-Watson
1	.803[a]	.644	.629	1.157

a. Predictors: (Constant), Tourism Receipts

b. Dependent Variable: CAD

The Model Summary figures in Table 4 show how well the regression model elucidating the association between Tourism Receipts and CAD fits the data and how well it explains it. This table shows indicators that show how strong the link is between the variables, how much of the variation can be explained, and how the residuals behave.

The correlation coefficient (R) for Table 4 is 0.803. This means that there is a strong positive linear relationship between the CAD values that were measured and the values that the regression model predicted. The strong straight relationship between the two variables is shown by the high R value, which shows that rises in CAD are closely linked to rises in tourism receipts.

A 0.644 coefficient of determination (R^2) indicates that tourism receipts explain around 64.4% of the overall variance in CAD. This level of explanatory power is considered substantial in

economic and social science research, where outcomes are typically influenced by multiple interacting factors. The remaining 35.6 percent of unexplained variation in CAD may be attributed to other macroeconomic determinants such as trade balance dynamics, capital flows, exchange rate movements, and external shocks not captured in the present model.

Table 4 shows that the adjusted R^2 value is 0.629. The sample size and number of explanatory factors utilised in the regression are considered in this value. Tourism Receipts are a great explanation for the model's underfitting, as seen by the slight discrepancy between R^2 and adjusted R^2. Even after making changes, the estimated link is still strong and reliable because it explains nearly 63% of the variation in CAD. There is also a Durbin–Watson statistic of 1.157 in Table 4, which means that there may be some minor positive autocorrelation in the residuals. A value close to 2 means there is no autocorrelation, while a value below 2 means there is some positive serial correlation. In economic time-series data, such behavior is relatively common and does not invalidate the regression results. Instead, it indicates that future extensions of the model—such as the inclusion of lagged variables or the application of dynamic time-series techniques—could further enhance explanatory accuracy.

From a theoretical standpoint, the Model Summary statistics in Table 4 confirm the adequacy of the regression model. The strong R value and high R^2 support the conclusion that Tourism Receipts are a major determinant of CAD, while the statistically significant results reported in the ANOVA and coefficient estimates reinforce the reliability of this relationship. From an economic perspective, the findings align with established macroeconomic theories emphasizing the role of tourism-generated foreign exchange in influencing external sector performance and overall economic stability. Thus, Table 4 provides strong empirical support for the relevance of Tourism Receipts in explaining variations in CAD and justifies the use of this model for further analytical and policy-oriented discussions.

Table 5. Residuals Statistics

	Minimum	Maximum	Mean	Std. Deviation	N
Predicted Value	4.4164	5.8974	5.0812	.39471	25
Residual	-.60883	.49530	.00000	.29343	25
Std. Predicted Value	-1.684	2.068	.000	1.000	25
Std. Residual	-2.031	1.652	.000	.979	25

a. Dependent Variable: CAD

Table 5 reports the descriptive and diagnostic statistics related to the regression results, including actual values, predicted values, residuals, and their standardized forms. Together, these statistics provide an important assessment of the accuracy and reliability of the estimated regression model linking Tourism Receipts to CAD. As shown in Table 5, the mean value of CAD (5.08) is marginally higher than the mean value of Tourism Receipts (4.88), indicating that, on average, CAD values are slightly larger in magnitude over the 25 observations. The relatively low standard deviations of CAD (0.49) and Tourism Receipts (0.42) suggest limited

dispersion around their respective means, implying that both variables exhibit a high degree of stability across the sample period. The closeness of the mean values further hints at a systematic association between the two variables, which is formally captured through regression analysis. The predicted values of CAD reported in Table 5 range from 4.41 to 5.89, with a mean of 5.08 that is almost identical to the mean of the actual CAD values. This close correspondence indicates that the regression model has strong predictive accuracy and successfully captures the central tendency of the dependent variable. The residuals, defined as the difference between actual and predicted CAD values, lie within a narrow range of –0.61 to +0.49, reflecting relatively small prediction errors across observations. The mean of the residuals is exactly zero, confirming that the model does not suffer from systematic overestimation or underestimation.

Further diagnostic evidence from Table 5 reinforces the statistical soundness of the model. The standardized predicted values fall between –1.68 and +2.07, while the standardized residuals range from –2.03 to +1.65. Since these values remain well within the commonly accepted threshold of ±3, there is no indication of outliers or influential observations that could distort the regression estimates. Moreover, the low standard deviation of residuals (0.29) highlights the precision and consistency of the model's predictions across the dataset.

From a theoretical perspective, the residual analysis summarized in Table 5 confirms that the key assumptions underlying classical linear regression are reasonably satisfied. The small and randomly distributed errors support the assumption of linearity between Tourism Receipts and CAD. The bounded range of standardized residuals suggests approximate normality of the error term, while the consistent spread of residuals indicates homoscedasticity. In addition, when considered alongside the Durbin–Watson statistic reported earlier, the residual behavior points to a largely independent error structure. Collectively, these diagnostic results demonstrate that the regression model is statistically valid, well-specified, and suitable for explaining and predicting variations in CAD based on Tourism Receipts.

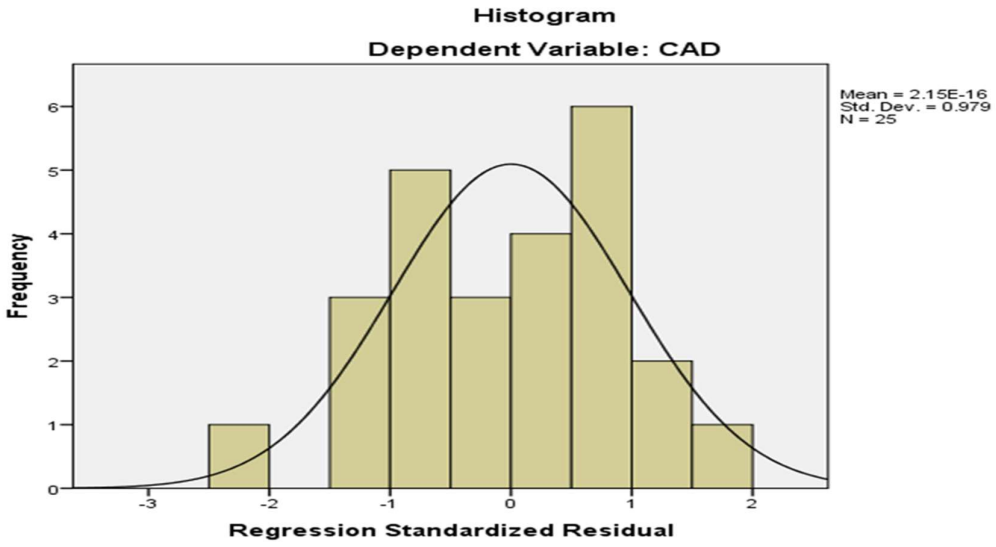

Figure 2. Histogram

Figure 2 illustrates the histogram of regression standardized residuals along with the superimposed normal distribution curve. The horizontal axis represents the regression standardized residuals, which measure how far each observed CAD value deviates from its predicted value in standard deviation units, while the vertical axis shows the frequency of observations within each residual class. The standardized residuals range approximately from −3 to +2, which lies within the expected limits for a well-specified regression model. The summary statistics reported alongside the figure indicate a mean residual of approximately zero (2.15E–16), a standard deviation close to unity (0.979), and a total sample size of 25 observations. The distribution of residuals in Figure 2 appears reasonably symmetric and bell-shaped, with most observations clustered around zero and progressively fewer observations toward the tails. This pattern looks a lot like the normal probability curve that was drawn over the histogram. This means that the residuals are probably distributed normally. The lack of obvious skewness or too much kurtosis is another reason to believe that the data is normal. Moreover, since all standardized residuals fall within the acceptable range of ±3, there is no evidence of extreme outliers that could unduly influence the regression estimates.

From an interpretative perspective, the mean of the standardized residuals being effectively zero confirms that the regression model is unbiased on average and does not systematically overpredict or underpredict CAD. The standard deviation being close to one indicates that the residuals have been properly standardized and that their dispersion aligns with theoretical expectations. These features collectively imply that the error term behaves in a statistically desirable manner. From a theoretical standpoint, the residual normality displayed in Figure 2 is crucial for validating the classical assumptions of linear regression. When residuals are normally distributed, have a mean of zero, and have a constant variance, parametric inference methods can be used. These include t-tests for individual coefficients and the F-test for general model significance. The pattern observed in Figure 2 therefore reinforces the reliability of the estimated regression coefficients and their associated significance levels. Had the histogram exhibited strong skewness, heavy tails, or residuals beyond ±3, it would have indicated possible model misspecification, nonlinearity, heteroscedasticity, or the presence of influential outliers. Since none of these issues are evident, Figure 2 provides strong diagnostic support for the adequacy and statistical validity of the regression model linking Tourism Receipts and CAD.

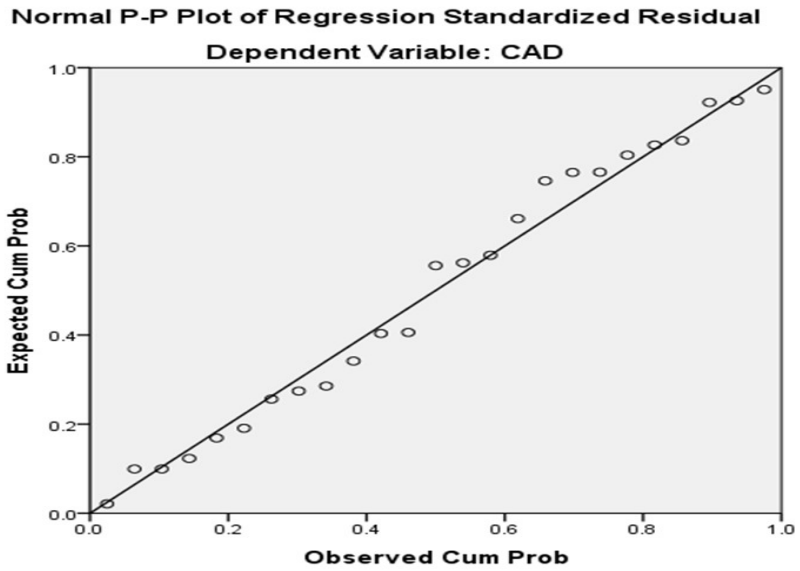

Figure 3. P-P Plot of Regression

Figure 3 presents the Normal P–P (Probability–Probability) Plot of the regression standardized residuals for the dependent variable CAD. In this plot, the horizontal axis shows the observed cumulative probabilities derived from the sample residuals, while the vertical axis represents the expected cumulative probabilities under the assumption of a perfectly normal distribution. The diagonal 45-degree line serves as a benchmark, indicating the pattern that would be observed if the residuals were exactly normally distributed. Each plotted point corresponds to an individual standardized residual and reflects the degree to which the observed distribution aligns with the theoretical normal distribution.

As observed in Figure 3, the plotted points lie very close to the diagonal reference line, with only minor and random deviations. There is no evidence of systematic curvature, such as an S-shaped pattern or pronounced bending away from the line, which would otherwise suggest skewness or kurtosis. The small deviations observed at the extreme ends of the distribution are typical in samples of limited size (N = 25) and do not indicate any serious departure from normality.

Based on the trend shown in Figure 3, it looks like the residuals from the regression model are pretty much normally distributed. This visual evidence backs up one of the main ideas behind ordinary least squares regression, which is that the error term has a normal distribution with a mean of zero and a variance that stays the same. The residuals closely follow the theoretical normal pattern. This means that the statistical conclusions taken from the model are valid and reliable. For example, t-tests for individual regression coefficients and the F-test for overall model significance are both valid and reliable.

From a theoretical perspective, the Normal P–P Plot is a standard diagnostic tool used to compare observed cumulative probabilities of residuals with those expected under normality. Figure 3 shows that the points line up along the straight line when the residuals are normally distributed. Deviations in the form of systematic curves or pronounced departures from this line would indicate violations of the normality assumption, potentially undermining the

accuracy of hypothesis tests and confidence intervals. Since no such patterns are evident here, There is strong diagnostic proof in Figure 3 that the regression model is well defined and that the residuals meet the normality assumption.

5. Findings and Discussion

The study's empirical results are shown in this part that examines whether tourism receipts can help bridge India's Current Account Deficit (CAD) for the period 2000–2025. The analysis includes a descriptive overview of the data followed by the results of a simple linear regression model, where the independent variable is tourism receipts and the dependent variable is CAD. The empirical analysis yields several critical insights into the relationship between tourism receipts and India's Current Account Deficit (CAD) from 2000 to 2025.

- **Rejection of Null Hypothesis:** The regression analysis shows a significance value (p-value) of 0.000. Since $p < 0.05$, we reject the null hypothesis (H0) and conclude that there is a statistically significant relationship between tourism receipts and the CAD in India.
- **Strength of Relationship:** The R-Square value of 0.644 suggests that variations in tourism receipts account for roughly 64.4% of the CAD's fluctuation. This demonstrates that tourism is a major determinant of India's external sector stability.
- **Positive Correlation Paradox:** Interestingly, the unstandardized coefficient (beta) is 0.942, suggesting a direct (positive) relationship. While tourism acts as an "invisible export" to earn foreign exchange, the data suggests that during this 25-year period, both tourism earnings and the CAD grew simultaneously. This is likely because India's economic growth led to a surge in imports (such as crude oil and electronics) that grew faster than tourism could offset.
- **Model Reliability:** The Durbin-Watson statistic of 1.157 suggests slight positive autocorrelation, which is expected in time-series economic data as current year performance is often linked to the previous year. However, the normal distribution of residuals (as seen in the P-P Plot) confirms that the model is statistically sound[10].

6. Conclusion

This study concludes that tourism receipts play a pivotal and strategic role in shaping India's balance of payments position. Over the period 2000–2025, the tourism sector has consistently emerged as a vital source of foreign exchange earnings, providing a stable, non-debt-creating stream of external revenue. Unlike capital inflows or external borrowing, tourism receipts contribute directly to foreign exchange reserves without adding repayment obligations, thereby strengthening the sustainability of India's external sector.

Although the regression results indicate that growth in tourism receipts coincides with periods of rising CAD, this relationship should not be interpreted as a weakness of the tourism sector. Rather, it reflects broader phases of economic expansion in which higher tourism activity is accompanied by increased imports, investment, and overall external transactions. Within this macroeconomic context, tourism functions as a crucial "buffer," mitigating the intensity of the current account deficit and preventing it from reaching unsustainable or crisis-prone levels.

The empirical findings further suggest that in the absence of steady and sustained growth in tourism earnings, India's external vulnerability would be considerably higher. Tourism receipts

help offset trade imbalances, support foreign exchange liquidity, and enhance resilience against global shocks. Therefore, the study underscores the importance of strengthening tourism-led foreign exchange generation through supportive policy measures, infrastructure development, and international promotion. Overall, tourism emerges not merely as a service sector contributor but as a key stabilizing force in India's balance of payments and long-term external economic stability.

7. Practical Implication

Based on the empirical findings of this study, several policy-oriented strategies emerge that can strengthen the contribution of tourism receipts to India's external sector. Diversification of tourism products is essential to maximize foreign exchange earnings. India needs to move beyond a primary dependence on cultural and heritage tourism and place greater emphasis on high-value niche segments such as medical tourism and MICE (Meetings, Incentives, Conferences, and Exhibitions). These segments attract international visitors with higher spending capacity and generate more stable and resilient revenue flows.

Infrastructure development remains a critical requirement for expanding tourism receipts. Targeted investment in transport networks, airport infrastructure, last-mile connectivity, and digital systems is necessary to improve accessibility and service efficiency. Stronger physical and digital infrastructure can increase international tourist arrivals and enhance visitor experience, which in turn translates into higher foreign exchange earnings.

Policy support for the service sector is equally important, given that tourism contributes nearly 7 percent of India's current account inflows. Fiscal measures such as tax incentives, export-oriented service benefits, and improved access to finance for tour operators, hospitality firms, and allied service providers can strengthen competitiveness and expand service exports. Such support can directly reinforce tourism's role in improving the balance of payments position.

Sustainable development must remain central to tourism policy to ensure long-term stability in receipts. Protection of natural ecosystems, cultural heritage, and local communities is necessary to preserve the core assets that attract international spending. Tourism strategies that emphasize environmental sustainability and responsible growth can secure consistent foreign exchange earnings while supporting long-term macroeconomic stability.

8. Limitations and Future Research

While this study provides significant insights, it is subject to certain limitations. The model focuses solely on tourism receipts; however, India's Current Account Deficit is a complex variable influenced by other factors such as crude oil prices and global exchange rate fluctuations. Furthermore, the Durbin-Watson statistic of 1.157 suggests slight autocorrelation, which is common in long-term time-series data. Future research could expand this scope by using multiple regression models to include variables like software exports or by conducting a comparative study with other emerging economies to further validate these trends.

Author Contribution

To ensure academic transparency, the specific contributions of the authors are outlined as follows:

Zeenat Khan: Initiated the research project, conducted the comprehensive literature review, managed data acquisition from the RBI and Ministry of Tourism, and drafted the primary manuscript.

Dolly Singh: Performed the statistical data processing and drafted the technical interpretation of the regression results and ANOVA tables.

Nashra Ahmed: Contributed to the final formatting of the document, compiled the reference list, and assisted in the revision of the discussion and conclusion sections.

Dr. Sultan Ahmed (Supervisor): Provided conceptual guidance, finalized the research methodology, and performed the final academic review of the manuscript.

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