

# The Evolution of the Low-Cost Carriers in Australia's International Air Freight Market

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## Abstract

This study examines the development of the low-cost carriers (LCCs) in Australia's export and import air freight markets. The study period is from 2004 to 2020. The study used a qualitative instrumental case study research approach. The data gathered for the study was examined by document analysis. The study found that the development of the low-cost carriers (LCCs) share of Australia's annual export and import air freight markets occurred in three distinct phases. In the initial phase, 2004-2005, the market was served by just one low-cost carrier (LCC) Pacific Blue Airlines, who did not transport any export or import air freight in 2004. In 2005, the airline made a strategic policy decision to transport air freight. Phase 2 saw the inception of international services by Jetstar Airways in 2006. Jetstar Airways immediately gained import and export air freight traffic. The third phase took place from 2007 to 2020, when the major Asia-based low-cost carriers entered the market, starting with AirAsia-X in 2007. The low-cost carriers (LCCs) annual air freight market growth rates oscillated substantially over the study period, particularly for export air freight traffic. Despite the strong growth, the low-cost carriers (LCCs) annual market export and import air freight shares are considerably lower than those of the dedicated all-cargo carriers and full-service networks carriers (FSNCs).

## 1. Introduction

One of the most ubiquitous trends in the world airline industry over the past three decades or so has been the rapid growth of the low-cost carriers (LCCs). The low-cost carriers are defined as carriers which, via a variety of operational processes, achieve cost advantages over full-service network carriers (FSNCs) and pass these cost advantages to consumers through lower air fares (Schlumberger & Weisskopf, 2014). The low-cost carriers (LCCs) are often viewed as one of the most successful business concepts that have happened within contemporary travel. The astute business model of these airlines by offering significantly lower prices through the elimination all the in-flight extras together with their strict focus on cost-control has enabled them to capture significant market share (Voigt, Buliga & Michl, 2017).

The low-cost carriers (LCC) business model has evolved in more recent times with several low-cost carriers (LCCs) now operating long-haul, scheduled, no frill services (Albers et al., 2020; De Poret, O'Connell & Warnock-Smith, 2015; Martín Rodríguez & O'Connell, 2018; Soyk, Ringbeck, & Spinler, 2017; Whyte & Lohmann, 2015). The low-cost carriers (LCC's) have also introduced regional services in recent times as well (Schofield, 2015). This has led to the development of Indonesia-based Indonesia Air Asia-X, Malaysia-based AirAsia-X, Philippines-based Cebu Pacific Air, Thailand-based Thai AirAsia-X, Singapore-based Scoot Tigerair, and the long-haul unit of Jetstar Airways, which is based in Melbourne, Australia. These three airlines all operate

wide-body aircraft in contrast to the traditional low-cost carriers (LCC) carriers' reliance on narrow-body aircraft (Cowie, 2010).

Typically, the low-cost carriers (LCCs) did not tend to transport air freight (Bubalo, 2014). This was because a key element of the low-cost carriers (LCCs) business model is on tight flight schedules and rapid aircraft turnaround times (Air Cargo News, 2012). However, like the full-service network carriers (FSNCs), the low-cost carriers (LCCs) are now viewing the carriage of air freight as an important revenue stream and, as such, have introduced air freight services on their long-haul flights. Air Asia-X, Cebu Pacific Airlines, and Jetstar Airways, for example, all offer air freight products on their long-haul services. Air freight is defined as "anything carried in an aircraft except for mail or luggage carried under a passenger ticket and baggage check but including baggage shipped under an airway bill or shipment record" (Hui, Hui & Zhang, 2004).

The objective of this study is to examine the development of the low-cost carriers (LCCs) in Australia's export and import air freight markets. A secondary objective is to identify the low-cost carriers (LCCs) annual export and import air freight traffic growth rates vis-à-vis their competitors, the full-service network airlines (FSNCs), and the dedicated all-cargo carriers. A further objective is to identify the most prominent low-cost carriers (LCCs) competing in Australia's export and import air freight markets as measured by market-share. A final objective is to examine the annual export and import air

freight market share of the low-cost carriers (LCCs) vis-à-vis their competitors, the full-service network airlines (FSNCs), and the dedicated all-cargo carriers. The study period is from 2004 to 2020. The first low-cost carrier (LCC) to transport air freight in Australia's international air freight market was Pacific Blue Airlines, who entered Australia's air freight market in 2004.

The paper is organized as follows: the literature review is presented in Section 2. This is followed by an overview of the research methodology that underpinned in the study in Section 3. The case study is presented in Section 4. The findings and conclusions of the study are presented in Section 5.

## 2. Background

### 2.1. Air freight as a strategic option for the low-cost carriers

Historically, the low-cost carriers (LCCs) were not normally associated with the carriage of air freight (Air Cargo News, 2012), as their primary focus was on passenger transportation. Indeed, air freight is often an afterthought for low-cost carriers (LCCs). Whilst air freight is regarded as an important revenue source for most full-service network airlines (FSNCs) it has generally not been viewed as a core component of the low-cost carriers (LCC) business model. Some low-cost carriers (LCCs) have a policy of not carrying air freight at all, as they are concerned that it would increase aircraft turnaround times and costs, thus, outweighing any revenue gains (Centre for Aviation, 2018a). In recent times, however, some low-cost air carriers (LCCs) have increasingly focused on the carriage of air freight to take advantage of available capacity in their passenger aircraft (Air Cargo World, 2013a).

The air freight product is offered by combination carriers, both full-service network airlines (FSNCs) and low-cost carriers (LCCs), to produce additional revenue on flights that are already scheduled passenger services (McKnight, 2010). Combination airlines principally offer point-to-point (airport-to-airport) services on a wholesale basis, relying on international freight forwarders for pick-up and delivery, sales to shippers, and customer service (Doganis, 2019). In contrast, the integrated carriers, DHL Express, FedEx, and United Parcel Service (UPS) are shipping carriers that control the complete air and road delivery networks and these firms offer an extensive range of package delivery services (Malighetti et al., 2019).

### 2.2. Passenger aircraft belly-hold air freight capacity

In the global air cargo industry, air freight is transported by combination airlines, dedicated all-cargo carriers, and the integrators, DHL Express, FedEx and United Parcel Service (UPS) (Baxter & Wild, 2021; Dresner & Zou, 2017; Merkert & Alexander, 2018). Air freight capacity in a combination airline service is an economy of scope by-product arising from the supply of passenger services. This is because for most passenger airlines, both passenger and air freight services are combined, and thus, are jointly produced (Doganis, 2019; Wensveen, 2016). This arrangement, in which passengers are carried on the aircraft's main passenger deck, and air freight is carried below in the lower lobe "belly hold" compartments, is referred to as a combination aircraft (Dempsey & Gesell, 1997). It is important to note that the design of passenger aircraft is dictated by passenger requirements. As a result, the space for air freight is what is left over in the otherwise unusable space below the main passenger deck of the aircraft

that is not required for the stowage of passengers' luggage. This space exists simply due to the aerodynamic requirements for a tubular shape for the aircraft fuselage (Tretheway & Andriulaitis, 2016).

Combination airlines air cargo capacity may come in the form of narrow bodied, single-aisle aircraft, such as, the Airbus A320 aircraft, or wide-bodied, twin aisle aircraft, such as the Airbus A350-900 aircraft (Baxter, 2015a). Other wide-bodied aircraft include the Boeing B787-9/10, 777-300ER and 747-8 aircraft as well as the Airbus A330, A350 and A380 aircraft (Morrell & Klein, 2019).

The lower deck belly hold air freight capacity on a passenger aircraft is determined by the available payload and volume of space available once passengers and their luggage have been taken into consideration (Aircraft Commerce, 2015; Billings, Diener & Yuen, 2003; Morrell & Klein, 2019). In a typical combination airline's operation, the aircraft's operating costs are normally covered by passenger revenue. Air freight revenue is only required to cover incremental costs, including fuel, cargo handling, marketing, and warehousing. The carriage of air freight provides an opportunity for an airline to earn revenue by filling lower deck belly hold space that would otherwise fly empty (Aircraft Commerce, 2015).

### 2.3 Combination airline passenger and freighter airline aircraft route networks

Line-haul operators transport air freight traffic on an airport-to-airport basis and as previously noted, are typically dependent upon international air freight forwarders, who deal directly with shippers. Line haul operators offer both scheduled and unscheduled all-freight services. All-cargo airlines offer high reliability and have the capability to transport large volumes of air freight traffic over long distances. For the combination passenger airlines, air freight operations are often comprised of long-haul services, with large volumes of air freight being transferred onto shorter haul feeder services. (Reynolds-Feighan, 2001). Some combination airlines also operate freighter aircraft in addition to their passenger services (Cook & Billig, 2017; Dresner & Zou, 2017).

As shippers' expectations regarding the speed of moving their products within their supply chains, reliability and timeliness of air transport has increased significantly, so too has the attraction for the operations of dedicated freighter aircraft. The larger capacities of dedicated freighter aircraft are also an increasingly important advantage as major firms often need to ship large consignments, which in many cases is at short notice. As freighter fleets have expanded, the ability of airlines to schedule higher frequencies services has further strengthened the attraction for freighter operations. Higher freighter frequencies are critical as they permit manufacturers to more tightly time larger consignments to fit in neatly meshed production networks (Bowen, 2004).

Inter-continental freighter routes are designed to link up the major centres of world trade. Such networks consist of long-haul flights to and from the airline's major hub airport, where long-haul shipments are often broken down and uplifted on subsequent flights to their final destinations. The major types of freighter aircraft operated on long-haul inter-continental routes are the Boeing B777-200LR, B747-400F B747-8F and MD11 aircraft (Baxter, 2015b). The Airbus A330 and Boeing B767-300F freighter aircraft are also extensively used in the air cargo industry (Aircraft Commerce, 2016, 2017). Regional freighter routes are designed to link up

the airline's major hub airport with important centres of regional trade. Air cargo is sourced from these markets and transported back to the airline's hub airport for subsequent loading onto the airline's long-haul inter-continental services (Baxter, 2015b).

#### 2.4. Low-Cost carrier competition for air freight market share

The global air freight market is highly competitive and is characterized by the presence of a large number of international and regional players (Saunders, 2020). Air freight provides a competitive alternative to surface-based transport modes (road, rail and ocean) in satisfying shippers requirements in terms of speed, service quality (lower damage to packaging), and cost (Abeyratne, 2018; Doganis, 2019; Shaw, 2016). Thus, in the air freight market, the combination airlines, dedicated all-cargo carriers, and the integrators compete for market share based on price, service offering, speed to destination, and the provision of suitable air freight capacity to satisfy shippers supply chain and logistics requirements.

### 3. Research Methodology

#### 3.1. Research method

With the aim of examining the development of the long-haul, low-cost carriers (LCCs) in Australia's international air freight market, a qualitative research approach was used. The study of the development of long-haul, low-cost carriers' (LCCs) transportation of air freight is an emergent area of study. Thus, the most appropriate research method for such an emerging area is a qualitative method (Edmondson & McManus, 2007). A case study approach was therefore used in this study as this research approach allows for the exploration of complex phenomena (Cua & Garrett, 2009; Remenyi et al., 2010; Yin, 2018) and permits researchers to build theory and connect with practice (Ridder, 2016; Simons, 2009).

A qualitative instrumental case study research approach was used in the present study. An instrumental case study is the study of a case, for example, a firm or firms, that provides insights into a specific issue, redraws generalizations, or builds theory (Stake, 1995, 2005). The instrumental case study research approach provides an understanding of a specific phenomenon and is designed around established theory (Grandy, 2010). The present study was designed around the established long-haul, low-cost carriers' (LCCs) business model (Albers et al., 2020; Francis et al., 2007; Renehan & Efthymioun, 2019; Wensveen & Leick, 2009) and air freight management and operations (Doganis, 2009; Dresner & Zou, 2017; Morrell & Klein, 2019; Sales, 2013, 2016, 2017).

#### 3.2. Data collection

The data gathered for analysis in the study was obtained from the Bureau of Infrastructure, Transport and Regional Economics (BITRE) annual "International Airline Activity" reports. In addition, data was sourced from the long-haul, low-cost carriers' serving Australia's international air freight market materials that were available on the internet. These documents provided the sources of the study's case evidence. An extensive source of the leading air transport and air freight-related journals and magazines was also conducted. The study also included a search of the SCOPUS and Google Scholar databases.

Secondary data was therefore used in the study. The three principles of data collection as recommended by Yin (2018)

were followed: the use of multiple sources of case evidence, creation of a database on the subject and the establishment of a chain of evidence.

#### 3.3. Data analysis

Document analysis was used to examine the documents gathered for the case study. Document analysis is a research approach that is commonly used in in case studies. The primary focus of document analysis is analyzing the information and data from formal documents and company records that are collected for a study (Oates, 2006; Ramon Gil-Garcia, 2012). The documents collected for the present study were examined according to four criteria: authenticity, credibility, representativeness and meaning (Fulcher & Scott, 2011; Scott, 2014; Scott & Marshall, 2009).

The study's document analysis was conducted in six discrete phases. The first phase involved planning the types and required documentation and their availability for the study. In the second phase, the data collection involved sourcing the documents and developing and implementing a scheme for managing the gathered documents. The gathered documents were examined to assess their authenticity, credibility and to identify any potential bias in the third phase of the document analysis process. In the fourth phase, the content of the collected documents was carefully examined, and the key themes and issues were identified and recorded. The fifth phase involved the deliberation and refinement to identify any difficulties associated with the documents, reviewing sources, as well as exploring the documents content. In the sixth and final phase, the analysis of the data was completed (O'Leary, 2004).

In this study, all the collected documents were downloaded and stored in a case study database (Yin, 2018). All the documents used in the study were all written in English. Each document was carefully perused, and key themes were coded and recorded (Baxter, 2021; Baxter & Srisaeng, 2020).

### 4. Findings

#### 4.1. Australia's international air freight market: A brief overview

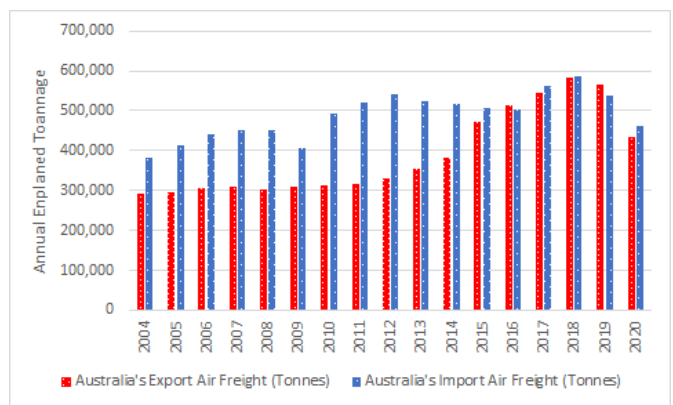
Throughout its history, Australia has been a trading nation, and thus, the country's material wealth and prosperity is dependent on its ability to export and import its trade (Adams, Brown & Wickes, 2013; Capling, 2001). However, Australia is a relatively remote continent (Kerns, 2004), and consequently, Australian exporters and importers are reliant on the air and ocean transport modes to ship their goods in their supply chains. Air freight and ocean transport are the only two transport modes available for any trade being shipped to or from Australia (Baxter & Srisaeng, 2018; Srisaeng, Baxter & Wild, 2018). The types of commodities exported from Australia by the air freight mode typically comprise low bulk and high value, and/or time-sensitive (including perishable cargoes). The types of products imported by air freight consist primarily of high-value, high-technology manufactured goods, for example, computers and other electronic goods (Productivity Commission, 1998).

Australia's export and import air freight is principally transported in the lower deck belly holds of combination airlines passenger aircraft (both the full-service network carriers and low-cost carriers with the remaining share carried on dedicated freight services). Thus, Australian exporters and importers have access to main deck freighter capacity for their oversize consignments, with freighter services being provided

by the integrators, for example FedEx and United Parcel Service (UPS) as well as by dedicated freighter operators and by some full-service network airlines (FSNCs), for example, Cathay Pacific Airways, Qantas Freight, and Singapore Airlines.

Like other air freight markets, Australia’s international air freight market largely started after the conclusion of World War II. In 1949-50, there was only a small volume and proportion of Australia’s annual international trade transported by air freight mode. During this market infancy period, four aviation firms, British Commonwealth Airlines, Qantas Empire Airways Ltd, British Overseas Airways Corporation, and Tasman Empire Airways transported Australia’s international air freight. The primary destinations for these air freight consignments were the South Pacific Islands, Hong Kong, London, Tokyo, and Vancouver (Australian Bureau of Statistics, 2001 p. 1038). From these modest beginnings, Australia’s international air freight mode has become an integral part of Australia’s economy.

Figure 1 presents the annual volumes of Australia’s export and import air freight traffic for the period 2004 to 2020. As can be observed in Figure 1, Australia’s export and import air freight increased from 293,070.4 and 383,422.8 tonnes in 2004 to 433,508 and 461,208 tonnes in 2020, respectively. Figure 1 also shows that historically there were greater volumes of import air freight, however, in later years export air freight volumes have grown strongly and are almost equivalent to import air freight volumes.



**Figure 1.** Australia’s annual enplaned export and import air freight tonnage: 2004-2020.

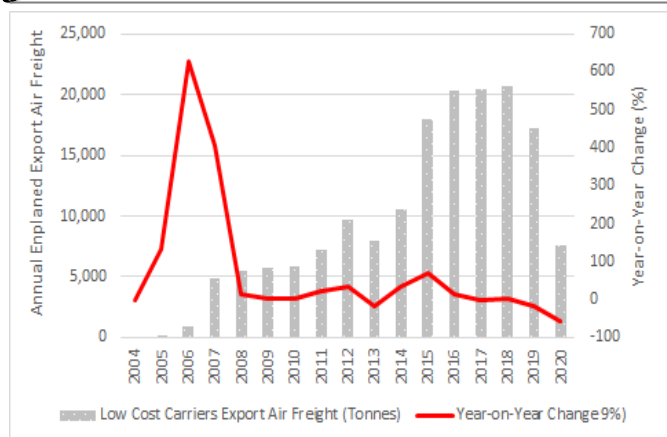
Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021), Bureau of Transport and Regional Economics (2005-2007).

#### 4.2. Development of the low-cost carriers in Australia’s international air freight market

The low-cost carriers (LCCs) entered Australia’s international air freight market in 2004. The initial air freight services were pioneered by Pacific Blue Airlines. Figure 2 shows the development in the annual volumes of Australia’s export air freight traffic from 2004 to 2020. As can be observed in Figure 2, the low-cost carriers (LCCs) export air freight market development occurred in three distinct phases. Phase 1 (2004-2006) was the initial entry of Pacific Blue Airlines. Phase 2 saw the introduction of international services by Australia-based Jetstar Airways in 2006. The third phase (2007-2020) followed the introduction of services by the major Asia-based LCCs, commencing with Air Asia-X in 2007, and since followed by the introduction of services by Cebu Pacific Air, Jetstar Asia, Indonesia Air Asia, and Scoot Tigerair.

Another important development occurred in 2010, when Pacific Blue was rebranded as Virgin Australia, and Pacific Blue Airlines airline’s business model evolved from a low-cost carrier (LCC) to a full-service network model (FSNC) (Srisaeng, Baxter & Wild, 2014 Whyte, Prideaux & Sakata, 2012).

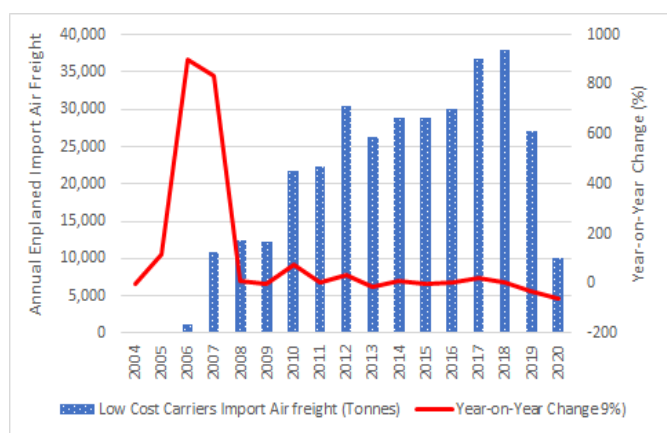
Figure 2 shows that despite the entry to the market in 2004, Pacific Blue did not transport any air freight in its first year of operation. Also, as can be observed in Figure 2, there were two pronounced spikes in the low-cost carriers (LCC’s) export air freight carriage in 2006 (+626.24%) and 2007 (+404.17%), respectively. These large spikes can be attributed to the success that Jetstar Airways enjoyed in capturing market share in 2006 and 2007, as well as the entry into the market by AirAsia-X in 2007. Figure 2 shows that the low-cost carriers (LCC’s) largest annual share of Australia’s export air freight occurred in 2017, when the LCCs carried 20,404.7 tonnes of export air freight traffic from Australia. Over the study period, the low-cost carriers (LCCs) annual export air freight tonnages have predominantly displayed an upward trend. This is demonstrated by the year-on-year percentage change line graph, which is more positive than negative, that is, more values are above the line than below. Figure 2 also shows that was the only three years during the study period when the low-cost carriers (LCCs) annual export air freight tonnage declined on a year-on-year basis. In 2013, the LCCs annual enplaned export air freight tonnage decreased by 18.15% on the 2012 levels (Figure 2). Australia’s annual export air freight market grew in 2013, with the full-service network airlines (FSNCs) and the dedicated all cargo carriers increasing their enplaned tonnage in that year. In 2017, the low-cost carriers (LCCs) annual enplaned export air freight tonnage decreased by 0.65% on the 2016 levels. Australia’s annual export air freight market grew in 2017, with both the full-service network airlines (FSNCs) and the dedicated all cargo carriers increasing their enplaned tonnage in that year. In 2020, the low-cost carriers (LCCs) annual enplaned export air freight tonnage decreased by 55.85% on the 2019 levels (Figure 2). The Australian international air travel market was impacted by the corona virus pandemic in 2020 (Bureau of Infrastructure, Transport and Regional Economics, 2021). The year 2020 was unprecedented within the aviation industry. In 2020, the airline industry—at a global level—experienced a very sharp and sustained decline in air passenger demand, which had a very adverse impact on the world’s airlines (Garrow, Lurkin & Marla, 2022; Xuan et al., 2021). Australia’s response to the COVID-19 pandemic was rapid with the closure of international borders by the Australian Government (D’Souza & Dunshea, 2021). In Australia, travel bans, border closures, and the stay-at-home orders severely disrupted various industries including the country’s aviation industry (Gao & Ren, 2020).



**Figure 2.** Low-cost carriers annual enplaned export air freight traffic and year-on-year change (%): 2004-2020.

Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021), Bureau of Transport and Regional Economics (2005-2007).

The development of Australia’s low-cost carriers (LCCs) import air freight enplaned tonnage for the period 2004 to 2020 is presented in Figure 3. The low-cost carriers (LCCs) annual import air freight tonnages also follow the same market development phases as that for the low-cost carriers (LCCs) annual export air freight tonnage. Figure 3 shows that there were two very pronounced spikes in the low-cost carriers (LCCs) annual import air freight tonnage recorded in 2006 (+900.0%) and 2007 (+833.5%), respectively. These spikes can be attributed to the significant volumes of import air freight carried by Jetstar Airways in 2006 and 2007. Over the study period, the low-cost carriers (LCCs) annual import air freight tonnages have predominantly displayed an upward trend. This is demonstrated by the year-on-year percentage change line graph, which is more positive than negative, that is, more values are above the line than below. The only exception to this positive growth trend occurred in 2013, 2019, and 2020, when the low-cost carriers (LCCs) annual import air freight tonnages decreased by 13.48%, 28.85% and 62.81% on the previous year’s levels, respectively (Figure 3). In 2013, 2019, and 2020, Australia’s annual import air freight tonnages decreased due to a lower demand for imported airborne trade.



**Figure 3.** Low-cost carriers annual enplaned import air freight traffic and year-on-year change (%): 2004-2020.

Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021), Bureau of Transport and Regional Economics (2005-2007).

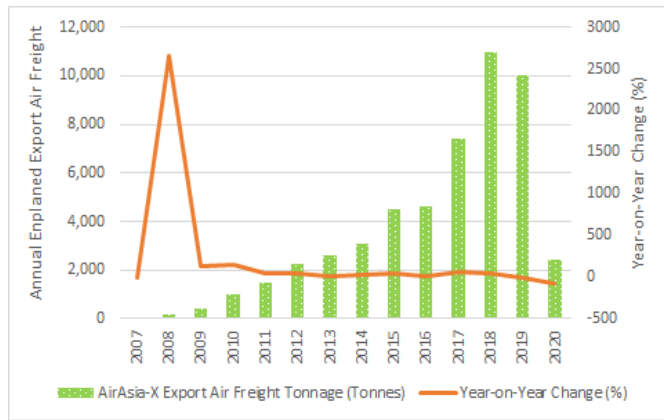
### 4.3. The long-haul, low-cost carriers serving Australia’s international air freight market

#### 4.3.1. Air Asia-X

In 2007, Malaysia-based AirAsia established AirAsia-X as its long-haul carrier (Grant, 2013; Lee & Carter, 2012; Ribeiro de Almeida, Costa & Abrantes, 2020). Today, the airline provides services to a range of destinations located throughout the Asia-Pacific and Middle East regions, operating services on routes with sector lengths of four hours or greater. The airline also delivers 'feeder traffic' to the AirAsia Groups’ various regional low-cost carriers (LCCs). AirAsia X operates a fleet of Airbus A330 widebody aircraft (Centre for Aviation, 2022). At the time of the present study, AirAsia-X had a fleet of eight Airbus A330-300 aircraft of which six were in active service (Curran, 2022). The Airbus A330-300 offers an air freight payload of around 17 tonnes (Morrell, 2011).

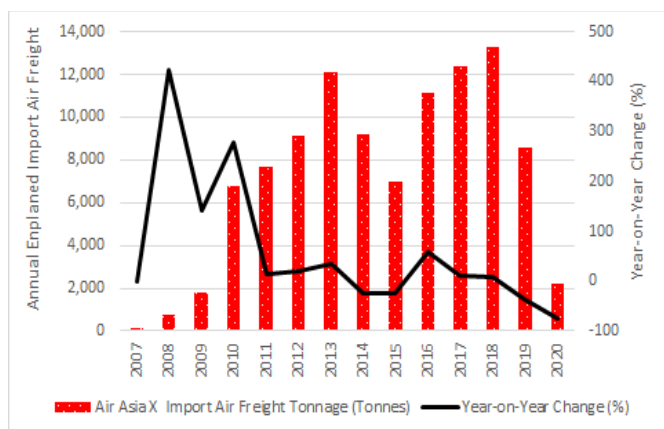
AirAsia-X commenced services to Australia in November 2007, when it launched services from Kuala Lumpur to the Gold Coast in Queensland. The airline expanded its Australian services in 2008 with the addition of new services to Melbourne and Perth. The airline commenced services to Sydney in April-2012 (Centre for Aviation, 2013).

AirAsia-X annual enplaned export air freight tonnage and the year-on-year change (%) from 2007 to 2020 is presented in Figure 4. Figure 4 shows that the AirAsia-X annual enplaned air freight tonnage increased from a low of 6.4 tonnes in 2007, when the airline first entered the Australian market, to 10,013.8 tonnes in 2019. It can be observed in Figure 4 that there have been two discrete phases in AirAsia-X carriage of Australian airborne export trade, with the first phase occurring between 2007 and 2009 when there were high growth rates recorded as the airline developed its export air freight product in the market. The pronounced spike in the airline’s annual growth rate in 2008 (+2,648.4%) can be attributed to the airline’s first full year of operations, as it only provided services for two months upon its entry to the market in 2007. There was quite rapid growth in the airline’s enplaned export air freight tonnages in 2009 (+137.52%) and 2010 (+141.52%) as the airline captured greater market share following the introduction of services to Melbourne and Perth in in November 2008. The second phase in AirAsia-X carriage of Australian airborne export trade has occurred from 2010 to 2018, when the airline experienced year-on-year growth in its enplaned air freight traffic. The growth in enplaned export air freight traffic was also assisted by the addition of services to Sydney. Sydney is Australia’s largest export air freight market. Thus, over the study period, AirAsia-X annual export air freight tonnages have largely displayed an upward trend. This is demonstrated by the year-on-year percentage change line graph, which is principally more positive than negative more values are above the line than below. Figure 4 shows that there were just two years in the study period where AirAsia-X annual enplaned export air freight tonnage decreased on a year-on-year basis. These decreases occurred in 2019 (-35.1%) and 2020 (-74.39%) (Figure 4). In late 2018, Air Asia-X announced that it would suspend its daily services from the Gold Coast to Auckland in early 2019 (Centre for Aviation, 2018b). These Trans-Tasman services ceased on the 9th of February 2019 (Liu, 2018). Australia’s annual export air freight market also decreased by 14.16% in 2020 due to the lower demand for Australia’s export airborne trade.



**Figure 4.** AirAsia-X annual enplaned export air freight traffic and year-on-year change (%): 2007-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021).

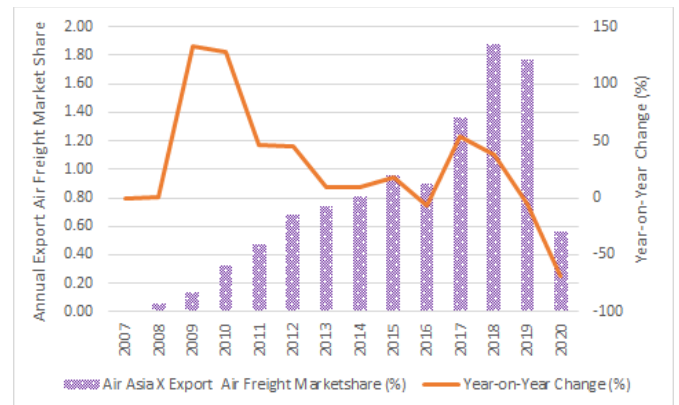
AirAsia-X annual enplaned import air freight and the year-on-year change (%) for the period 2007 to 2020 is presented in Figure 5. Figure 5 shows that AirAsia-X annual enplaned import air freight tonnages have oscillated throughout this period. There was quite rapid growth experienced in the early years of the airline’s operations to Australia as the airline established itself in the marketplace. In 2005, there was a 423.15% increase in the airline’s enplaned import air freight tonnage, and this was followed by quite significant increases in 2009 (+142.19%) and 2010 (+279.33%) as the airline expanded its Australian services to include both Melbourne and Perth. From 2011 to 2020, the most significant annual increase in enplaned air freight tonnage was recorded in 2016, when the airline’s annual enplaned import air freight increased by 58.86% on the 2015 levels. Figure 5 also reveals that there were four years during the study period where the airline’s annual enplaned import air freight declined. These occurred in 2014 (-24.13%), 2015 (-24.14%), 2019 (-35.1%), and 2020 (-74.39%), respectively (Figure 5). Australia’s total annual enplaned import air freight tonnage declined on a year-on-year basis in 2014, 2015, and 2019. As previously noted, AirAsia-X withdrew from the Coolangatta to Auckland aviation market in February 2019 and this had an impact on the airline’s enplaned import air freight traffic. Australia’s annual import air freight market decreased by 16.03% in 2020.



**Figure 5.** AirAsia-X annual enplaned import air freight traffic and year-on-year change (%): 2007-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021).

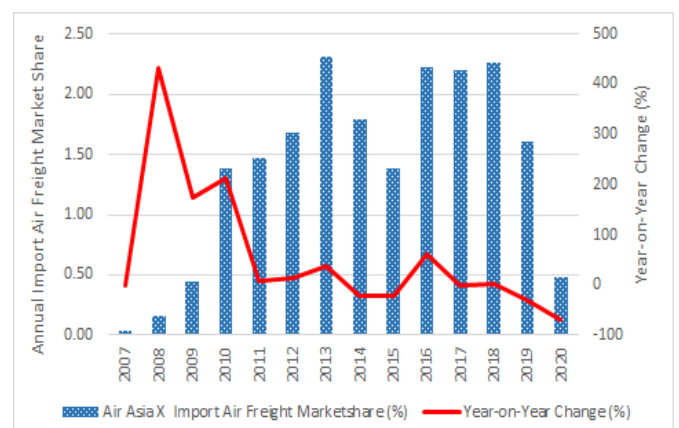
AirAsia-X annual share of Australia’s export air freight market from 2007 to 2020 is depicted in Figure 6. As can be

observed in Figure 6, AirAsia-X annual share of Australia’s export air freight market has shown a steady upward trend increasing from a low of zero percent in 2007 to a high of 1.88% in 2018. Also, as can be seen in Figure 6, there has only been two years throughout the study period when Air Asia-X annual export market share decreased on a year-on-year basis. These decreases occurred in 2019, when the airline’s annual export market share decreased from 1.88% in 2018 to 1.77% in 2019, and in 2020, when the airline’s annual export air freight market share decreased from 1.77% in 2019 to 0.56% in 2020 (Figure 6).



**Figure 6.** AirAsia-X annual export air freight market share and year-on-year change (%): 2007-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021).

Figure 7 shows that AirAsia-X annual share of Australia’s import air freight increased from a low of 0.03% in 2007 to a high of 2.31% in 2013. As can be observed in Figure 7, AirAsia-X annual import air freight market share decreased in 2014 (-22.51%) and 2015 (-22.9%). There was a pronounced spike in this metric in 2016, when it increased by 60.86% on the 2015 levels. Towards the latter years of the study period, that is, 2019 and 2020, AirAsia-X annual import air freight market share decreased on a year-on-year basis. In 2019, the airline’s annual import market share decreased by 29.2%. The cessation of Trans-Tasman services was a contributory factor in this decrease. Figure 7 shows that there was a pronounced decrease in this metric in 2020, when Air Asia-X annual import air freight market share decreased by 70.0% from 1.60% in 2019 to 0.48% in 2020.



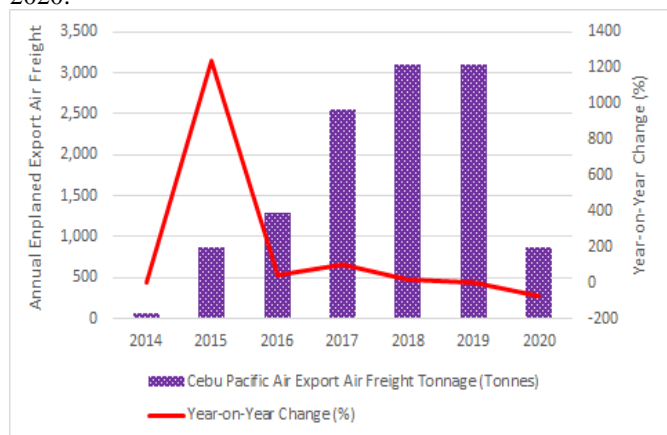
**Figure 7.** AirAsia-X annual import air freight market share and year-on-year change (%): 2007-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021).

### 4.3.2. Cebu Pacific Air

In 1991, Cebu Pacific Air received its formal permission from the Philippines Government to operate both domestic and international services. The airline commenced passenger services in 1996, with an in-augural flight between Cebu and Manila. The airline began international operations in November 2001. Cebu Pacific Air formally adopted the low-cost carrier (LCC) business model in 2005 (Mills, 2016). At the time of the present study, Cebu Pacific Air operated a fleet of Airbus A330-300 aircraft on its long-haul, low-cost services as well as on high-density domestic services. The airline received its first Airbus A330neo (New Engine Option) aircraft on November 28, 2021 (Cebu Pacific Air, 2021).

Cebu Pacific Air commenced services to Australia in September 2014, when it began a daily Airbus A330-300 service from Manila to Sydney (Australian Aviation, 2014). Cebu Pacific Air added a second Australian destination in August 2018, with the start of nonstop flights between Manila and Melbourne’s Tullamarine Airport. These services are also operated with an Airbus A330-300 aircraft (Australian Aviation, 2018; International Airport Review, 2018).

Cebu Pacific Air annual enplaned export air freight tonnage and the year-on-year change (%) for the period 2014 to 2020 is presented in Figure 8. As can be observed in Figure 8, Cebu Pacific Air annual enplaned export air freight tonnage increased from 65.3 tonnes in 2014 to 3,108.8 tonnes in 2019. There was a rapid growth in the airline’s enplaned export freight tonnage in 2015, when the annual volumes increased by 1239.3%. This large increase was due to the first full year of operations, so the large increase came from a low base in 2014. Another significant development occurred in 2017, when the airline’s annual export air freight traffic increased by 99.29% on the 2016 levels, reflecting a greater market share by the carrier in 2017. The introduction of Melbourne services in 2018 contributed to the growth in the airline’s traffic in both 2018 (+20.83%) and 2019 (+0.54%) (Figure 8). As can be observed in Figure 8, there was very pronounced decrease in the airline’s enplaned export air freight traffic in 2020, when it decreased by 71.84% on the 2019 levels. As previously noted, Australia’s aviation industry was adversely impacted by the Corona virus pandemic and the subsequent border closures in 2020.

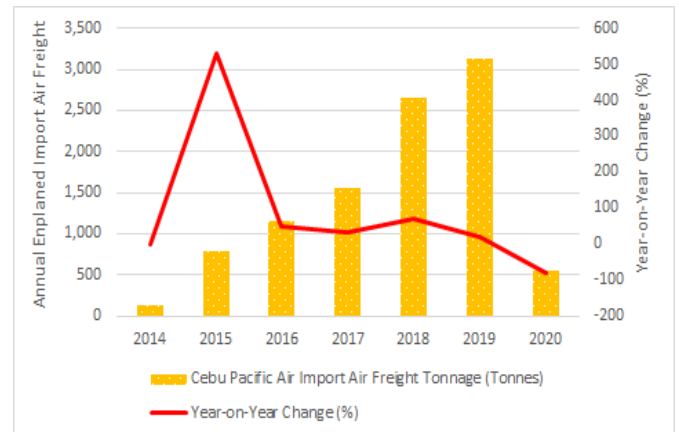


**Figure 8.** Cebu Pacific Air annual enplaned export air freight traffic and year-on-year change (%): 2014-2020.

Data derived from Bureau of Infrastructure, Transport and Regional Economics (2015-2021).

Cebu Pacific Air annual enplaned import air freight tonnage and the year-on-year change (%) from 2014 to 2020 is presented in Figure 9. Figure 9 shows that since its inception

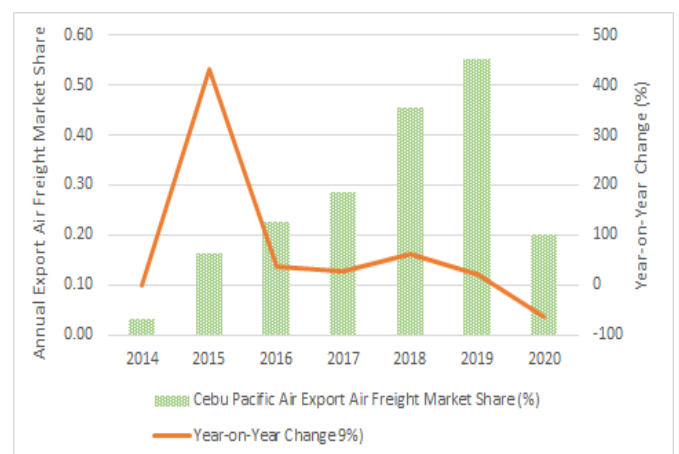
of operations to Australia in 2014, Cebu Pacific Air annual enplaned import air freight has exhibited an upward growth trend, with the highest annual growth being recorded in 2015 (+529.3%). The addition of Melbourne services in 2018 contributed to a 71.42% annual growth rate in 2018 (Figure 9). Figure 9 shows that the airline’s annual enplaned import air freight traffic was adversely impacted in 2020 when it decreased by 82.42% on the 2019 levels. This decrease could be attributed to the downturn in demand for aviation services as well as Australia’s border closures.



**Figure 9.** Cebu Pacific Air annual enplaned import air freight traffic and year-on-year change (%): 2014-2020.

Data derived from Bureau of Infrastructure, Transport and Regional Economics (2015-2021).

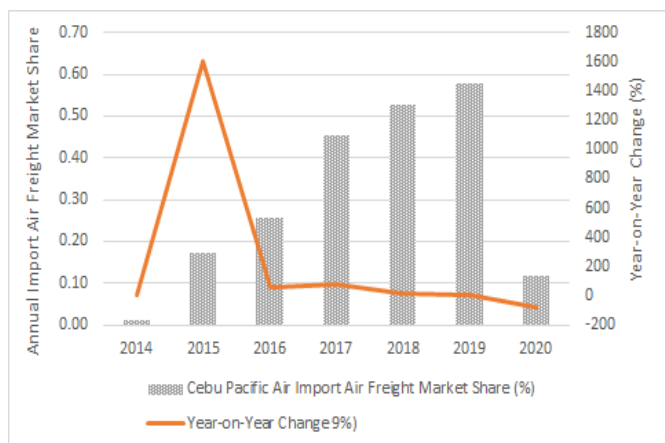
Figure 10 presents Cebu Pacific Air’s annual Australian export air freight market share from 2014 to 2020. As can be observed in Figure 10, the airline has steadily increased its share of Australia’s export air freight market. Cebu Pacific Air’s annual export market share increased from 0.03% in 2014 to a high of 0.55% in 2019 (Figure 10). Figure 10 shows that the airline’s annual export air freight market share decreased by 63.63% in 2020 from 0.55% in 2019 to 0.20% in 2020.



**Figure 10.** Cebu Pacific Air annual export air freight market share and year-on-year change (%): 2014-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2015-2021).

Figure 11 presents Cebu Pacific Air’s annual Australian import air freight market share from 2014 to 2020. As can be observed in Figure 11, the airline steadily increased its share of Australia’s import air freight market as it expanded its services to Australia. Cebu Pacific Air’s annual export market

share has increased from 0.01% in 2014 to a high of 0.58% in 2019 (Figure 11). Figure 11 shows that the airline’s annual import air freight market share decreased by 79.31% in 2020 from 0.58% in 2019 to 0.12% in 2020.

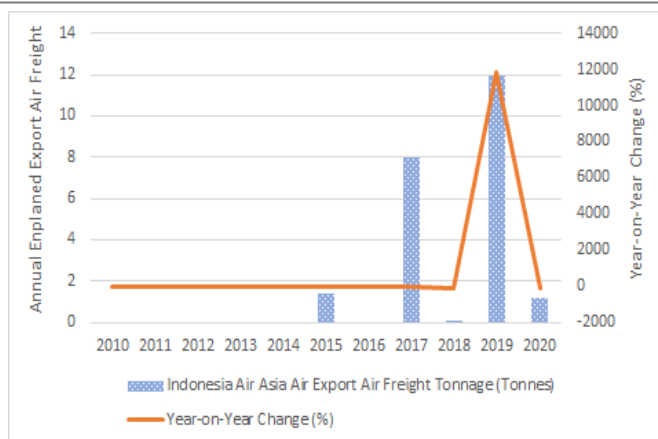


**Figure 11.** Cebu Pacific Air annual import air freight market share and year-on-year change (%): 2014-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2015-2021).

### 4.3.3. Indonesia AirAsia-X

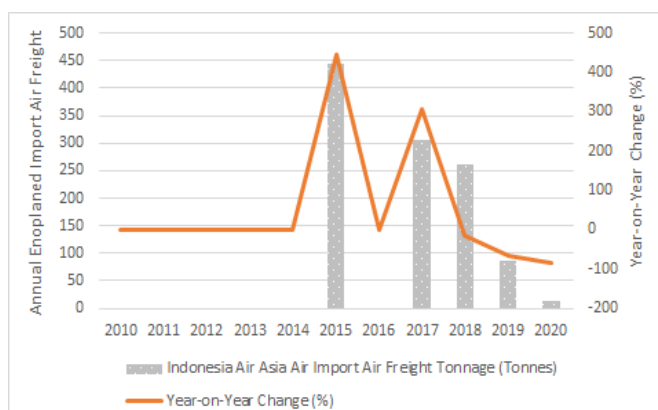
Indonesia AirAsia-X was formed in December 2004, as a 49:51% joint venture with AirAsia, when AirAsia acquired a private airline called AW Air International. The airline was subsequently renamed Indonesia AirAsia-X and began commercial operations in 2005 (Bowen, 2019). Indonesia AirAsia-X entered the Australian market in 2010 (Bureau of Infrastructure, Transport and Regional Economics, 2011). In October 2015, Indonesia AirAsia-X commenced Airbus A330-300 services from Denpasar Airport, Bali to Sydney. The route was operated five times per week (Anna Aero, 2015).

Figure 12 presents Indonesia AirAsia-X annual export air freight tonnage and the year-on-year growth (%) from 2010 to 2020. As can be observed in Figure 12, for the first five years of its operations to Australia the airline did not carry any export air freight traffic on its services from Australia. This situation changed in 2015, when the airline uplifted 1.4 tonnes of air freight from Australia. Once again in 2016, Indonesia AirAsia-X did not uplift any export air freight traffic from Australia. From 2017 to 2020, the airline resumed carrying small volumes of export air freight on its services from Australia (Figure 12). Indonesia AirAsia-X highest annual enplaned export air freight tonnage was recorded in 2019, when the airline uplifted 11.9 tonnes on its services from Australia. Like other airlines, the airline’s annual export air freight tonnage declined significantly in 2020 (-89.81%) from a high of 11.9 tonnes in 2019 to 1.2 tonnes in 2020 (Figure 12).



**Figure 12.** Indonesia AirAsia-X annual enplaned export air freight traffic and year-on-year change (%): 2010-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2011-2021).

Indonesia AirAsia-X annual enplaned import air freight tonnage and the year-on-year change (%) for the period 2010 to 2020 is presented in Figure 13. A similar trend to the airline’s export air freight carriage can be observed, that is, no import air freight was carried between 2010 and 2014 and again in 2016. The most significant annual uplift of import air freight was recorded in 2015, when Indonesia AirAsia transported 444.4 tonnes of import air freight on its services to Australia. Figure 13 shows that the airline’s annual volumes of enplaned import air freight traffic decreased on a year-on-year basis from 2017 to 2020, with the most significant decrease occurring in 2020, when the airline’s annual import air freight tonnage decreased by 84.12% on 2019 volumes. This followed a decrease of 66.97% in the airline’s annual enplaned import air freight traffic in 2019 (Figure 13). The decreased import air freight tonnage could be attributed to the airline’s decision to withdraw from the Denpasar to Melbourne and Sydney markets in September 2016 (Australian Aviation, 2016). Sydney and Melbourne are Australia’s largest import air freight markets. Also, the Corona virus pandemic and the associated border closures impacted the airline’s 2020 import air freight traffic volumes.

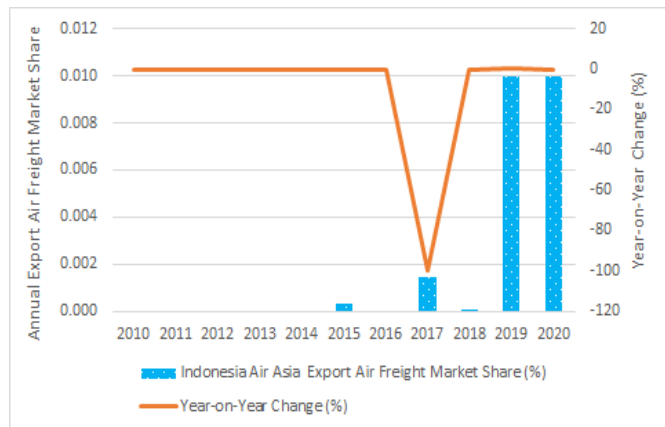


**Figure 13.** Indonesia AirAsia-X annual enplaned import air freight traffic and year-on-year change (%): 2010-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2011-2021).

Indonesia AirAsia-X annual Australian export air freight markets share from 2010 to 2020 is depicted in Figure 14. As previously noted, the airline carried no export air freight from Australia from 2010 to 2014. The airline carried 1.4 tonnes of

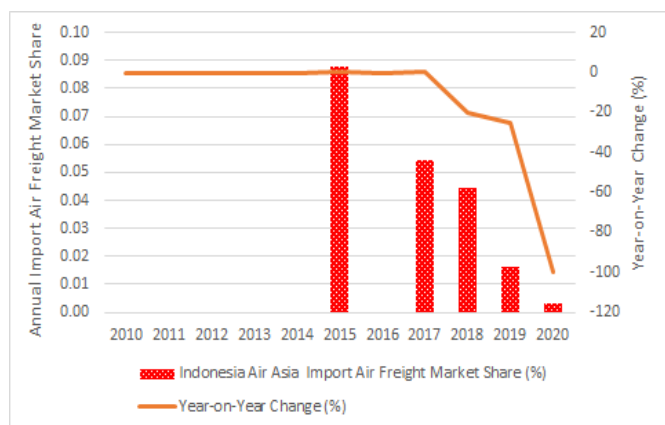


export air freight in 2015, which equated to a market share of 0.0003%. The airline did not carry any export air freight traffic in 2016 and only uplifted very small quantities of air freight from Australia from 2017 to 2020. As can be seen in Figure 14, the airline's export market share was 0.0015% in 2017, 0.00002% in 2018 and 0.0100% in 2019 and 2020, respectively.



**Figure 14.** Indonesia AirAsia-X annual export air freight market share and year-on-year change (%): 2010-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2011-2021).

Indonesia AirAsia-X annual Australian import air freight markets share from 2010 to 2020 is depicted in Figure 15. Indonesia Air Asia-X did not carry any import air freight traffic during the period 2010 to 2014 and again in 2016. Figure 15 shows that Indonesia AirAsia-X highest annual import market share was recorded in 2015 (0.09%). From 2016 to 2020, the airline's annual import air freight market share decreased on a year basis due to the lower volumes of import air freight traffic carried by the airline (Figure 15). Figure 15 shows that in 2020, Indonesia AirAsia-X annual Australian import air freight market share was 0.003%.



**Figure 15.** Indonesia AirAsia-X annual import air freight market share and year-on-year change (%): 2010-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2011-2021).

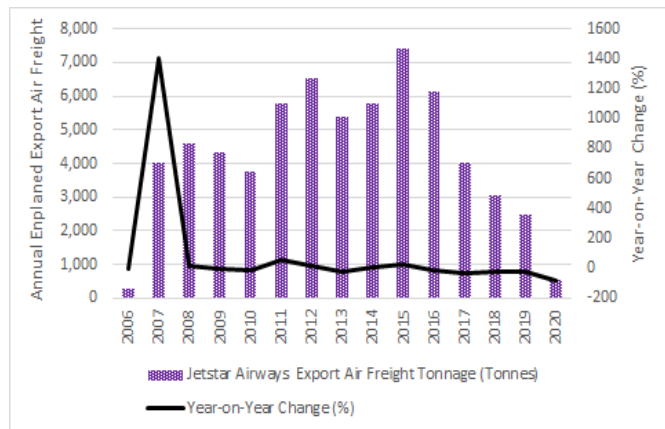
#### 4.3.4. Jetstar Airways

Qantas established Jetstar Airways in 2003 (Bowen, 2010; Homsombat, Lei & Fu, 2014; Peng, 2022). Jetstar is a fully owned subsidiary of the Qantas Group (Schofield, 2013). The airline commenced low fare operations in Australia in May 2004 (Knibb, 2004). In December 2005, Jetstar commenced services from Brisbane, Gold Coast, Melbourne and Sydney to

Christchurch, New Zealand (Thomas, 2007). In 2006, Qantas announced plans to launch a new low-cost international division, Jetstar International. The new airline's focus was targeted at the market between single-class low cost and the traditional two-or-three class international carrier services. Jetstar's international services involved initial stage lengths of between 6 to 10 hours to key Asian and Pacific leisure destinations (Knibb, 2006). Jetstar International commenced long-haul international services in November 2006 with wide-body Airbus A330 services to Bangkok and Phuket in Thailand. These services were followed by services to Ho Chi Minh City in Vietnam and Denpasar, Bali (Ionides, 2007). Services to Honolulu and Osaka in Japan commenced in 2007 (Srisaeng, Baxter & Wild, 2014). In 2010, Jetstar Airways began Airbus A330-200 services from Melbourne to Singapore (Centre for Aviation, 2010; Elliot, 2010). Jetstar extended its market presence into Asia by setting up joint venture franchises in Japan, Singapore, and Vietnam (Flottau, 2008; Schofield, 2014). At the time of the present study, Jetstar Airways had a fleet of 11 Boeing B787-9, 53 Airbus A320 and 8 A321 aircraft (Jetstar Airways, 2021b). Qantas Freight, the air freight division of Qantas Airways, markets the lower-deck belly hold space capacity of all domestic and international Jetstar Airways flights (Air Cargo World, 2013b). Based on a full passenger load and prevailing weather conditions, the Jetstar Airbus A320 has an air freight payload of 1,000kgs. The Jetstar Airbus A321 aircraft have an air freight payload of 3,000kgs, whilst the airline's Boeing B787-9 aircraft can accommodate up to 17,900ks (Qantas Freight, 2022).

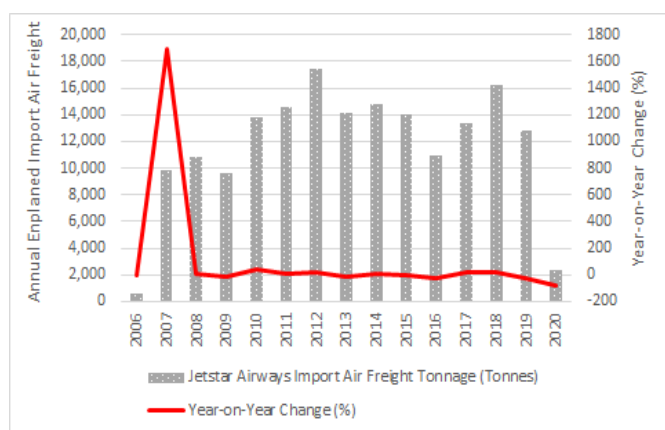
Jetstar Airways annual export air freight tonnage and the year-on-year change (%) from 2006 to 2020 is presented in Figure 16. As can be observed in Figure 16, Jetstar's annual export air freight tonnage oscillated over this period. Figure 16 shows that Jetstar's annual export air freight tonnages have developed in four distinct phases. The first phase covered the period 2006 to 2008. During this phase, Jetstar established its presence in the market and in 2007 and 2008 increased its annual enplaned tonnages by 1,399.2% and 13.86%, respectively (Figure 16). Following this initial growth phase, the airline's annual export air freight tonnage subsequently decreased in the second phase by 6.62% and 14.89% in 2009 and 2010 (Figure 16). During the third phase from 2011 to 2015, Jetstar's annual enplaned air freight tonnage increased each year with the exception being in 2013, when it declined by 23.61% on the 2012 levels. Figure 16 shows that in the fourth phase of Jetstar Airways annual export air freight market development, the airline's annual enplaned export air freight tonnage decreased in 2016 (-23.56%), 2017 (-38.33%), 2018 (-28.37%), 2019 (-16.98%), and 2020 (-72.72%), respectively (Figure 16). In 2016, the airline's export air freight traffic from Australia to Fiji, Indonesia, Japan, New Zealand, Singapore, Thailand and the United States of America were all down on the 2015 volumes (Bureau of Infrastructure, Transport and Regional Economics, 2017). In 2017, Jetstar Airways uplifted smaller volumes of export air freight traffic from Australia to Fiji, Indonesia, Japan, New Zealand, and Thailand (Bureau of Infrastructure, Transport and Regional Economics, 2018). In 2018, Jetstar Airways significantly reduced its services in the Australia to Singapore market (Corporate Travel Community, 2018). Singapore is one of Australia's largest air freight markets. In 2019, the airline's air freight traffic from Australia to New Zealand decreased quite significantly which impacted its overall air freight traffic volumes in 2019. Similar to the other airlines operating in Australia's aviation market, Jetstar Airways was

adversely impacted by the Corona virus pandemic and border closures and travel restrictions in 2020.



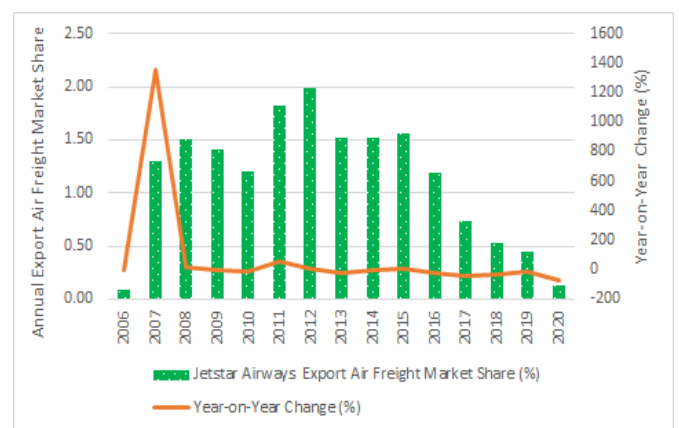
**Figure 16.** Jetstar Airways annual enplaned export air freight traffic and year-on-year change (%): 2006-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2007-2021).

Jetstar Airways annual import air freight tonnage and the year-on-year change over the period 2006 to 2020 is presented in Figure 17. Figure 17 shows that Jetstar’s annual import air freight tonnages fluctuated quite markedly throughout study period. There was a pronounced spike of 1708.33% recorded in 2007 as the airlines import air freight traffic increased from 547.2 tonnes in 2006 to 9,804.5 tonnes in 2007, this was because 2007 was the first full year of operations by Jetstar Airways. The airline’s import air freight traffic increased steadily from 2009 to 2012, when it reached a high of 17,418.2 tonnes in 2012. From 2013 to 2020, the airline’s annual import air freight tonnages decreased on a year-on-year basis in 2013 (-16.14%), 2015 (-3.47%), 2016 (-21.58%), 2019 (-20.72%), and 2020 (-79.07) (Figure 17), respectively. Figure 17 shows that Jetstar Airways increased its import air freight traffic in 2017 and 2018 by 8.25% and 16.52%, respectively (Figure 17). These two annual increases reflect stronger levels of import air freight traffic being recorded in 2017 and 2018 by the airline. During the latter years of the study, that is, 2019 and 2020, Jetstar Airways enplaned import air freight traffic decreased by 13.09% in 2019 and by 79.07% in 2020 (Figure 17). The pronounced decrease in 2020 may be attributed to Australia’s border closures and the impact that this had on airlines services.



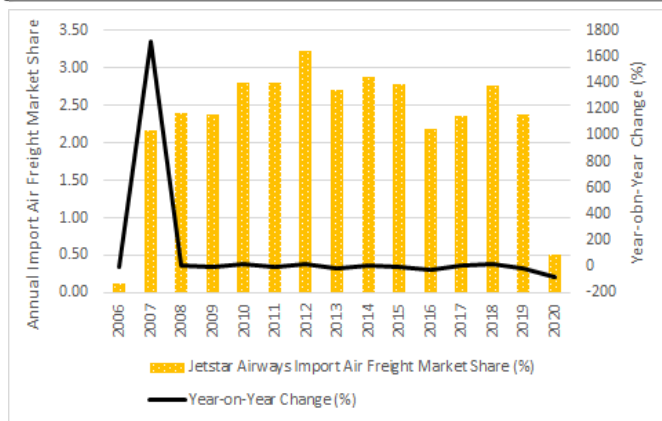
**Figure 17.** Jetstar Airways annual enplaned import air freight traffic and year-on-year change (%): 2006-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2007-2021).

Jetstar Airways annual Australian export air freight market share from 2006 to 2020 is depicted in Figure 18. As can be observed in Figure 18, Jetstar Airways annual export air freight market share has oscillated throughout the study period rising from a low of 0.09% in 2006 to a high of 1.99% in 2012. Figure 18 shows that from 2015 to 2020, the airline’s annual export air freight market share declined on a year-on-year basis reflecting the lower volumes of export air freight traffic carried by the airline. In 2020, Jetstar Airways annual export air freight market share was 0.12% (Figure 18). As can be observed in Figure 18, there were two quite pronounced spikes in Jetstar Airways export air freight market share. These increases occurred in 2007, when the airline’s market share increased by 1355.55% on the 2006 levels (Figure 18). In 2006, Jetstar Airways launched services from Australia to Indonesia, Singapore, Thailand, Vietnam, and the United States. The second significant spike in the airline’s market share was recorded in 2011, when this metric increased by 52.5% on the 2010 level (Figure 18). In 2011, Jetstar Airways commenced services from Australia to Malaysia and Japan, both of which are important air freight markets.



**Figure 18.** Jetstar Airways annual export air freight market share and year-on-year change (%): 2006-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2007-2021).

Jetstar Airways annual Australian import air freight market share for the period 2006 to 2020 are depicted in Figure 19. Jetstar Airways annual import air freight market share has also oscillated throughout the study period rising from a low of 0.12% in 2006 to a high of 3.22% in 2012. In 2020, Jetstar Airways annual import air freight market share was 0.50% (Figure 19). Figure 19 shows that there was a very pronounced spike in the airline’s annual import air freight market share, when it increased by 1708.33% on the 2006 levels. As noted earlier, Jetstar Airways began services to two important markets (Japan and Malaysia) in 2011. The largest year-on-year decrease in the airline’s market share was recorded in 2020, when it declined by 79.07% on the 2019 level (Figure 19). The downturn in flight activity associated with the Covid 19 pandemic and Australia’s border closures could have attributed to this decrease. Furthermore, there was a very pronounced decrease in Australia’s annual import air freight traffic in 2020.



**Figure 19.** Jetstar Airways annual import air freight market share and year-on-year change (%): 2006-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2007-2021).

#### 4.3.5. Jetstar Asia

In December 2004, Qantas established Jetstar Asia, a low-cost carrier (LCC), based in Singapore. At its inception of commercial operations, Qantas held 49% of the new airline’s shares, Temaseck held 19%, and two local investors held the remaining shares (Mathews, 2004; Mills, 2016). Jetstar Asia commenced services from Singapore to a range of destinations including Hong Kong, Manila, and Taipei (Mills, 2016). At the time of the present study, Jetstar Asia served 22 destinations in North and Southeast Asia with a fleet of 18 Airbus A320 aircraft (Jetstar Airways, 2021a).

On 12 September 2019, Jetstar Asia announced a new partnership agreement with Sydney-based Qantas Freight, the air freight division of Qantas Airways. Under the terms of the partnership agreement, Qantas Freight will manage Jetstar Asia’s freight capacity across 23 destinations in 13 markets. The new agreement was effective November 20, 2019. The new partnership agreement is intended to provide increased connectivity and access for Jetstar Asia’s customers to Qantas Group’s wider network as well as to Qantas Freight’s 130 partners (Gill, 2019; Ngai, 2019; Toczaer, 2019). Jetstar Asia entered the Australian market in 2010.

Figure 20 presents Jetstar Asia’s annual export air freight tonnage and the year-on-year change (%) from 2010 to 2020. As can be observed in Figure 20, the airline did not transport any export air freight from Australia during its first four years of operations. Figure 20 shows that the largest volumes of export air freight carried by the airline occurred in 2015 (19.2 tonnes). The lowest annual export air freight tonnage was recorded in 2020, when Jetstar Asia uplifted 1.8 tonnes, a decrease of 81.25 % on the 2019 levels (Figure 20). As can be observed in Figure 20, there were several quite pronounced annual decreases in the volumes of export air freight uplifted from Australia. These pronounced decreases were recorded in 2016 (-11.97%), 2017 (-21.89%), and 2019 (-46.06%) and reflected lower levels of demand for the airline’s air freight services (Figure 20). Jetstar Asia discontinued its daily Airbus A320 Singapore-Perth service on the 25th of March 2018 (Chaser, 2017). The largest single annual decrease in the airline’s export air freight traffic was recorded in 2020, when it decreased by 80% on the 2019 levels (Figure 20).



**Figure 20.** Jetstar Asia annual enplaned export air freight traffic and year-on-year change (%): 2010-2020.

Data derived from Bureau of Infrastructure, Transport and Regional Economics (2011-2021).

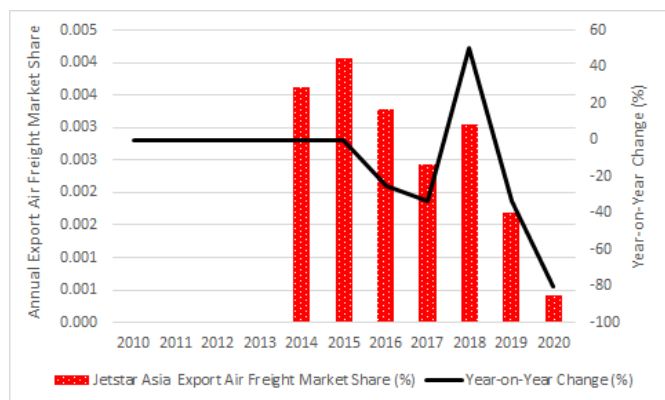
Jetstar Asia’s annual import air freight tonnage and the year-on-year change (%) for the period 2010 to 2020 is presented in Figure 21. Figure 21 shows that the airline did not transport any import air freight traffic during its first four years of operations from Singapore to Australia. Figure 21 shows that there are two discernible trends in Jetstar Asia’s annual import air freight tonnages. In the first phase, from 2013 to 2016, Jetstar Asia recorded year-on-year increases in its import air freight traffic, reaching a high of 136.3 tonnes in 2016. Figure 21 shows that in the second phase during the latter years of the study (2017-2020), Jetstar Asia’s annual import air freight tonnage declined on a year basis, with the lowest annual uplift of import air freight traffic occurring in 2020 (4.5 tonnes) (Figure 21). There was a pronounced spike in the airline’s import air freight tonnage in 2014, when it increased by 100.3% on the 2013 level. This was due to 2014 being the first year when Jetstar Air Asia carried import traffic on its services from Singapore to Australia. The airline’s annual import traffic grew by 28.41% in 2015 reflecting a higher demand for its services. The largest single annual decrease in the airline’s annual import air freight traffic was recorded in 2020, when it decreased by 87.67% on the 2019 levels (Figure 21). As previously noted, Australia’s border closures and the decrease in the volumes of airborne import trade impacted the airlines serving Australia’s international air freight market in 2020.



**Figure 21.** Jetstar Asia annual enplaned import air freight traffic and year-on-year change (%): 2010-2020.

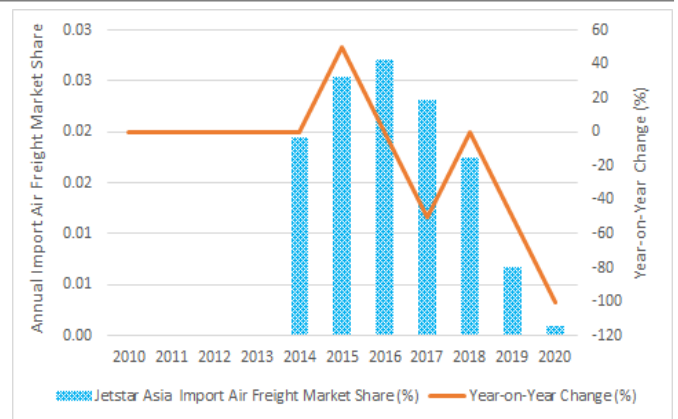
Data derived from Bureau of Infrastructure, Transport and Regional Economics (2011-2021).

Jetstar Asia annual Australian export air freight market share from 2010 to 2020 is presented in Figure 22. As noted earlier, during the first four years of Jetstar Asia operations to Australia, the airline did not carry any export or import air freight traffic. Figure 24 shows that Jetstar Asia annual export air freight market share has largely exhibited a downward trend, decreasing from a high of 0.004% in 2015 and 2016 to a low of 0.0004% in 2020. This decrease in export air freight market share is demonstrated by the year-on-year percentage change line graph, which is more negative than positive, that is, more values are below the line than above. Figure 24 shows that there was only one increase in the airline’s annual export market share which occurred in 2018, when the airline’s total the export market share increased by 50% on the previous year levels. The single largest annual decrease in Jetstar Asia’s annual import air freight market share was recorded in 2020, when it declined by 80% to 0.0004%. Figure 22 also shows that there were two further significant annual decreases in the airline’s export air freight market share in 2017 (-33.33%) and in 2019 (-33.33%). The decline in market share can be attributed to the lower volumes of export air freight traffic carried in 2015, 2019 and 2020 by the airline.



**Figure 22.** Jetstar Asia annual export air freight market share and year-on-year change (%): 2010-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2011-2021).

Jetstar Asia annual Australian import air freight market share from 2010 to 2020 is presented in Figure 23. As can be observed in Figure 23, the airline’s annual import air freight market share fluctuated over the study period. Figure 23 shows that Jetstar Asia import air freight market share increased from 0.02% in 2014 to 0.03% in 2015 and 2016, respectively. From 2016 to 2020, Jetstar Asia annual import air freight market share declined on a year-on-year basis, with three significant annual decreases being recorded in 2017 (-50%), 2019 (-50%), and 2020 (-100%), reflecting lower levels of demand for the airline’s air freight services in these latter years of the study period. In 2020, the airline held a 0.001% share of Australia’s import air freight market.



**Figure 23.** Jetstar Asia annual import air freight market share and year-on-year change (%): 2010-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2011-2021).

#### 4.3.6. Jin Air Co. Ltd

Jin Air entered South Korea’s domestic air travel market in 2006 (Zhang et al., 2008). Jin Air is associated with Korean Air (Kim, 2011; Kim, Kim & Lee, 2011). South Korea based low-cost carrier Jin Air operated 16 return seasonal services on the Seoul-Cairns route with a Boeing 777-200ER aircraft between December 2016 and February 2017. The carrier operated 12 seasonal services on the Seoul-Cairns route during December 2017 and January 2018, using a Boeing B777-200ER aircraft (Australian Aviation, 2017). In the year ended December 2017, Jin Air carried 5.2 tonnes of import air freight and 67.5 tonnes of export air freight. Jin Air carried 5.5 tonnes of export air freight but no import air freight in the year ended December 2018. In 2017, Jin Air export air freight market share was 0.012%. Jin Air’s import air freight market share was 0.0009% in 2017. In 2018, Jin Air’s export air freight market share was 0.001%.

#### 4.3.7. Pacific Blue Airlines

Virgin Blue Airlines commenced operations in Australia in August 2000 with two Boeing B737 aircraft (Thomas, 2006). Virgin Blue Airlines was granted authority by the Australian Government to commence New Zealand flights in 2003. In accordance with the “Open Skies” air services agreement ratified between Australia and New Zealand; Virgin Blue acquired unlimited capacity to New Zealand (Knibb, 2003).

Virgin Blue Airlines launched its Christchurch, New Zealand leisure-based airline, Pacific Blue Airlines in January 2004 (Knibb, 2005a, 2005b). Pacific Blue commenced daily services from Christchurch to Brisbane on the 29th of January 2004 (Virgin Australia, 2004a). Christchurch to Melbourne services were introduced on March 4th, 2004 (Virgin Australia, 2004b). Pacific Blue continued its expansion of Trans-Tasman services in 2004 commencing daily services from Sydney to Christchurch and Wellington on the 10th of May 2004 (Virgin Australia, 2004c). Pacific Blue Airlines commenced direct services from Brisbane to Nadi, Fiji, and from Melbourne to Nadi on September 9 and September 10, 2004, respectively (Virgin Australia, 2004d). Pacific Blue Airlines introduced new services from Melbourne to Port Vila, Vanuatu on 20 September 2004 (Virgin Australia, 2004e). On the 2nd of November 2004, Pacific Blue commenced services between Christchurch and Coolangatta (Gold Coast) and Wellington and Brisbane (Virgin Australia, 2004f).

On the anniversary of their first year of operations in 2005, Pacific Blue Airlines announced that the airline would offer an

international air freight service between New Zealand, Australia, Fiji and Vanuatu using the lower lobe belly hold capacity in their fleet of Boeing B737-800 aircraft (Virgin Australia, 2005a). These aircraft offer an air freight payload of 2,000kgs (Virgin Australia, 2022).

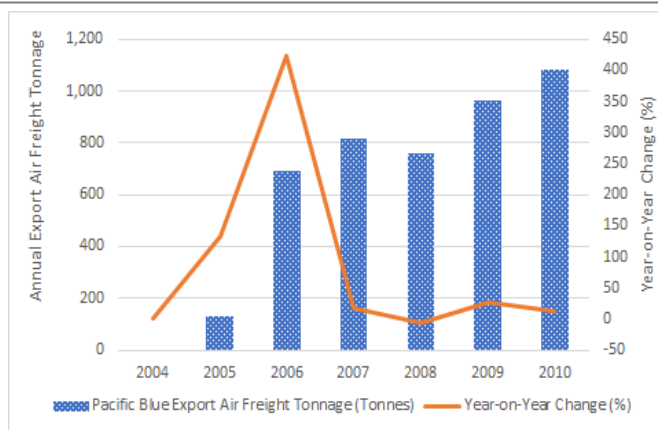
Pacific Blue Airlines continued to expand its Trans-Tasman services in 2005. The airline introduced Brisbane to Auckland and Coolangatta (Gold Coast) to Auckland on the 12th and 14th May, respectively (Virgin Australia, 2005b). Pacific Blue gained entry to Auckland Airport, New Zealand’s principal gateway airport, in 2005 (Airline Business, 2005). Pacific Blue expansion continued in 2005 with the launch of direct flights to Tonga from both Australia and New Zealand (Virgin Australia, 2005c).

On the 22nd of September 2008, Pacific Blue launched flights from Melbourne to Auckland and, in so doing, became the first low-cost carrier (LCC) to provide services on this important air route (Virgin Australia, 2008a). Pacific Blue Airlines added Port Moresby on 3 November 2008, when the airline launched direct services from Brisbane to Port Moresby (Virgin Australia, 2008b).

Air New Zealand and Virgin Australia announced a new joint network strategy on the 16th of May 2011, whereby Air New Zealand would operate services equal to 70 per cent of the total capacity and Pacific Blue Airlines would provide the remaining 30 per cent. These were like the market shares held by the two airlines prior to the agreement. Also, both airline’s flights were aligned under the agreement to ensure more convenient schedules for passengers (Centre for Aviation, 2011; Elliot, 2011).

On the 7th of December 2011, the Virgin Australia group of airlines officially launched its international airlines V-Australia and Pacific Blue under the new brand, “Virgin Australia” (Creedy, 2011; Curran, 2021). At this time, Virgin Blue changed its business model from a low-cost carrier (LCC) model to the full-service network (FSNC) airline business model (Hubbard, Riced & Galvin, 2015; Whyte, Prideaux & Sakata, 2012). As previously noted, during the company’s history, Pacific Blue’s services were operated by the airline’s Next Generation Boeing B737-800 aircraft.

Pacific Blue Airlines annual export air freight tonnage and the year-on-year change (%) for the period 2004 to 2010 is presented in Figure 24. The airline transported no export air freight in its first year of operations in 2004. However, over the study period, Pacific Blue Airlines annual export air freight tonnages principally displayed an upward trend. This is demonstrated by the year-on-year percentage change line graph, which is more positive than negative, that is, more values are above the line than below. Figure 24 shows that there was a very pronounced annual growth rate recorded in 2006 (423.45%) following strong growth in the airline’s Fiji and New Zealand air freight markets in 2006. During the company’s operations, the largest annual enplaned export air freight tonnage was in 2010, when the airline uplifted 1,082.8 tonnes of export air freight traffic. Figure 24 also shows that there was only one annual decrease in the airline’s annual export air freight tonnage and this decrease occurred in 2008, when the annual tonnage decreased by 7.14% on the 2007 levels.



**Figure 24.** Pacific Blue Airlines annual enplaned export air freight traffic and year-on-year change (%): 2004-2010. Data derived from Bureau of Transport and Regional Economics (2005-2007), Bureau of Infrastructure, Transport and Regional Economics (2008-2011).

Figure 25 presents Pacific Blue Airlines annual import air freight tonnages and the year-on-year change (%) from 2004 to 2010. As can be observed in Figure 25, Pacific Blue Airlines annual import air freight tonnage fluctuated over the study period. The airline transported no import air freight in its first year of operations in 2004. Like the airline’s annual export air freight traffic, there was a very significant increase in the volumes of import air freight carried in 2006 (+432.79%), which was attributed to strong growth in the airline’s Fiji and New Zealand markets. The largest volume of import air freight traffic carried by the airline was in 2010, when Pacific Blue Airlines transported a total of 1,117.3 tonnes on its services. Figure 25 also shows that in 2008, the airline’s annual import air freight tonnage declined by 23.38% on the 2007 volumes. This was the only year in which there was a decrease in the transportation of inbound air freight to Australia.



**Figure 25.** Pacific Blue Airlines annual enplaned import air freight traffic and year-on-year change (%): 2004-2010. Data derived from Bureau of Transport and Regional Economics (2005-2007), Bureau of Infrastructure, Transport and Regional Economics (2008-2011).

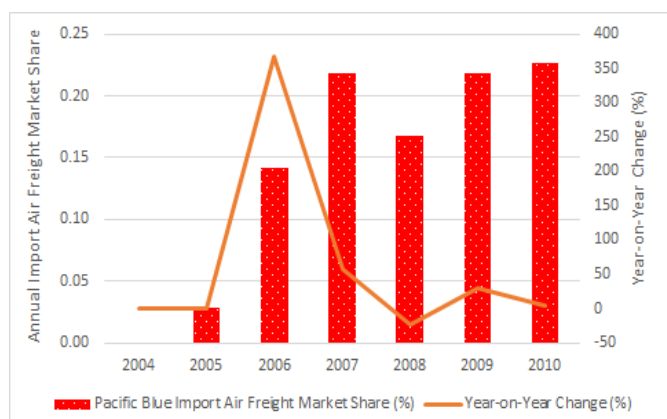
Pacific Blue Airlines annual Australian export air freight market share from 2004 to 2010 is presented in Figure 26. Figure 26 shows that the airline was able to steadily increase its share of Australia’s export air freight market throughout its history of operations as a low-cost carrier (LCC). The airline’s annual export air freight market share rose from 0.05% in 2005 to a high of 0.34% in 2010. Throughout its history of

operations, the airline only recorded one annual decrease in its export air freight market share. This occurred in 2008, when the airlines annual market share decreased slightly from 0.26% in 2007 to 0.25% in 2008 (Figure 26). Figure 26 shows that there was a pronounced spike in the airline’s export air freight market share in 2006, when it increased by 360% on the 2005 level. As noted earlier, the airline’s export air freight traffic from Australia to Fiji and New Zealand grew very strongly in 2006.



**Figure 26.** Pacific Blue Airlines annual export air freight market share and year-on-year change (%): 2004-2010. Data derived from Bureau of Transport and Regional Economics (2005-2007), Bureau of Infrastructure, Transport and Regional Economics (2008-2011).

Pacific Blue Airlines annual Australian import air freight market share from 2004 to 2010 is presented in Figure 27. A similar trend can be observed in the airline’s annual import air freight market share, which increased from 0.03% in 2005 to a high of 0.23% in 2010. Pacific Blue Airlines annual import air freight market share decreased only once throughout its history of operations. This decrease occurred in 2008, when the airline’s annual import air freight market share decreased from 0.22% in 2007 to 0.17% in 2008 (Figure 27). Figure 27 shows that there was a pronounced spike in the airline’s import air freight market share in 2006, when it increased by 366.6% on the 2005 level. As noted earlier, the airline’s import air freight traffic from Fiji and New Zealand displayed high growth rates in 2006.



**Figure 27.** Pacific Blue Airlines annual import air freight market share and year-on-year change (%): 2004-2010. Data derived from Bureau of Transport and Regional Economics (2005-2007), Bureau of Infrastructure, Transport and Regional Economics (2008-2011).

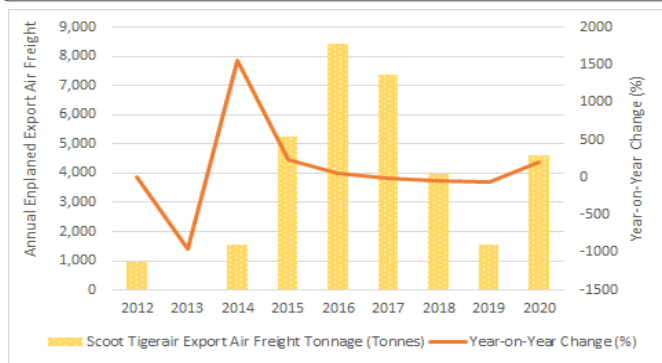
#### 4.3.8. Scoot Tigerair

In recent times, Singapore Airlines has launched new airlines, such as, Scoot and Silk Air, that are targeted at various niche markets (Dempsey, 2019). Scoot Tigerair is the low-cost airline subsidiary of the Singapore Airlines Group (Lohmann & Spasojevic, 2018; Schofield, 2016; Taneja, 2018). Singapore Airlines launched its low-cost carrier subsidiary Scoot Pte Ltd in June 2012. Scoot initially started operations with a fleet of Boeing B777-200 aircraft that were outfitted in a two-class configuration. These aircraft were deployed to enable Scoot to compete in the long-haul low-cost carrier market segment against Air Asia-X and Jetstar Airways (Taneja, 2016). Scoot has subsequently expanded its route network and serves key markets in the Asia-Pacific region plus India (Chia & Singh, 2016). Scoot took delivery of its first Boeing 787 aircraft on the 1st of February 2015 (Chow, 2015). Scoot planned to retire all six of its Boeing 777-200s aircraft, which were formerly from Singapore Airlines, around the middle of 2015 and shift to an all-Boeing 787 fleet (Centre for Aviation, 2015).

Singapore Airlines announced on 5th of February 2016 that it had acquired more than 90% stake in Tigerair and that the airline would delist its short haul Tigerair subsidiary. Tigerair had been listed on the Singapore Exchange since early 2010, at which point Singapore Airlines held a minority share (Centre for Aviation, 2016). On May 14, 2016, Singapore Airlines (SIA) established a holding company to own and manage its budget airlines Scoot and Tiger Airways, following the delisting of Tiger Airways (which operates as Tigerair) from Singapore Exchange (SGX-ST) (Singapore Airlines, 2016). On July 25, 2017, Singapore Airlines merged both its low-cost airlines, Scoot and Tigerair (Centre for Aviation, 2017; Chuanren, 2017; Kapoor, 2017), and renamed the airline Scoot Tigerair.

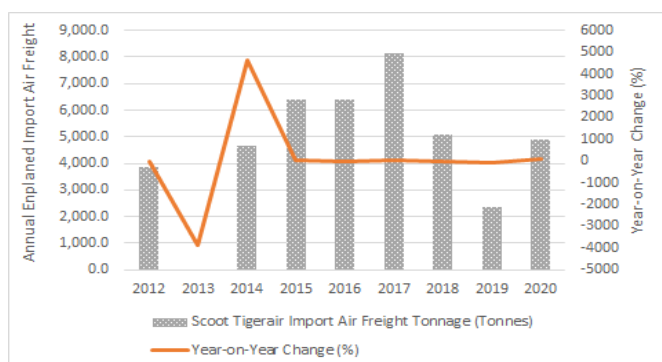
On 4 June 2012, Scoot commenced services from Singapore to Sydney, which were operated with a Boeing B777-200ER aircraft. Shortly thereafter on 12 June 2012, Scoot began operations from Singapore to Coolangatta (Gold Coast). These services were also operated by Boeing B777-200ER aircraft (Anna Aero, 2012). The Boeing B777-200 aircraft offers an air freight payload of 20 tonnes (Morrell, 2011). In November 2015, Scoot commenced direct services from Singapore to Melbourne with a Boeing 787 Dreamliner aircraft (Platt, 2015). Scoot launched services from Singapore to Perth using Boeing B787 aircraft in February 2015 (Centre for Aviation, 2015).

Figure 28 depicts Scoot Tigerair annual enplaned export air freight tonnage and the year-on-year change (%) from 2012 to 2020. As can be noted in Figure 28, Scoot Tigerair annual enplaned export air freight tonnage has oscillated over this period, rising from a low of 955.2 tonnes in 2012 to a high of 8,426.1 tonnes in 2016. Figure 28 also shows that the airline carried no export air freight traffic from Australia in 2013. There was a pronounced spike recorded in 2014 when the airline once again began uplifting export air freight traffic from Australia. In the latter years of the study, that is, 2017 to 2020, the airline recorded an annual decrease in the volumes of export air freight carried, with the most significant decrease occurring in 2019, when the annual export air freight tonnage decreased by 61.01% on the 2018 levels (Figure 28). Australia’s annual export air freight tonnage grew in 2017 and 2018 but declined in 2019. Figure 28 shows that Scoot Tigerair’s annual export air freight tonnage increased by 196.37% in 2020 from 1,552 tonnes in 2019 to 4,599 tonnes in 2020.



**Figure 28.** Scoot Tigerair annual enplaned export air freight traffic and year-on-year change (%): 2012-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2013-2021).

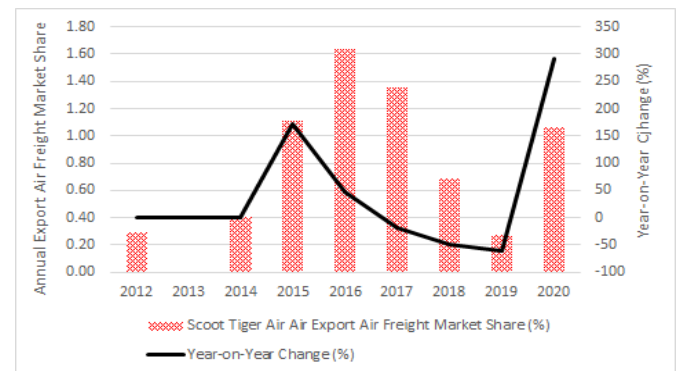
Scoot Tigerair annual enplaned import air freight traffic and the year-on-year change (%) from 2012 to 2020 is presented in Figure 29. Like the airline’s annual export air cargo traffic, the annual uplift of import air cargo has oscillated throughout the time that the airline has served the Australian import air freight market. As can be observed in Figure 29, Scoot Tigerair enplaned import air freight traffic increased on a year-on-year basis from 2012 to the 2017, with the only exception being in 2013, when the airline did not transport any import air freight traffic. The pronounced spike in 2014 was due to the uplift of import air freight traffic re-commencing in 2014. Scoot did not transport any import air freight from Singapore to Australia in 2013. In 2018 and 2019, the airline’s annual import tonnage declined by 37.68% and 53.76%, respectively (Figure 29). Australia’s annual import air freight market increased in 2018 but decreased in 2019 due to lower levels of demand for imported air freight products by Australian importers and consumers. Figure 29 shows that Scoot Tigerair’s import air freight traffic increased by 110.05% in 2020, from 2,339.1 tonnes in 2019 to 4,913.5 tonnes in 2020.



**Figure 29.** Scoot Tigerair annual enplaned import air freight traffic and year-on-year change (%): 2012-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2013-2021).

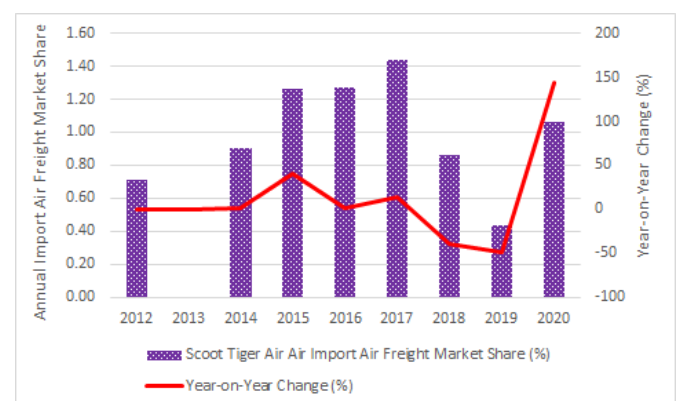
Figure 30 presents Scoot Tigerair annual Australian export air freight market share for the period 2012 to 2020. As previously noted, the airline did not transport any export or export air freight traffic on its Australian services in 2013. Figure 30 shows that the airline’s annual export air freight market share increased from 0.41% in 2014 to a high of 1.64% in 2016. From 2017 to 2019, the airline’s annual export market share decreased on a year-on-year basis, declining from 1.35% in 2017 to 0.27% in 2019 (Figure 30). In 2020, the airline’s annual export air freight market share increased by 292.59%

from 0.27% in 2019 to 1.06% in 2020. Figure 30 shows that there were two quite significant annual decreases in the airline’s market share during the study period. These decreases occurred in 2018 (-49.62%) and 2019 (-60.29%) and reflected the lower levels of export air freight traffic carried on its services from Australia to Singapore. The largest single annual increase in the airline’s export air freight market share was recorded in 2020, when it increased by 292.59% on the 2019 level.



**Figure 30.** Scoot Tigerair annual export air freight market share and year-on-year change (%): 2012-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2013-2021).

Figure 31 presents Scoot Tigerair annual Australian import air freight market share for the period 2012 to 2020. Scoot Tigerair import air freight traffic increased from 0.90% in 2014 to a high of 1.44% in 2017(Figure 24). As can be observed in Figure 31, Scoot did not transport and inbound cargo to Australia in 2013. In 2018 and 2019, the airline’s import air freight market share declined from 1.44% in 2017 to 0.86% in 2018, and to 0.44% in 2019 (Figure 24), and these decreases reflected a lower level of demand for the airline’s services. In 2020, Scoot Tigerair’s annual import air freight market share increased by 143.18% from 0.44% in 2019 to 1.07% in 2020 (Figure 31)). This increase was attributed to the greater volumes of import air freight traffic transported between Singapore and Australia in 2020 by the airline. During the study period, there were two quite pronounced decreases in Scoot Tigerair’s annual import air freight market share, with these decreases being recorded in 2018 (-40.27%) and 2019 (-48.83%), respectively (Figure 31). These decreases could be attributed to the airline’s lower import air freight traffic levels in 2018 and 2019.



**Figure 31.** Scoot Tigerair annual import air freight market share and year-on-year change (%): 2012-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2013-2021).

#### 4.3.9. Thai AirAsia X

In November 2003, AirAsia announced its plans to form Thailand-based Thai AirAsia as a joint venture with the Shin Corporation. Shin corporation had a 51% shareholding whilst Air Asia held the remaining 49% of the company's shares (Bowen, 2019; Mutum & Ghazali, 2014; Singh, Pangarkar & Heracleous, 2014). Thai AirAsia commenced commercial services in February 2004, linking Bangkok with other major cities in Thailand (Air Asia, 2019). Thai AirAsia X commenced services from Bangkok's Don Mueang Airport to Brisbane on 25 June 2019. The services are operated with an Airbus A330-300 aircraft (Australian Aviation, 2019). Thai AirAsia X planned to serve Brisbane four times per week from its Bangkok Don Muang hub airport (Curran, 2019). At the time of the present study, Thai AirAsia-X had a fleet of nine Airbus A330-300 aircraft of which five were in active service (Curran, 2022).

In 2019, Thai AirAsia-X uplifted 48.7 tonnes of export air freight on its services from Brisbane to Bangkok's Don Mueang Airport. This represented an annual Australian export air freight market share of 0.008%. Thai AirAsia-X transported 159.4 tonnes of air freight on its services to Brisbane in 2019. This enabled the airline to capture 0.029% of Australia's annual import air freight traffic in 2019. In 2020, Thai AirAsia-X export traffic declined by 74.94% from a high of 48.7 tonnes in 2019 to a low of 12.2 tonnes in 2020. In 2020, the airline's annual Australian export market share decreased by 75% to 0.002%. Similarly, the airline's annual import air freight traffic volumes declined in 2020 by 71.32% from 159.4 tonnes in 2019 to 45.7 tonnes in 2020. As a result, Thai Air Asia-X annual import air freight market share declined by 68.96% in 2020 at which time the airline had captured 0.009% of Australia's annual import air freight traffic.

#### 4.4 Comparison of the low-cost carriers, full-service network airlines and dedicated all-cargo carriers annual traffic growth rates and market shares

Like many other air freight markets around the world, Australia's international air freight market is served by both full service and low-cost carriers (LCCs) as well as several dedicated all-cargo carriers. The major full-service network carriers are Air New Zealand, Qantas Airways, Emirates Airline, and Virgin Australia. It is important to note that a number of full-service network airlines (FSNCs) also operate freighter services to and from Australia in addition to their scheduled passenger flights. For example, Qantas operates an extensive freighter network linking Australia with key markets in Asia, China, New Zealand, and the United States (Baxter, Srisaeng & Wild, 2019). Cathay Pacific Airways and Singapore Airlines are also full-service network airlines that operate scheduled freighter services to Australia. These freighter services are in addition to their passenger flights. In 2020, all-cargo services were provided by FedEx, Kalitta Air, Pacific Air Express, Polar Air Cargo, Tasman Cargo Airlines, and United Parcel Service (UPS) (Bureau of Infrastructure, Transport and Regional Economics, 2021).

Figure 32 presents the low-cost carriers (LCCs), full-service network airlines (FSNCs), and dedicated all-cargo carriers annual export air freight market growth rates from 2004 to 2019. Figure 32 shows that there was a very pronounced increase in the low-cost carriers' (LCCs) export air freight growth in 2005 (+132.6%), 2006 (+626.24%) and 2007 (+404.17%). These increases were a result of the decision of Pacific Blue Airlines to carry air freight effective in 2005, the launch of services by Jetstar Airways in 2006, and the

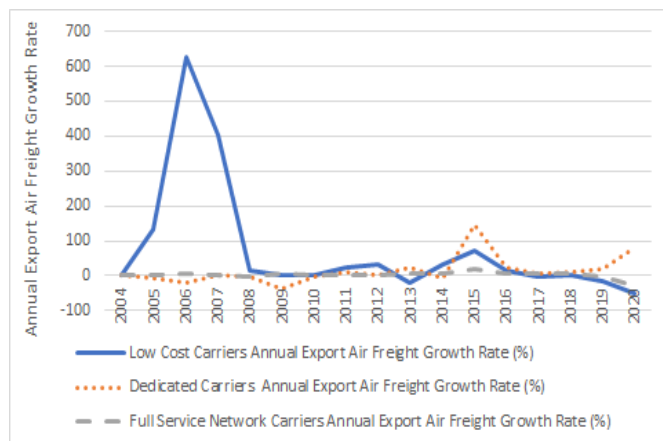
introduction of services to Australia by AirAsia-X in 2007. From 2008 to 2020, the low-cost carriers (LCCs) annual export air freight growth rate fluctuated quite markedly. Throughout this period, the highest annual growth rate was recorded in 2015 (+70.01%), whilst there were just three decreases in the low-cost carriers (LCCs) annual export traffic. These decreases were recorded in 2013 (-18.15%), 2019 (-16.74%), and 2020 (-52.28), respectively (Figure 32). Despite the growth in Australia's export air freight traffic in 2013, the low-cost carriers annual enplaned export air freight traffic declined in 2013, whilst the full-service network carriers (FSNCs) and dedicated all-cargo airlines were able to take advantage of the traffic growth. In 2019, Australia's annual export traffic declined on a year-on-year basis and this downturn in traffic impacted the low-cost carriers as well as the full-service network carriers (FSNCs) and dedicated all-cargo airlines. As previously noted, in response to the COVID-19 pandemic in 2020 the Australian Government closed the country's borders (D'Souza & Dunshea, 2021). In Australia, travel bans, border closures, and the stay-at-home orders severely disrupted various industries including the country's aviation industry (Gao & Ren, 2020).

Figure 32 shows that the full-service network airlines (FSNCs) annual export air freight market growth rates were predominantly positive. The highest annual growth rate was recorded in 2015, when the full service-network airlines annual (FSNCs) export air freight growth rate increased by 19.56% on the 2014 levels. Figure 32 also shows that over the study period, the full-service network carriers (FSNCs) annual export air freight growth rate decreased in 2007 (-0.39%), 2008 (-1.75%), 2019 (-3.92%), and in 2020 (-30.34 %), respectively (Figure 32). In 2007, the low-cost carriers (LCCs) were able to grow their export air freight market share, which resulted in a higher market share for the low-cost carriers in 2007. In 2008, the full-service network carriers (FSNCs) annual enplaned export air freight traffic decreased on a year-on-year basis whilst the low-cost carriers (LCCs) annual export air freight traffic increased, thus enabling the low-cost carriers (LCCs) to secure a higher market share.

Figure 32 shows that the annual export air freight market growth rate of the dedicated all-cargo carriers fluctuated throughout the period 2004 to 2020. Figure 32 shows that from 2004 to 2010, the dedicated air cargo carriers annual export air freight growth rate decreased on a year-on-year basis with the only exception being in 2007, when it increased by 0.7% on the previous year level. During these early years of the study, the integrated carriers (FedEx and UPS) had quite low levels of export air freight traffic. As can be observed in Figure 32, the dedicated air cargo carriers recorded positive annual increases in their export freight growth from 2011 to 2019, with the only exception being in 2014, when the annual export market growth decreased by 7.44% on the 2018 level. The low-cost carriers (LCCs) and the full-service network carriers (FSNCs) were able to increase their export air freight market share in 2014. The highest single annual increase in the export air freight traffic carried by the dedicated all-cargo carriers occurred in 2015, when the annual air freight traffic volumes increased by 148.04 % on the 2014 levels. Australia's annual export air freight traffic grew strongly in 2015, and the dedicated all-cargo airlines were able to capture higher levels of air cargo traffic which enabled them to increase their annual market share. Figure 32 also shows that there was a pronounced spike in the export air freight traffic carried by the dedicated all-cargo carriers in 2020. In 2020, the export air freight traffic levels uplifted by the dedicated all-cargo airlines



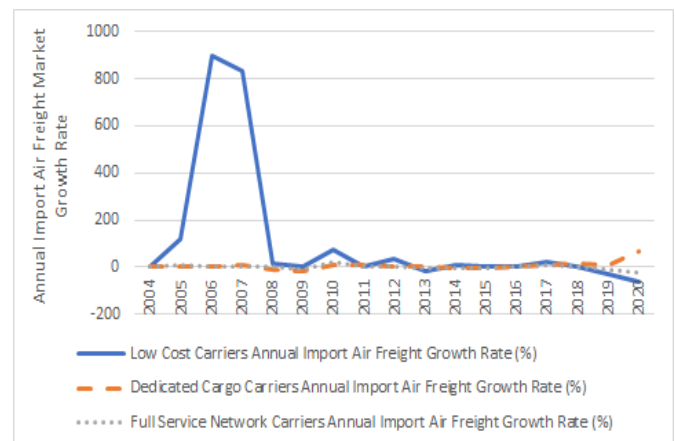
increased by 78.19% on the 2019 levels and this strong growth reflected a higher demand for the dedicated all-cargo carriers' services (Figure 32).



**Figure 32.** Low-cost carriers, all-cargo airlines, and full-service network carrier's annual enplaned export air freight traffic growth rates and year-on-year change (%): 2004-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021), Bureau of Transport and Regional Economics (2005-2007).

Figure 33 presents the low-cost carriers (LCCs), full-service network airlines (FSNCs), and dedicated all-cargo carriers annual import air freight market growth rates from 2004 to 2020. As can be observed in Figure 33, the low-cost carriers (LCCs) annual import air freight growth rates fluctuated quite extensively over the study period. The pronounced spike for 2005 to 2007 was due to the launch of air freight services by Pacific Blue as well as the inception of services by Jetstar Airways in 2006. In 2007, AirAsia-X entered the Australian import air freight market and successfully captured import air freight traffic. Figure 33 also shows that the low-cost carriers (LCCs) annual import air freight growth rates increased quite strongly in 2010 (+75.77%) and again in 2017 (+22.95%). Air Asia-X and Jetstar Airways recorded very significant growth in their annual enplaned import air cargo traffic in 2010, and this enabled these airlines to increase their annual import air freight market share. Cebu Pacific, Jetstar Airways and Scoot Tigerair recorded strong growth in their import air cargo traffic in 2017, and once again this contributed to the low-cost carriers' higher annual market share in 2017. Figure 33 also indicates that there were several years when the low-cost carriers (LCCs) annual import air freight growth rate declined on a year-on-year basis. These decreases were recorded in 2009 (-0.03%), 2013 (-13.48%), 2019 (-28.46%), and in 2020 (-62.06%), respectively (Figure 33). This loss in market share by the low-cost carriers (LCCs) could be attributed to the decrease in the annual import air freight tonnage in 2009, 2013, 2019, and 2020, respectively. As can be noted in Figure 33, the full-service network airlines (FSNCs) annual import air freight growth rates also fluctuated over the study period. The full-service network airlines (FSNCs) highest annual import air freight growth rate occurred in 2010, when these carriers annual import freight market share increased by 19.67% on the previous year levels. Like the low-cost carriers (LCCs), the full-service network airlines annual import air freight market growth decreased in 2009 (-9.79%), 2013 (-2.89%), 2014 (-2.3%), 2015 (-1.65%), 2019 (-8.67%), and 2020 (-23.48%) (Figure 33). In each of these year's, Australia's total annual import air freight traffic decreased on a year-on-year basis.

The dedicated all-cargo carriers annual import air freight market growth rate also fluctuated from 2004 to 2020 (Figure 33). The dedicated all-cargo carriers highest annual import air freight growth rate occurred in 2020, when these carriers annual import freight market share increased by 66.26 % on the 2019 levels (Figure 33). Figure 33 also shows that the dedicated all-cargo carriers import air freight traffic volumes increased quite significantly in 2010 (+11.18%), 2017 (+10.72%), and 2018 (17.31%), reflecting the greater demand for dedicated all-cargo services in these years. The largest single annual increase in the dedicated all-cargo airlines import air freight market share was recorded in 2020, when it increased by 66.26% on the 2019 levels.

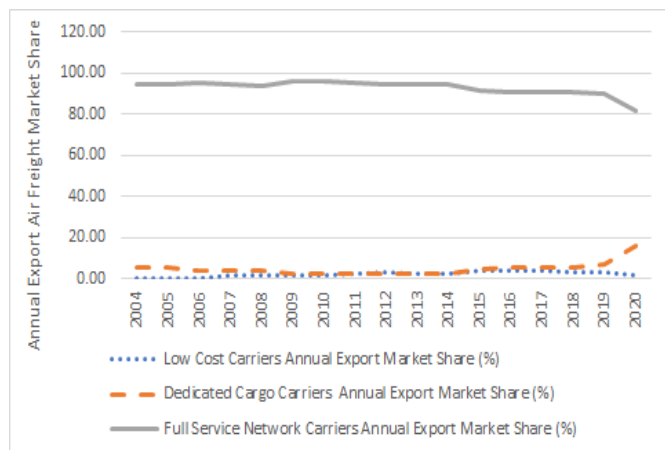


**Figure 33.** Low-cost carriers, all-cargo airlines and full-service network carrier's annual enplaned import air freight traffic growth rates and year-on-year change (%): 2004-2020. Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021), Bureau of Transport and Regional Economics (2005-2007).

The low-cost carriers (LCCs), full-service network airlines (FSNCs), and dedicated all-cargo carriers annual export air freight market shares from 2004 to 2020 are presented in Figure 34. Figure 34 shows that the low-cost carriers (LCCs) export air freight market share displayed an upward trajectory from 2005 to 2016 before declining in the period 2017 to 2020. The low-cost carriers (LCCs) highest annual export air freight market share was recorded in 2016, when the low-cost carriers (LCCs) transported 3.96% of Australia's annual export air freight traffic. Figure 34 also shows that during the infancy of the low-cost carriers (LCCs) participation in Australia's export air freight market their market share was very low. In 2005, the low-cost carriers (LCC's) accounted for just 0.05% of Australia's annual export air freight market share. Figure 34 shows that in the latter years of the study (2017 to 2020), the low-cost carriers (LCCs) annual export air freight market share decreased on a year-on-year basis and declined from 3.96% in 2016 to 1.90% in 2020.

As can be seen in Figure 34, the full-service network airlines (FSNCs) have historically held the greatest share of Australia's annual export air freight market. The full-service network carriers (FSNCs) highest annual export air freight market share was recorded in 2010, when these carriers accounted for 95.82% of Australia's annual export air freight tonnage. As can be observed in Figure 34, the full-service network carriers (FSNCs) annual export air freight market share has declined in the latter years of the study period (2015-2020). The lowest annual export air freight market for these airlines occurred in 2019, when they accounted for 89.89% of Australia's annual air freight market (Figure 34).

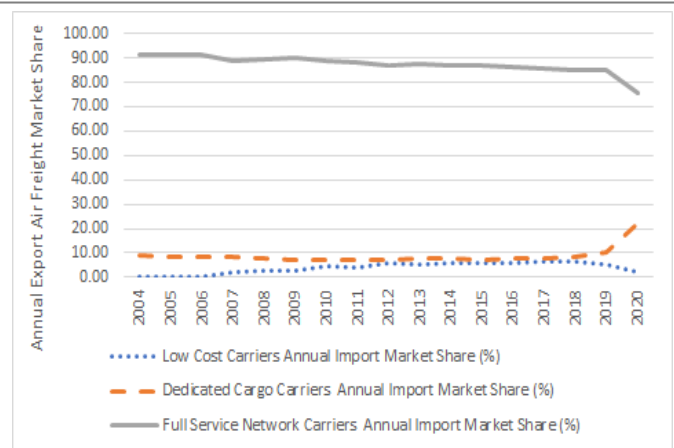
The dedicated all cargo carriers annual share of Australia’s export air freight market has oscillated over the period 2004 to 2020 (Figure 34). From 2005 to 2010, the dedicated all cargo carriers annual market share decreased on a year basis from a high of 5.80% in 2004 to a low of 2.31% in 2010. From 2011 to 2014, the dedicated all cargo carriers market share remained quite consistent at around 2.62% (Figure 34). From 2015 to 2020, the dedicated all-cargo carriers market share has increased on a year-on-year basis and reached a high of 16.44% in 2020 (Figure 34). The integrated carriers FedEx and UPS have achieved strong market growth in recent years, which has underpinned the increase in the dedicated all-cargo carriers overall Australian export air freight market share.



**Figure 34.** Low-cost carriers, all-cargo airlines, and full-service network carrier’s annual export air freight market shares: 2004-2020.

Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021), Bureau of Transport and Regional Economics (2005-2007).

Figure 35 presents the low-cost carriers (LCCs), full-service network carriers (FSNCs), and the dedicated all-cargo carriers annual share of Australia’s import air freight market from 2004 to 2020. Like Australia’s export air freight market, the full-service network carriers (FSNCs) have historically captured the largest share of Australia’s import air freight market. However, Figure 35 shows that these airlines annual market share has displayed a downward trend from a high 91.57% in 2005 to a low of 75.65% in 2020. The low-cost carriers (LCCs) annual import air freight market share has predominantly shown an upward trend increasing from a low of 0% in 2004 to a high of 6.54% in 2017. In the latter years of the study, the low-cost carriers (LCCs) decreased on a year-on-year basis, declining from 6.54% in 2017 to 2.23% in 2020 (Figure 35). As can be observed in Figure 35, the dedicated all-cargo carriers annual share of Australia’s import air freight market has been relatively consistent and has averaged around 7.96% over the study period. The dedicated all-cargo carriers highest annual share of Australia’s import air freight market was recorded in 2020, when the dedicated all-cargo carriers held a 22.11% market-share. As can be observed in Figure 35, the dedicated all-cargo carriers lowest annual share of Australia’s import air freight market was in 2010, when the dedicated all-cargo carriers accounted for 7.09% of Australia’s annual import air freight market.



**Figure 35.** Low-cost carriers, all-cargo airlines, and full-service network carrier’s annual import air freight market shares: 2004-2020.

Data derived from Bureau of Infrastructure, Transport and Regional Economics (2008-2021), Bureau of Transport and Regional Economics (2005-2007).

Amongst the low-cost carriers serving Australia’s export air freight market, Pacific Blue held the largest Australian export air freight market share in both 2005 and 2006. Of the low-cost carriers serving Australia’s export air freight market, Jetstar Airways held the largest Australian export air freight market share from 2006 to 2012. In 2013, AirAsia-X surpassed Jetstar Airways annual Australian export share, and thus, became the largest low-cost carrier in this air freight market segment. Air Asia-X captured the highest share of the low-cost carriers competing in Australia’s export air freight market in 2014. The situation changed in 2015 when Jetstar Airways once again captured the highest share of the low-cost carriers competing in Australia’s export air freight market. During the period 2017 to 2019, Air Asia-X held the highest share of the low-cost carriers competing in Australia’s export air freight market. In 2020, Scoot Tigerair captured the highest share of the low-cost carriers competing in Australia’s export air freight market.

Amongst the low-cost carriers serving Australia’s import air freight market, Pacific Blue held the largest share of Australia’s import air freight traffic in both 2005 and 2006. Of the low-cost carriers serving Australia’s import air freight market, Jetstar Airways held the largest Australian import air freight market share from 2006 to 2015. In 2016, AirAsia-X surpassed Jetstar Airways annual Australian import share, and thus, became the largest low-cost carrier competing in this air freight market segment. The situation changed again in 2017 when Jetstar Airways once again captured the highest share of the low-cost carriers competing in Australia’s import air freight market. During the period 2017 to 2019, Jetstar Airways held the highest share of the low-cost carriers competing in Australia’s import air freight market. In 2020, Scoot Tigerair captured the highest share of the low-cost carriers competing in Australia’s import air freight market.

## 5. Conclusion

Using an instrumental qualitative case study research design, this study has examined the development of the low-cost carriers (LCCs) in Australia’s export and import air freight markets. The period of the study was from 2004 to 2019. The qualitative data was analyzed using document

analysis. The study was underpinned by a case study protocol and research framework that followed the guidance of Yin (2018).

The case study revealed that the development of the low-cost carriers (LCCs) share of Australia's annual export air freight market occurred in three distinct phases. In the initial phase, 2004-2005, the market was served by just one low-cost carrier (LCC) Pacific Blue Airlines who did not transport any export air freight in 2004. In 2005, the airline made a strategic policy decision to transport air freight in the lower deck belly holds of its Boeing B737-800 aircraft. Thus, in 2005, Pacific Blue Airlines became the first low-cost carrier (LCC) to uplift export air freight from Australia. Phase 2 saw the inception of international services by Jetstar Airways in 2006. Jetstar Airways immediately gained export air freight traffic, and hence, became the second low-cost carrier (LCC) to serve Australia's export air freight market. The third phase took place from 2007 to 2020, when the major Asia-based low-cost carriers entered the market, starting with AirAsia-X in 2007. The low-cost carriers (LCCs) share of Australia's export air freight traffic increased from 132.6 tonnes in 2005 to a high of 20,713 tonnes in 2018. The low-cost carriers (LCCs) share of Australia's annual import air freight market followed a similar trend as that for the low-cost carriers (LCCs) export air freight tonnage. In the early years of the market (2005-2007), there was very rapid growth in the annual enplaned import air freight traffic of the low-cost carriers (LCCs). This was particularly so for Jetstar Airways who transported significant tonnages during this period. Once again, following the introduction of services by the Asia-based low-cost carriers, the low-cost carriers (LCCs) annual import air freight traffic continued to increase from 2007 to 2019, with the only exceptions occurring in 2013, 2019, and 2020, when the annual volumes of import air freight traffic carried by the low-cost carriers (LCCs) declined. The low-cost carriers (LCCs) increased their uplift of Australia's annual import air freight traffic from a low of 117.1 tonnes in 2005 to a high of 37,949.40 tonnes in 2018.

As previously noted in the case study, the low-cost carriers (LCCs) serving Australia's export and import air freight market's annual growth rates oscillated quite markedly over the study period. During the infancy period of the low-cost carriers' (LCCs) participation in Australia's export air freight market (2004 to 2006), the low-cost carriers (LCCs) annual export air freight market growth rates were exceptionally high as they gained a foothold in Australia's export air freight market. The highest annual growth rates were recorded in 2005 (+132.6%), 2006 (+626.24%), and 2007 (+404.17%), respectively. From 2007 to 2020, the low-cost carrier's annual export air freight growth rates were higher than the full-service network carriers and the dedicated all-cargo carriers in 2007, 2008, 2010-2012, and in 2014, respectively. In 2009, the full-service network carriers had the highest annual export air freight market growth rate (+4.48%). The dedicated all-cargo carriers recorded the highest annual export air freight market growth rates in 2013 and then again from 2015 to 2020. Towards the latter years of the study (2017 to 2020), the low-cost carrier's (LCCs) annual export air freight market growth rates were appreciably lower than those of their full-service network airlines (FSNCs) and dedicated all-cargo carrier counterparts. Like the situation with Australia's export air freight market, the low-cost carriers (LCCs) experienced very high annual import air freight market growth rates from 2005 to 2007, as they gained entry to this market. The inception of operations by Jetstar Airways in 2006 was particularly notable, as the airline immediately had success in capturing import air freight traffic. The low-cost carriers highest annual import air

freight market growth rates were recorded in 2006 (+900.08%) and 2007 (+833.5%), respectively. From 2007 to 2020, the low-cost carriers had the highest annual import air freight market traffic growth rates from 2008 to 2010, again in 2012, and once again from 2014 to 2017. In 2011, the dedicated all cargo carriers recorded the highest annual import air freight traffic growth rate (+11.2%). In 2018 and 2020, the dedicated all cargo carriers once again had the highest annual import air freight traffic growth rates continuing their strong position in the market. Over the study period, the full-service network airlines (FSNCs) annual import air freight traffic growth rates only exceeded the low-cost carrier's (LCCs) annual growth rate in two years. These were in 2011, when the low-cost carriers (LCCs) import air freight traffic growth rate was 2.62% and the full-service network carriers was 5.73%, and in 2018, the full-service network carriers (FSNCs) annual import air freight traffic growth rate was 3.53% versus the low-cost carrier (LCCs) annual import air freight traffic growth rate of 3.03%.

Throughout the history of serving Australia's export air freight market, the low-cost carriers (LCCs) have steadily increased their annual share of the market. In 2005, the low-cost carriers (LCCs) carried 0.05% of Australia's annual export air freight traffic, this was the lowest market share over the study period. In 2019, the low-cost carriers (LCCs) carried 1.90% of Australia's annual export air freight traffic. The low-cost carriers (LCCs) highest annual export air freight market share was in 2016, when they carried 3.96% of Australia's export air freight traffic. The dedicated air cargo carriers annual export market share fluctuated over the study period, from a low of 2.31% in 2010 to a high of 16.44% in 2020. The full-service network carriers (FSNCs) held the major export air freight market share over the study period. The full-service network carriers (FSNCs) highest annual export market share was recorded in 2010, when they carried 95.82% of Australia's annual export air freight traffic. The full-service network carrier's (FSNCs) lowest annual share of Australia's export air freight market occurred in 2020, when these airlines uplifted 81.66% of Australia's annual export air freight traffic. The low-cost carriers (LCCs) have also successfully increased their share of Australia's annual import air freight market. In 2005, the low-cost carriers (LCCs) import air freight market share was 0.03%, whilst in 2020 the low-cost carriers (LCCs) carried 2.23% of Australia's annual import air freight traffic. The low-cost carriers (LCCs) highest annual import air freight market share was recorded in 2017, when they uplifted 6.54% of Australia's annual import air freight traffic. The dedicated all-cargo carrier's annual import air freight market share remained relatively constant over the study period. The lowest annual import market share was recorded in 2009 (7.15%), and the highest annual import air freight market share was in 2020 (22.11%). The full-service network carriers (FSNCs) carry the largest share of Australia's annual import air freight traffic. Over the study period, their highest annual import air freight market share was 91.57% in 2005. In the latter years of the study (2016-2020), the full-service network carriers (FSNCs) annual import share had decreased on a year-on-year basis and stood at 75.65% in 2020; this was the lowest annual import market share recorded by the full-service network carriers (FSNCs) during the study period.

Since launching services to Australia in 2007, AirAsia-X has consistently increased its export air freight market share from a low of zero in 2007 to a high of 1.77% in 2019. Cebu Pacific Airlines has followed a similar trend and increased its export air freight market share from 0.03% in 2014 to 0.55%

in 2019. Jetstar Airways export air freight market share oscillated throughout the study period, from a low of 0.09% in 2006 to a high of 1.99% in 2012. In 2020, Jetstar export air freight market share was 0.12%. Australia's aviation industry was badly impacted by the Corona virus pandemic and the subsequent border closures in 2020. Throughout its history of international services, Jetstar Airways has been the leading low-cost carrier in Australia's import air freight market. Jetstar Airways increased its import air freight market share from 0.12% in 2006 to a high of 3.22% in 2012. Air Asia-X has also successfully increased its share of Australia's annual import air freight market. The airline has increased its market share from 0.03% in 2007 to 1.60% in 2019. AirAsia-X highest annual import air freight market share was recorded in 2013, when it accounted for 2.31% of Australia's annual import air freight market. Cebu Pacific Air has steadily built its import air freight market share from 0.01% in 2014 to 0.58% in 2019. Scoot Tigerair export air freight market share increased from a low of 0.29% in 2012 to a high of 1.64% in 2016. The airline did not carry any export air freight traffic from Australia in 2013. In 2020, Scoot Tigerair export air freight market share was 1.06%. Scoot Tigerair lowest annual import air freight market share was recorded in 2019 (0.44%), whilst the airline's highest annual import air freight market share was recorded in 2017 (1.44%). Jetstar Asia, Indonesia Air Asia and Thai Air Asia-X also provide import and export air freight services to and from Australia, however, due to the smaller volumes of air freight traffic carried these airlines market shares are quite small to those of AirAsia-X, Cebu Pacific, Jetstar Airways, and Scoot Tigerair.

A limitation of the present study was that it was restricted to a single market, that is, Australia's export and import air freight markets. A possible future study could conduct a cross-sectional analysis of the low-cost carriers' (LCCs) air freight traffic volumes and market shares in other air freight markets. A further limitation of the study was that was based on enplaned air freight tonnages. An import metric used in the air freight industry is the freight tonne kilometres flown (FTKs). Freight tonne kilometres (FTKs) are generated by airlines when they transport one tonne of cargo one kilometre. Should this data become available in the future then it could be used to empirically examine the low-cost carriers (LCCs) air freight FTKs vis-à-vis their competitors, the full-service network airlines (FSNCs), and the dedicated all-cargo carriers.

### Ethical approval

Not applicable.

### Conflicts of Interest

The authors declare that there is no conflict of interest regarding the publication of this paper

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