Measuring Affordability In Indian Aviation: Developing An Airline Ticket Price Index And Pricing Strategies Through Game Theory

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Abstract

The Indian aviation industry plays a pivotal role in driving economic growth and enhancing connectivity, yet affordability remains a critical challenge due to the country's high income inequality. This paper develops an indicative Airline Ticket Price Index (ATPI) using real-world data from five major domestic routes and evaluates air travel affordability by relating the ATPI to monthly GDP per capita, excluding the top 5% of earners to account for wealth disparities. The analysis produces an affordability index of 0.4457, indicating that nearly 45% of an average Indian's monthly income would be required to purchase a single air ticket, underscoring the limited accessibility of air travel for much of the population. Applying a game theory lens, the paper further explores optimal pricing strategies tailored to route-specific demand elasticities, balancing profitability with consumer affordability. The study highlights the need for a comprehensive ATPI framework to guide equitable and sustainable pricing in Indian aviation.

Keywords: Indian aviation, Airline Ticket Price Index, affordability analysis, income inequality, game theory pricing

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I. Introduction

The aviation industry in India contributes 5% to India's GDP, creating 4 million jobs in the process (The Economic Times, 2023). Domestic air connectivity is regarded as the most vital element in today's connected world. As of now, India ranks third as the largest domestic aviation market in the world after the United States and China (Freire-Garabal y Núñez, 2024). The Indian aviation industry is on the cusp of unprecedented growth, with a total order book of more than 1,500 aircraft across airlines and a projected demand for over 2,200 aircraft by 2042 (IBEF, 2025). The civil aviation sector in India has tremendous potential, driven by rising demand, increased economic activity, tourism, higher disposable incomes, favourable demographics, and greater penetration of aviation infrastructure (Sharma, 2024). India's aviation sector remains dominated by just two big players who hold between them more than 90% of the market share. IndiGo's market share in the Indian aviation market is 63%, while the overall domestic market share of Air India Group, comprising Air India, AIX Connect, and Vistara, is 29.2%. While Akasa Air's market share stands at 4.4% that of SpiceJet is at 2% (The Economic Times, 2024).

Over the years, India has witnessed economic growth marked by rising GDP and GDP per capita, which has led to increased affordability in airline travel. Still, India has prominent wealth inequality as evidenced by the high Gini Coefficient (0.402) (Menon, 2024). In the context of the country's aviation industry, air fares remain highly price-sensitive despite the potential duopoly and the presence of other budget airlines. This highlights the need to develop an Airline Ticket Price Index (ATPI) to track fluctuations in fares and assess their implications for affordability.

This paper develops an indicative ATPI for the Indian aviation sector using real-world data, evaluates the affordability of air travel by relating the ATPI to GDP per capita, and applies game theory to explore pricing strategies that balance airline profitability with public affordability.

II. Methodology And Raw Data Collection

For the sake of the ATPI calculation, the researcher first collected the necessary data from relevant and reliable sources. This included the monthly passenger data for 2022 for five randomly selected domestic airline routes and the average monthly ticket prices for each route from January to April 2025. The former was collected from data published by the Directorate General of Civil Aviation (DGCA), while the latter was manually extracted from Skyscanner.

The data collected at this stage have been presented in the tables below:

DEL-JAI	Jan	Feb	March	April
Passenger traffic	11617	18459	22257	17376
Avg Prices (INR)	2547	2348.5	2271.6	2571
CCU-BOM	Jan	Feb	March	April
Passenger traffic	35757	53445	64562	59603
Avg prices (INR)	5373	4982	4853	4951
BLR-CJB	Jan	Feb	March	April
Passenger traffic	5391	7332	10387	10004
Avg prices (INR)	5153.6	2705.8	2666	2750
BOM-GOA	Jan	Feb	March	April
Passenger traffic	53460	78874	97879	81244
Avg prices (INR)	4108	2565	2103.3	2390
ATQ-SXR	Jan	Feb	March	April
Passenger traffic	3655	3604	5451	9109
Avg prices (INR)	7312.8	5324.1	4980	4700

After this, for each of the routes, the respective weight was calculated for each month. This was achieved by dividing the passengers on that route by the total number of passengers across all routes in the same month. This data has been presented below:

Monthly weight	JAN	FEB	MARCH	APRIL
Total Passengers	109880	161714	200536	177336
del-jai	0.11	0.11	0.11	0.10
ccu-bom	0.33	0.33	0.32	0.34
blr-cjb	0.05	0.05	0.05	0.06
bom-goa	0.49	0.49	0.49	0.46
atq-sxr	0.03	0.02	0.03	0.05

Once done, each weight was multiplied by the corresponding average ticket price for that route and that month to obtain the weighted price. This can be seen below:

Weighted price (INR)	JAN	FEB	MARCH	APRIL
del-jai	269.28	268.07	252.12	251.92
ccu-bom	1748.47	1646.51	1562.41	1664.04
blr-cjb	252.85	122.68	138.09	155.13
bom-goa	1998.67	1251.05	1026.59	1094.94
atq-sxr	243.25	118.65	135.37	241.42

Based on the above, the researcher obtained the ATPI of INR 3,610.38 by summing the weighted prices for each month and dividing the total by four.

Affordability Analysis

The GDP per capita (annually) of India is approximately $1130 when we exclude the wealthiest top 5% of the population (Raghunathan, 2024). Taking $1 as INR 86.0, we get GDP per capita (annual) as INR 97,180. Now, to get the GDP per capita per month, we divide INR 97,180 by 12.
Therefore, INR 8,100 is the GDP per capita per month of India.

The affordability index of air travel can be calculated through the following formula:

$$Affordability\ index\ = \frac{ATPI}{GDP\ per\ capita\ (monthly)} = \frac{3,610.38}{8,100} = 0.4457$$

The affordability analysis indicates that, on average, 44.57% of an Indian's monthly income would be required to purchase a single air ticket. This proportion is significantly high. Furthermore, even after excluding the top 5% of earners from the GDP calculation, substantial income disparities remain within the remaining population. This suggests that air travel continues to be a luxury for large sections of society rather than a routine mode of transport. Affordability, therefore, is highly uneven: higher-income groups may still consider flying viable due to the value they place on saving time and reducing opportunity costs, while lower-income groups are more constrained to rely on cheaper alternatives such as rail or road, despite greater inconvenience. This divergence highlights the role of income elasticity of demand: demand for air travel among wealthier groups tends to be relatively inelastic, whereas for poorer groups it remains highly elastic, with even small price increases deterring usage. Hence, the ATPI affordability ratio not only reflects the average cost burden but also underscores the structural inequality embedded in India's aviation market.

Game Theory Applications

Game theory is the study of how and why individuals and entities (called players) make decisions about their situations. It is a theoretical framework for conceiving social scenarios among competing players. Game theory is used in a variety of fields to lay out various situations and predict their most likely outcomes (Hayes, 2024). The prisoner's dilemma is one of the most well-known concepts in modern game theory. The typical prisoner's dilemma is set up in such a way that both parties choose to protect themselves at the expense of the other participant. As a result, both participants find themselves in a worse state than if they had cooperated in the decision-making process.

Game theory applies to the Indian airline industry as well. Since demand for air travel is price elastic for a large percentage of the population, in their bid to maximise profits, airlines must decide whether to lower fares and attract more customers or charge higher fares. To understand how this affects the airlines competing on the routes chosen for this study, it is first vital to check the price sensitivity of each of the airline routes based on the availability of alternate means of transport.

Route	Distance	Alternate Modes	Travel Time	Feasibility
DEL–JAI (Delhi–Jaipur)	270 km	- Train: Shatabdi, Ajmer Double Decker - Car/Taxi: NH48 - Volvo Bus (Frequent service)	4.5–6 hours	- Highly feasible by train or road: Delhi and Jaipur are well-connected via expressways and multiple daily fast trains. - The cost of alternatives is low. - Journey on alternatives is comfortable, and the check-in hassle of flights is avoided - While air transport is the quickest, with a flight time of only 45 minutes, strong alternatives like driving and trains make this route highly price-sensitive.
CCU–BOM (Kolkata–Mumbai)	2000 km	- Train: Gitanjali Express, Duronto, Howrah Mail - Bus/Car: Not viable	28–32 hours	- Not feasible by train for most travelers due to the long duration. - Only suitable for budget-conscious or flexible travelers. - Flights drastically reduce travel time (2.5 hours) with multiple flights daily, making them the preferred choice for business, students, or tourists. Therefore, weak alternatives lead to higher demand for flights and lower price sensitivity.
BLR–CJB (Bangalore–Coimbatore)	370 km	- Train: Intercity, Kongu Express - Bus: KSRTC, Private Volvo - Car (via NH948)	6–8 hours	- Alternative travel routes are feasible and flexible. - Excellent connectivity by train and bus. - Overnight buses offer sleeper options. - A car journey is scenic and comfortable for families.

				- Flights are faster (1 hr) but may not justify the extra cost unless time is critical. Therefore, strong competition from trains and driving leads to moderate to high price sensitivity for flights.
BOM–GOA (Mumbai–Goa)	600 km	- Train: Konkan Railway (Mandovi, Jan Shatabdi) - Bus: Overnight sleeper buses - Car (via NH66)	8–12 hours	- Alternative transportation is a very popular option - The train journey is scenic along the coast and affordable. - Buses run frequently and are preferred for overnight travel. - So, while flying does have convenience, as it is quicker (~1 hour), many choose trains or buses for budget or leisure purposes. Price sensitivity for flights is moderate.
ATQ–SXR (Amritsar–Srinagar)	460 km	- Train: No direct option. Closest is Amritsar to Jammu, then the road to Srinagar (~6 hrs) - Bus: Limited, mountain terrain	12–15 hours (multi-leg)	- The only alternative overland option involves multiple legs (train + road) with delays and risk of road closures in winter. - Mountain routes can be difficult, especially for families or the elderly. - With limited alternatives, flights are the primary mode of transport, and price sensitivity is low.

Based on the price sensitivity analysis conducted in the table above, the suggestions, based on game theory concepts, for the airlines competing on each of the flight routes are laid out below.

Delhi to Jaipur

For travel from Delhi to Jaipur, alternative modes of transportation are available, highly feasible, and practical. Many travelers may prefer a train or road journey due to its lower cost and good connections via expressways and multiple daily fast trains. Thus, demand for air travel is highly price elastic. Indigo and Air India Express, both budget-friendly airlines, operate on this route. Both airlines may keep fares below the ATPI to compete effectively. A prisoner's dilemma situation is prevalent here as one airline may lower fares to capture a significant share of the market. Indigo, having more flights than Air India Express, may consider increasing fares during periods when flights from the other airline are unavailable. Still, Indigo and Air India Express have to be cautious with their pricing strategies owing to the high price sensitivity of this route.

Kolkata to Mumbai

On this route, alternate modes of travel are not feasible due to the route's long duration and are only opted for by highly budget-conscious travellers. Thus, demand for air travel is relatively price inelastic. Three airlines are operating this route - Indigo, Air India, and Akasa Air. Airlines would like to offer comparatively higher fares due to inelastic demand for air travel and longer flight durations (3 hours). A Stackelberg model may exist here, giving the airline that determines its pricing strategy first a competitive advantage. As a full-service airline, Air India may be inclined to maintain higher prices. Thus, Air India would target the corporate and luxury travellers while Indigo and Akasa Air would attract budget travellers.

Bangalore to Coimbatore

For this route, alternative modes of transportation are available, which are often more cost-effective and flexible. Thus, demand for air travel is relatively price elastic. So, even though Indigo is the only airline operating on this route, it faces competition from other modes of travel, such as trains, buses, and private cars, which offer a comfortable and scenic journey; therefore, the airline cannot pursue monopolistic practices. Given, however, that air travel may remain the top choice among those travellers whose main priority is time, Indigo could set a moderate ticket price, just at the ATPI or slightly above. It should remain cautious about increasing it, as this could risk driving customers to other means of transport.

Mumbai to Goa

Alternate modes of transport are available for this route, and they often provide a cheaper and more leisurely journey. Thus, demand for air travel is moderately price sensitive. There is a duopoly in the airline industry on this route - Indigo and Air India. Both airlines, however, have a different target consumer group. Indigo, a low-cost budget carrier, targets fliers who prioritise cheap, affordable fares. Air India, on the other hand, being a full-service airline, targets corporate and high-end travellers who are looking for a luxurious mode of travel. Naturally, Air India would like to keep higher prices, whereas Indigo may look to lower prices to capture market dominance. However, owing to the low flight time (1 hour), not many passengers may opt for business

class travel, and lower fares may be the preference for many corporate travelers as well. Hence, Air India would look to offer flash discounts to offer fares comparable to those of Indigo and retain market share. Overall, owing to the route's short flight time and moderate to high price sensitivity, Indigo would be better equipped to capture market dominance.

Amritsar to Srinagar

Due to the lack of feasible alternatives, air travel remains the only viable mode of transportation for this route. Thus, demand for air travel is price inelastic. Furthermore, Indigo is the only airline operating on this route. Indigo, therefore, enjoys full monopoly power in this sector. As a result, Indigo may offer a base price higher than the average ATPI on this route to maximise profits. The airline can further adjust ticket pricing for seasonal variations. This would entail lowering prices during the off-peak periods in a bid to attract more customers, and charging higher prices during peak seasons to maximise profits. Still, Indigo would have to be careful of certain restrictions on pricing, as per the guidelines in place by institutions such as the Competition Commission of India, which ensures that passengers are not exploited through unfair pricing or other anti-competitive practices.

III.   Conclusion

The Indian aviation industry is a rapidly growing sector, significantly contributing to the nation's GDP and providing employment to millions. The domestic aviation market, in particular, is vital for India's economic growth and success. Although India's GDP and GDP per capita have increased over the years, indicating greater affordability in air travel, the country still experiences a high degree of income inequality, with the majority of the nation's wealth concentrated in the hands of the top 5%. This paper aimed to calculate an ATPI based on five popular domestic routes and suggest pricing strategies for airlines operating on those routes, examining them through a game theory lens.

The ATPI obtained by taking five popular domestic routes amounts to INR 3,610.38. Using this ATPI, an affordability index was calculated. This was done with consideration for the significant income inequality prevalent in India. Hence, we used the GDP per capita, excluding the top 5%, when calculating the ATPI to minimize the effect of wealth disparity and obtain precise results. The affordability index was found to be 0.4457. This figure indicates that a significant proportion of an average Indian's monthly income would be spent on air travel. This underscores the importance for airlines to understand their specific routes and decide pricing strategies accordingly.

Based on alternate modes of transport and competitiveness in the aviation market, airlines must pursue different pricing strategies. For the Delhi to Jaipur route, owing to highly price-sensitive demand, airlines must maintain an airfare that is slightly below the ATPI to compete effectively.

For Amritsar to Srinagar, owing to relatively price-inelastic demand and a monopoly situation in the aviation market, Indigo may look to keep fares above the average ATPI to maximise profits. For Mumbai to Goa, due to relatively price-elastic demand for air travel and short travel time, airlines would look to keep moderate fares to compete effectively and capture market dominance. For the Bangalore to Coimbatore route, due to relatively price-elastic demand for air travel and a monopoly situation in the aviation market, Indigo may maintain a moderate fare to compete effectively with other modes of transport, as well as to maximize profits. Lastly, for Kolkata to Mumbai, due to relatively price-inelastic demand and longer flight duration, airlines may look to keep comparatively higher fares to maximise profits.

Given that air travel is both a facilitator of economic activity and an important social connector, it is vital for airlines operating on domestic routes in India to remain sensitive to consumer affordability. Developing an ATPI on a larger scale, while accounting for income disparities by excluding distortions caused by the wealthiest 5%, would enable airlines to price more equitably and sustainably in alignment with India's broader developmental goals.

Bibliography

[1]   Freire-Garabal Y Núñez , M. (2024). The Indian Aviation Industry: Soaring To New Heights. [Online] Times Of India Blog. Available At: Https://Timesofindia.Indiatimes.Com/Blogs/Disruption-In-Higher-Education/The-Indian-Aviation-Industry-Soaring-To-New-Heights/.

[2]   Hayes, A. (2024). Game Theory: A Comprehensive Guide. [Online] Investopedia. Available At: Https://Www.Investopedia.Com/Terms/G/Gametheory.Asp.

[3]   IBEF (2025). Indian Aviation Industry, Aviation Sector In India, About, Analysis. [Online] Www.Ibef.Org. Available At: Https://Www.Ibef.Org/Industry/Indian-Aviation.

[4]   Menon, R. (2024). Analysing The Rising Gap In Incomes. [Online] The Hindu. Available At: Https://Www.Thehindu.Com/News/National/Analysing-The-Rising-Gap-In-Incomes/Article67770234.Ece.

[5]   Raghunathan, V. (2024). This Growing Chasm Is A Danger To Democracy. [Online] Deccan Herald. Available At: Https://Www.Deccanherald.Com/Opinion/This-Growing-Chasm-Is-A-Danger-To-Democracy-2-3131675

[6]   Sharma, A. (2024). Indian Aviation Industry On The Cusp Of Unprecedented Growth: Economic Survey. [Online] Mint. Available At: Https://Www.Livemint.Com/Industry/Indian-Aviation-Industry-On-The-Cusp-Of-Unprecedented-Growth-Economic-Survey-11721637636626.Html

[7]   The Economic Times (2023). A Competitive Aviation Sector Is Truly Giving Wings To India's Rapidly Growing Economy. The Economic Times. [Online] 6 Aug. Available At: Https://Economictimes.Indiatimes.Com/Opinion/Et-Commentary/A-Competitive-Aviation-Sector-Is-Truly-Giving-Wings-To-Indias-Rapidly-Growing-Economy/Articleshow/102479320.Cms?From=Mdr.
[8]   The Economic Times (2024). Vistara's Last Flight: Why Indian Aviation Remains A Two-Plane Race? [Online] The Economic Times. Available At: Https://Economictimes.Indiatimes.Com/Industry/Transportation/Airlines-/-Aviation/Vistaras-Last-Flight-Why-Indian-Aviation-Remains-A-Two-Plane-Race/Articleshow/115172861.Cms?From=Mdr.