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Determinants of regional airfares
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RE: DETERMINANTS OF REGIONAL AIRFARES

We are supply chain management academics from the University of Technology Sydney. Our collective work focuses on advancing research, teaching, and industry engagement in operations, logistics, and service ecosystems. We examine how complex networks, whether global production systems or regional service environments, can be designed to improve productivity, resilience, and long-term value creation.

Associate Professor Sanjoy Paul is the Program Director of the UTS Strategic Supply Chain Course at the UTS Business School. He contributes expertise in sustainable supply chains, operational resilience, and optimisation. His research addressed how organisations manage risk, digital integration, and performance measurements across globally distributed networks.

Associate Professor Maruf Chowdhury brings deep capability in supply chain analytics and data driven decision making. His work focuses on improving coordination and strategic alignment across inter organisational systems through rigorous modelling and empirical analysis.

Professor Iraj Mahdavi provides leadership in operations and quality management, with a strong emphasis on strategic supply chain design and performance systems. His research and academic leadership have shaped thinking on how organisations align operational capability with broader strategic and societal outcomes.

Dr Moira Scerri is an expert in productivity for service and network based firms. Her research examines how value is co-created across complex service systems such as health, aged care, tourism and regional service ecosystems. She is currently leading research into ageing in place and how service design, digital inclusion, and local infrastructure can better support older residents living in NSW. Moira lives in Coffs Harbour, is a community member of the Coffs Harbour Positive Ageing Committee and was invited onto the Board of the Australian Travel Careers Council in recognition of her time and contributions to the travel and tourism industry.

We provide a collective response focused on Value Leakage in the Coffs Harbour Aviation Eco-system from a Supply Chain Efficiency Perspective.

VALUE LEAKAGE IN THE COFFS HARBOUR AVIATION ECOSYSTEM

A SUPPLY CHAIN EFFICIENCY PERSPECTIVE

Within a regional aviation supply chain, value leakage occurs when structural cost rigidities and capacity constraints inhibit optimal demand realisation and network utilisation. In the case of Coffs Harbour, leakage is not simply a pricing phenomenon, it reflects inefficiencies embedded in the broader service ecosystem linking infrastructure, hubs, airlines, and end users.

Four key aspects for consideration are the high aeronautical charges and demand elasticity suppression, slot bottlenecks and frequency constraints, seasonal volatility and asset underutilisation and limited carrier competition and network density.

1. High Aeronautical Charges and Demand Elasticity Suppression

When airport charges, both locally at Coffs Harbour Airport and upstream at Sydney Airport, form a significant share of total ticket cost, price sensitivity increases.

In thin markets, demand elasticity is typically higher for discretionary travel such as tourism and visiting friends and relatives, and moderately elastic for business travel. Elevated structural charges reduce the ability of airlines to offer competitive pricing, particularly in shoulder and off-peak periods. The result is suppressed demand rather than stimulated utilisation.

From a supply chain perspective, this creates a suboptimal equilibrium where infrastructure exists but is not fully leveraged, reducing overall network productivity.

2. Slot Bottlenecks and Frequency Constraints

Access to constrained hub airports operates as a classic bottleneck within the aviation supply chain. When peak hour slots are limited in Sydney, scheduling flexibility for regional services is materially restricted. In supply chain terms, this represents a throughput constraint at a critical node within the network. Even if upstream and downstream nodes such as Coffs Harbour possess available runway capacity and terminal capability, the binding constraint at the hub determines overall system performance.

Bottlenecks reduce effective throughput and increase variability across the network. In aviation, this manifests as constrained departure and arrival windows that compress scheduling options and limit frequency. For Coffs Harbour, the implications are structural rather than incidental. Limited flight frequency reduces the feasibility of same day return travel for business passengers, which in turn suppresses corporate demand and weakens regional economic connectivity. Schedule inflexibility also increases the risk profile for passengers travelling for medical appointments, particularly where specialist services are concentrated in metropolitan centres. Missed connections or limited rebooking options impose both financial and health related costs. In addition, time sensitive travels, such as legal matters, government engagement, or urgent family responsibilities, become less reliable, diminishing overall service confidence.

From a supply chain perspective, frequency is not merely an operational variable but a core component of perceived value. Reduced frequency lowers the utility of the route even when physical infrastructure exists at the regional node. The constraint at the hub effectively caps network density, limits competitive dynamics, and constrains load factor optimisation. The outcome is under-realised demand. Potential passengers either defer travel, substitute to alternative destinations, or absorb higher generalised costs. This represents value leakage across the regional service ecosystem, where economic, social, and health related benefits are not fully captured due to upstream capacity constraints.

Western Sydney International Airport and Future Network Structure

The forthcoming opening of Western Sydney International Airport in 2026 introduces an important structural change in the Australian aviation network. The new airport is expected to provide significant additional capacity to the Sydney basin and operate with lower congestion and potentially lower aeronautical charges. From a supply chain perspective, Western Sydney represents the creation of a new network node rather than simply an expansion of existing hub capacity.

While additional airport capacity may relieve some operational pressure on Sydney Kingsford Smith Airport, improved regional connectivity is not guaranteed. Slot allocations at Kingsford Smith are historically constrained and airlines may continue prioritising high-yield trunk routes. At the same time, regional services operating from Western Sydney may face reduced connectivity to international services that remain concentrated at Kingsford Smith. Without coordinated network design, the emergence of dual Sydney airports may fragment rather than strengthen connectivity.

For regional centres such as Coffs Harbour, the key policy question is therefore not only whether additional capacity exists, but how the two-airport system will be integrated into the broader aviation supply chain to support frequency, connectivity, and regional economic development.

In this sense, slot scarcity at Sydney functions as a structural bottleneck that shapes demand patterns, asset utilisation, and regional productivity outcomes. Addressing such constraints requires system level thinking rather than isolated airport level optimisation.

3. Seasonal Volatility and Asset Underutilisation

Regional tourism demand is structurally seasonal, particularly in coastal destinations such as Coffs Harbour where visitation patterns are shaped by school holidays, weather conditions, and event calendars. During peak periods, aircraft load factors and terminal activity can approach operational limits. In contrast, off-peak periods are characterised by materially lower passenger volumes and underutilised infrastructure.

Aviation infrastructure is largely indivisible and characterised by high fixed costs. Runways, terminal facilities, security screening, ground handling arrangements, and aircraft ownership or leasing costs do not scale down proportionally with demand. When utilisation declines in low season, the average cost per passenger increases because fixed costs must be recovered across fewer travelers. From a supply chain perspective, this creates structural cost pressure at both airport and airline levels.

Airlines typically respond through dynamic pricing strategies aimed at protecting yield and stabilising margins. However, in thin regional markets, this can lead to elevated average fares even during low demand periods. Rather than stimulating travel, higher fares can suppress discretionary demand, particularly for leisure passengers who are more price sensitive. Lower passenger volumes then translate into reduced load factors, reinforcing the need for continued cost recovery through pricing adjustments.

This dynamic produces a self-reinforcing cycle. High fares in low demand season suppress discretionary travel. Suppressed demand reduces load factors. Lower load factors increase the per passenger cost burden. Continued cost pressure sustains higher pricing. The system struggles to smooth demand across the year because there are limited alternative demand segments to fill capacity outside peak periods. The result is persistent asset underperformance, where infrastructure and aircraft operate below efficient utilisation levels for significant portions of the year.

From a regional productivity perspective, this represents a coordination challenge across the tourism, aviation, and event ecosystems. Without mechanisms to redistribute demand temporally or diversify traveler segments, seasonal volatility continues to undermine both economic value capture and supply chain efficiency.

4. Limited Carrier Competition and Network Density

Network density is a central determinant of efficiency within aviation supply chains. Where multiple carriers operate on a route, frequency increases, connectivity improves, and competitive pressure disciplines pricing structures. In thin regional markets such as Coffs Harbour, however, limited carrier presence constrains these density effects and narrows the structural capacity for growth.

When only one or a small number of carriers serve a route, schedule choice is reduced. Fewer daily services limit passenger flexibility and restrict the ability to match departure times with business, medical, or leisure needs. Interline connectivity is also weakened. With lower network integration, passengers face fewer seamless connection options into domestic and international networks, increasing total journey time and perceived travel risk. At the same time, load factor optimisation becomes more difficult. Limited frequency and smaller aircraft deployment reduce the carrier's capacity to smooth demand across departure times and adjust supply dynamically.

From a supply chain perspective, this resembles a single supplier environment with limited redundancy. The absence of competitive overlap reduces system resilience and dampens incentives for service innovation. Competitive tension is a key driver of pricing experimentation, targeted demand stimulation, and differentiated product offerings. Where such tension is weak, pricing structures may remain relatively rigid and demand development strategies more conservative. The outcome is a constrained growth trajectory, where limited network density reinforces thin demand conditions rather than expanding them.

In regional contexts, therefore, carrier competition is not merely a market variable but a structural lever shaping connectivity, asset utilisation, and long-term economic integration.

Manifestations of Leakage in the Regional Economy

These structural aviation constraints translate directly into measurable socio-economic outcomes at the regional level. When fares are elevated and schedules are constrained, residents tend to travel less frequently than would otherwise be optimal. This represents suppressed travel frequency, where latent demand exists but remains unrealised due to price and timing barriers. The consequence is not simply fewer passenger movements, but reduced social, economic, and institutional connectivity between the region and metropolitan centres.

For ageing populations in Coffs Harbour, the implications are particularly significant. Limited flight frequency combined with high airfares can lead residents to defer specialist consultations located in metropolitan hospitals. Delayed access to care may exacerbate chronic conditions, increase the likelihood of acute episodes, and shift costs downstream into more intensive segments of the health system. In this way, aviation constraints intersect with health system efficiency, influencing both patient outcomes and public expenditure trajectories.

Business mobility is similarly affected. Regional firms face higher transaction costs when engaging with capital city markets for investment, partnership development, procurement, or professional services. Reduced mobility constrains face to face engagement, which remains critical in many sectors for trust formation and deal making. Over time, this limits business development opportunities, weakens labour market fluidity, and reduces the region's capacity to integrate into broader value networks.

Tourism demand also adjusts in response to structural cost signals. Potential visitors compare destinations based on total travel cost and convenience. Where air access is more competitive elsewhere, travelers may substitute Coffs Harbour for lower cost or higher frequency destinations. This substitution effect diverts visitor expenditure, reduces accommodation occupancy rates, and weakens regional tourism multipliers. The cumulative outcome is diminished value capture across hospitality, retail, and service sectors that depend on visitor inflows.

Collectively, these effects demonstrate how aviation supply chain constraints extend beyond transport economics to shape broader patterns of regional productivity, health access, and economic resilience.

Strategic Interpretation

Value leakage in regional aviation is systemic rather than operational in nature. It does not arise primarily from inefficiency within a single airline or airport, but from structural characteristics embedded across the broader aviation ecosystem. High fixed infrastructure costs relative to thin demand density create persistent cost recovery pressures. Regional airports and aircraft assets must recover substantial capital and operating expenditures from comparatively small passenger volumes, elevating per unit cost structures. At the same time, dependence on constrained metropolitan hubs introduces bottleneck risk that limits scheduling flexibility and caps network throughput.

Limited supply side competition further compounds these structural dynamics. Where few carriers operate, network density remains low, frequency is constrained, and pricing discipline weakens. In

addition, the inability to smooth seasonal variability across the year reinforces asset underutilisation during off peak periods. The interaction of these factors produces a system in which demand is suppressed, connectivity is constrained, and economic spillovers are reduced. The result is a foregone ecosystem value rather than simple operational inefficiency.

From a supply chain management perspective, leakage represents unrealised value across interconnected actors, including airlines, airports, regional businesses, health systems, and tourism operators. Addressing this challenge therefore requires coordinated intervention rather than isolated optimisation. Infrastructure financing models may need recalibration to reflect thin market realities. Hub slot allocation mechanisms must consider regional connectivity impacts alongside commercial returns. Procurement collaboration and demand aggregation strategies could improve load factors and stabilise revenue streams. Seasonal demand smoothing may require integrated tourism and event strategies aligned with aviation scheduling.

The central policy question is not whether fares appear high in isolation, but whether the regional aviation supply chain is configured to maximise network productivity and long-term regional value creation. Without system level coordination, structural leakage will persist, constraining economic resilience and social access outcomes.

Methodological and Analytical Extension

Empirical Evidence and Data Requirements

While the preceding discussion identifies structural drivers of value leakage in the regional aviation ecosystem, empirical evidence is necessary to validate the magnitude and mechanisms of these effects. In addition to secondary data, qualitative insights will be obtained through semi-structured interviews with key stakeholders across the regional aviation ecosystem, including airport authorities, airline operators, tourism organisations, and regional policy makers. These interviews will help identify additional determinants influencing regional airfares and provide contextual understanding of operational and institutional constraints. In particular, the claims relating to high aeronautical charges, demand elasticity suppression, and constrained network utilisation require supporting data drawn from operational, pricing, and passenger demand sources. Relevant empirical inputs may include:

- Airport aeronautical charges and cost structures across comparable regional airports
- Historical airfare data by route, carrier, and booking class
- Passenger volumes, load factors, and seasonal utilisation rates
- Flight frequency and schedule distributions across peak and off-peak periods
- Tourism visitation patterns and regional economic indicators

Combining these datasets enables the identification of statistical relationships between airfare levels, airport charges, demand elasticity, and network capacity constraints. Such evidence strengthens the policy relevance of the analysis by demonstrating whether structural cost drivers translate directly into suppressed travel demand and reduced regional connectivity.

Empirical indicators suggest that aeronautical charges represent a meaningful share of ticket costs on short regional routes such as Sydney–Coffs Harbour. Monitoring data from the Australian Competition and Consumer Commission indicates that Sydney Airport passenger service charges are approximately \$34 per departing passenger, while regional airport passenger and terminal charges typically range between \$15 and \$25. When combined with landing and terminal usage fees, total aeronautical charges across both airports are estimated to exceed \$55–\$70 per passenger. For a typical return airfare on the Sydney–Coffs Harbour route of approximately \$360–\$640, these charges represent roughly 18–30 per cent of the ticket price. At the same time, empirical studies of aviation demand suggest that discretionary travel segments such as tourism and visiting friends and relatives exhibit relatively high price elasticity, typically between -1.2 and -1.8 (InterVISTAS, 2007; Zhang, Wang, & Fu, 2017). Under such conditions, increases in structural cost components can generate disproportionate reductions in passenger demand, suppressing load factors and reducing service frequency on thin regional routes. This interaction between fixed infrastructure charges and elastic demand contributes to a suppressed utilisation equilibrium, where available infrastructure capacity is not fully realised due to price-induced demand contraction.

Case Selection and Comparative Regional Analysis

The analysis presented in this submission focuses on Coffs Harbour as a representative regional aviation ecosystem. The selection of Coffs Harbour is motivated by several factors.

First, it represents a coastal regional centre with significant tourism activity, making seasonal demand volatility highly visible. Second, the airport operates within a hub-dependent network structure, relying heavily on metropolitan connectivity, particularly through Sydney. Third, the region exhibits demographic characteristics, including an ageing population and strong health service mobility needs, that make aviation accessibility particularly important.

However, to strengthen analytical generalisability, the research could be extended to include two additional regional airport cases representing different market densities. A comparative three case structure may include:

- High density regional airport with strong tourism and business demand
- Medium density regional airport such as Coffs Harbour
- Low density regional airport with limited frequency and thin passenger markets

This multi case approach will allow researchers to examine whether the determinants of regional airfares are structurally consistent across contexts or whether different network conditions produce different pricing and capacity outcomes. The comparison can generate insights into which policy interventions are universally applicable, and which are context specific.

Analytical Framework and Methodological Approach

To examine the determinants of regional airfares from a supply chain system perspective, we propose a study that adopts a multi method analytical framework combining quantitative modelling and network analysis. The four determinants discussed earlier in this proposal provide an initial conceptual structure. However, this set of determinants will be further refined and potentially expanded based on the findings from stakeholder interviews and the literature review to ensure that the analysis

reflects the full range of factors influencing regional airfare dynamics. Possible analytical components include:

- *Econometric Analysis*

Econometric modelling can be used to estimate the relationship between airfare levels and explanatory variables such as airport charges, route distance, passenger demand, aircraft capacity, and competition intensity. Regression based models may help quantify the elasticity of demand with respect to airfare levels and identify the structural drivers of price variation across regional routes.

- *Network Connectivity Analysis*

Airline route networks can be examined using connectivity metrics that capture frequency, hub dependency, and travel time reliability. Network analysis helps identify structural bottlenecks, particularly those associated with constrained metropolitan hubs such as Sydney, and assesses how these constraints influence regional service availability.

- *System Dynamics Modelling*

Given the interaction between pricing, demand, capacity allocation, and infrastructure investment, System Dynamics modelling may provide a useful framework for exploring long term system behaviour. A system dynamics model will allow simulation of feedback relationships such as:

- how airfare levels influence demand
- how demand influences airline capacity decisions
- how capacity utilisation influences pricing strategies
- how policy interventions alter system outcomes over time

Through scenario simulation and multi-objective optimisation, this approach can illustrate the potential long-term impacts of policy interventions including:

- changes to aeronautical charging structures
- regional connectivity incentives
- infrastructure investment programs
- dynamic pricing strategies designed to smooth seasonal demand

Data Collection and Research Implementation

The research will begin with a systematic review of academic literature, industry reports, and publicly available aviation policy documents to develop an initial list of potential determinants of regional airfare levels. These sources will be complemented by insights from stakeholder interviews to ensure that both academic and practitioner perspectives are incorporated. The determinants identified through literature review, industry reports, and stakeholder interviews will then be consolidated and prioritised before proceeding to quantitative modelling and empirical testing. We propose a research design that includes the collection of both operational aviation data and regional economic indicators. Potential data sources include:

- airport operational statistics

- airline scheduling and capacity data
- fare distribution datasets
- tourism and regional economic data
- passenger demand surveys where available

The integration of these data sources will allow the construction of a system level dataset linking infrastructure costs, airline strategies, passenger behaviour, and regional economic activity.

Such a dataset provides the foundation for both econometric analysis and dynamic system modelling, enabling the study to move beyond conceptual arguments toward evidence-based policy insights.

Policy and Research Contribution

By integrating supply chain theory with aviation network analysis, we seek to advance our understanding of how regional airfare levels emerge from interactions across the broader aviation ecosystem rather than from airline pricing decisions alone.

The analysis highlights how infrastructure costs, hub capacity constraints, demand volatility, and network density interact to shape airfare levels and service availability in regional markets. Importantly, the combination of empirical analysis, comparative case studies, and system modelling provides a framework through which policy makers can evaluate the long-term implications of alternative regional aviation strategies.

Such insights may assist governments, airports, and airlines in designing policies that improve connectivity, enhance asset utilisation, and strengthen the economic contribution of regional aviation systems.

Further study

Further research can extend the analysis by modeling the regional aviation ecosystem as a hub-and-spoke supply chain network (Figure 1). In this approach, Coffs Harbour serves as the central hub consolidating passenger flows from surrounding regional airports, enabling higher aircraft load factors, reduced operational costs, and improved regional connectivity.

The model integrates multimodal transport options at the hub, ensuring seamless passenger mobility to nearby destinations and supporting broader regional economic activity. By simulating different network configurations, seasonal demand patterns, and airline scheduling strategies, future research can explore how optimized supply chain design can:

- Minimize regional airfare costs while maintaining service quality.
- Enhance load factor efficiency and network utilisation.
- Support tourism, business mobility, and socio-economic development in regional areas.
- Inform policy interventions for infrastructure investment, hub development, and airline incentives.

Figure 1 illustrates the proposed hub-and-spoke network and the flow of passenger and economic value through the regional aviation ecosystem. This framework provides a basis for future empirical testing and system dynamics modelling, enabling researchers to evaluate the long-term impacts of supply chain optimization on regional airfare sustainability and value capture.

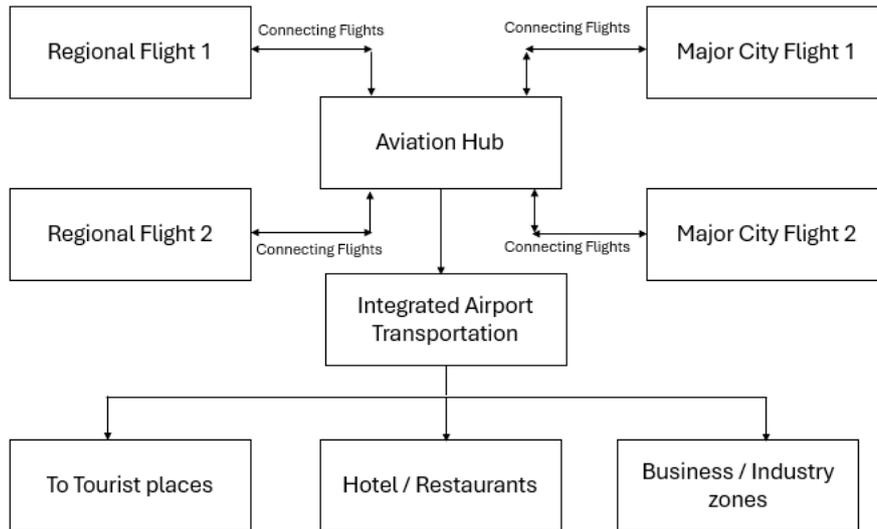


Figure 1. Conceptual hub-and-spoke regional aviation supply chain network for further study

The figure shows regional airports feeding into the Coffs Harbour hub, multimodal transport connections, and downstream economic impacts on tourism, business, and service sectors.

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