EX POST ANALYSIS OF AIR NEW ZEALAND REVENUE-SHARING JOINT VENTURE AGREEMENTS

Jan Brueckner, Darin Lee and Ethan Singer
Compass Lexecon

June 13, 2016

CONTRIBUTOR BIOGRAPHIES

Jan K. Brueckner is Professor of Economics at the University of California, Irvine and holds an A.B. from UC Berkeley and a Ph.D. from Stanford University. Professor Brueckner has served as visiting professor at UC Santa Barbara and UC San Diego, and has been a visiting scholar at many foreign universities. Professor Brueckner has published over 25 articles on the economics of the airline industry in leading peer-reviewed economic journals including the *American Economic Review*, the *Review of Economics and Statistics*, the *Journal of Law & Economics*, and the *International Journal of Industrial Organization*. Professor Brueckner's early work on the airline industry provided some of the first economic analysis of hub-and-spoke networks, demonstrating the efficiency gains from operation of such networks. More recently, Professor Brueckner has written extensively on the economics of airline alliances, showing both theoretically and empirically that alliances lead to lower fares for interline passengers. Other recent work by Professor Brueckner deals with the economics of airport congestion.

Darin Lee is an Executive Vice President at Compass Lexecon and has published numerous articles on various aspects of airline economics in journals such as *The Journal of Law & Economics*, the *Journal of Labor Economics*, *Economics of Transportation* and the *Journal of Competition Law & Economics*. Dr. Lee is also the editor of volumes I and II of the *Advances in Airline Economics* book series published by Elsevier. Dr. Lee has over 18 years of experience in the airline industry analyzing issues such as alleged anti-competitive behavior, bankruptcy reorganization, codesharing, joint ventures and antitrust immunity, labor disputes, business interruption and the seniority integration. Dr. Lee has frequently testified as an expert on the airline industry in U.S. Federal Court and before numerous arbitration panels, and has also presented empirical analyses of airline competition issues before the U.S. Departments of Justice, State, and Transportation, as well as and numerous foreign competition bureaus. Dr. Lee holds a Ph.D. in Economics from Brown University, an M.A. in Economics from Queen's University and a B.Sc. in Economics from the University of Victoria.

Ethan Singer is a Senior Economist at Compass Lexecon. He has over eight years of consulting experience in the airline industry as a consultant to the aviation practice at Compass Lexecon, and previously, as a Senior Associate at LECG. Dr. Singer holds a PhD in Economics from the University of Minnesota, an M.A. in Economics from the University of Minnesota and a B.A. in Economics with Distinction from Carleton College. Dr. Singer specializes in the analysis of airline economics and has worked extensively on a broad range of airline engagements including mergers, joint ventures and antitrust immunity, labor arbitrations, bankruptcy restructuring and financial damages. His research focuses on airline competition and the cost structure of international trade and he has published articles on airline economics in *Economics of Transportation*, the *Journal of Competition Law & Economics*, *Review of Industrial Organization*, and the *Journal of Economic and Management & Strategy*.

Table of Contents

1. Introduction and Executive Summary

Over the past decade, a major development shaping the competitive landscape of the global aviation industry has been the proliferation of revenue-sharing-joint-venture agreements ("JV") between carriers. Under such agreements, two (or more) carriers are granted regulatory and antitrust authority to jointly coordinate virtually all aspects of their capacity, marketing and pricing decisions on an approved set of routes, and the carriers pool and share the revenues generated on such routes according to a pre-determined formula.[1] Revenue-sharing JVs are widely viewed by economists and regulatory bodies around the world as being the closest form of coordination (absent equity ownership) that can be practically achieved by two carriers absent a merger.[2] The incentive for carriers to form JVs arises due to the fact that no airline can economically serve every global destination that its passengers want to travel to relying solely on its own network resources (i.e., aircraft and crew). By combining the network resources of two (or more) carriers, however, JVs enable airlines to expand the geographic breadth of their network with the goal of providing the near "ubiquitous" service that consumers and businesses seek in an increasingly globalized economy. Examples of prominent revenue-sharing JV agreements that have been implemented in recent years include those between Qantas Airways ("Qantas") and Emirates Airline ("Emirates"),[3] Virgin Australia Airlines ("Virgin Australia") and Delta Air Lines ("Delta"),[4] and All Nippon Airways ("ANA") and United Airlines ("United").[5]

Like other international carriers, Air New Zealand ("Air NZ") has also actively sought to expand the scope of its network through revenue-sharing JVs and currently participates in five such agreements. Air NZ's first JV agreement with Virgin Australia covering trans-Tasman routes was

[1] As discussed in greater detail in Section 2 below, JV agreements are typically required to be "metal-neutral", meaning that the revenue sharing structure of the JV's parties is such that they are indifferent as to which carrier transports a particular passenger. By ensuring that a JV has been structured to be metal neutral, carriers are incentivized to schedule and price their joint services as if they were a single carrier, thereby offering a joint schedule and fare options to better suit passengers' needs.

[2] *See, e.g., "*The Economic Benefits of Airline Alliances and Joint Ventures", IATA, January 2012 and "Detailed analysis to support the report to the Minister of Transport", New Zealand Ministry of Transport, July 28, 2014 ("MOT Air NZ/Singapore Report"), Figure 1.

[3] *See* "Qantas-Emirates alliance authorized", New Zealand Government Press Release, May 15, 2013 available at http://www.beehive.govt.nz/release/qantas-%E2%80%93-emirates-alliance-authorised.

[4] *See* United States Department of Transport Docket DOT-OST-2009-0155.

[5] *See* United States Department of Transport Docket DOT-OST-2010-0059.

approved December 21, 2010 and is authorized until December 31, 2018.[6] More recently, Air NZ formed JVs with Cathay Pacific ("Cathay") and Singapore Airlines ("Singapore") covering services between Auckland-Hong Kong and Auckland/Christchurch-Singapore, respectively, both of which are authorized until 2019.[7] Likewise, in September 2015, Air NZ and Air China received approval to form a revenue-sharing JV on direct routes between New Zealand the mainland China through March 31, 2021.[8] Finally, in March 2016, Air NZ and United announced that they would begin revenue sharing on services between New Zealand and the United States.[9]

While Air NZ's efforts to broaden the geographic scope of its network (as well as its schedule coverage to destinations it serves) through JV agreements is consistent with the trend by other, much larger, international airlines to expand the breadth and quality of their networks through deeply integrated JV alliance agreements, some industry observers have questioned whether the benefits of such agreements outweigh the potential costs, including the potential for reduced competition between JV partner carriers.[10] Although several published academic studies have found that cooperative agreements and antitrust immunity between airlines lead to lower fares (and hence, output expansion), virtually all of the empirical literature to date has focused on the predecessors to today's revenue-sharing JVs (i.e., basic codesharing and/or cooperation via global "alliance" agreements such as Star Alliance, oneworld or SkyTeam, or antitrust immunity *without* a revenue-sharing JV).[11] Moreover, while the existing literature has focused primarily on assessing

[6] Prior to forming its JV with Virgin Australia, Air NZ sought (but did not receive) regulatory approval to form a JV with Qantas. *See* "Analysis of Air New Zealand/Virgin Australia application for reauthorization of the Trans-Tasman Alliance", New Zealand Ministry of Transport, September 2013.

[7] The Ministry of Transportation ("MOT") originally approved the Air NZ-Cathay JV for a three year terms on November 1, 2012 for travel starting January 31, 2013, which was re-authorized on August 24, 2015 through October 31, 2019. MOT approved the Air NZ-Singapore/SilkAir JV on August 7, 2014 through January 6, 2019. *See* "Air New Zealand – Cathay Pacific Alliance", Ministry of Transport Briefing, November 2012; *See also,* "Air NZ-Singapore Airlines alliance authorized", New Zealand Government Press Release, August 7, 2014 available at http://www.beehive.govt.nz/release/air-nz-singapore-airlines-alliance-authorised.

[8] *See* "Authorization of a Strategic Alliance Between Air China and Air New Zealand", Ministry of Transport, September 1, 2015. The revenue-sharing JV commenced in December 2015 when Air China began non-stop service between Beijing ("PEK") and Auckland ("AKL").

[9] *See* "Air New Zealand and United Airlines to Revenue Share on USA - New Zealand Routes", Air New Zealand Press Release, March 10, 2016.

[10] *See* for example, "Dunkerley: Transpacific Competition Hurt By Joint Ventures," *Aviation Daily*, Aug 6, 2015, and "JetBlue Says Rivals' Antitrust Immunity Needs Closer Look," *Law360*, June 3, 2015.

[11] A summary of the economic literature on the competitive effects of various forms of airline cooperation is contained in Section 2.

the fare effects from cooperative agreements for *connecting* passengers where the potential benefits of combining the complementary network resources of two carriers is most obvious, many revenue-sharing JVs—including two of Air NZ's five JVs—involve joint operations on one or more routes where both of the partner carriers had previously offered non-stop service.[12] For passengers traveling on these non-stop overlap routes, the potential benefits to consumers (e.g., increased flight frequency, fare combinability, etc.) needs to be weighed against the loss in head-to-head non-stop competition on these routes by the JV partners.

a) Whitepaper Goals

The purpose of this whitepaper is to empirically assess the *ex post* competitive effects of Air NZ's revenue-sharing JVs. At the outset, it is worthwhile to discuss some of the terminology related to airline cooperation that will be used throughout our study. We use the term *"revenue-sharing JV"* (or the abbreviated term *"JV"*) to refer to immunized, revenue-sharing joint ventures such as those between Air NZ and Singapore, Cathay, Air China, Virgin Australia and United. It is worthwhile to point out that while carriers in some parts of the world have been granted antitrust immunity *outside of a revenue-sharing JV agreement*, in the New Zealand context, antitrust immunity and revenue-sharing JVs are functionally dependent on one another.

We use the term "global alliance partners" to refer to two carriers that are members of the same global marketing alliance (i.e., Star Alliance, SkyTeam or oneworld). Global alliance partners typically engage in various degrees of codesharing and other cooperative marketing initiatives (e.g., frequent flyer or airport lounge reciprocity). Although many revenue-sharing JV partners are also global alliance partners (e.g., Air NZ and Singapore are both Star Alliance members) some JV partners are not members of the same global alliance (e.g., Qantas and Emirates). Similarly, most global alliance members are not revenue-sharing JV partners.

The goal of our study is three fold. First, we are interested in understanding whether the observed price effects from increased coordination between airlines for connecting passengers found in the

[12] Prior to its JV with Cathay, Air NZ and Cathay both served Auckland-Hong Kong. Likewise, Air NZ and Virgin Australia offered overlapping service on several trans-Tasman routes prior to their JV. While Air NZ and Singapore Airlines both offer non-stop service between Auckland and Singapore today, Air NZ had not served the route since 2006, but resumed service in January 2015 in conjunction with the commencement of its JV with Singapore Airlines. *See* footnote 76 below. Air NZ and Air China do not offer overlapping non-stop service on any route to/from New Zealand.

existing literature (i.e., that increased coordination lowers fares) extends to Air NZ's revenue-sharing JV agreements. As discussed in more detail in Section 3 below, our analysis is the first study of its kind to explicitly estimate revenue-sharing JV fare effects separate from other cooperative effects (i.e., basic codesharing or antitrust immunity), as well as the first study of its kind that has been able to exploit detailed carrier-specific data with information such as an itinerary's time-of-purchase (relative to first date of travel) and length of stay.

Second, we are interested in determining how Air NZ's JV's have affected the market for *non-stop passengers* traveling on JV routes where the two carriers had previously competed, both in terms of the prices paid on routes where Air NZ and its JV partners formerly competed, but also on the quality of non-stop service (e.g., flight frequency and schedule convenience, capacity, number of non-stop routes, etc.) offered by the JV carriers. Likewise, we are interested in understanding the extent to which Air NZ's JVs might serve as potential barrier to entry for other carriers seeking to add (or expand) non-stop service to/from New Zealand.

Finally, it is important to emphasize that while estimating the competitive (i.e., fare) effects from Air NZ's JVs is an important component of assessing the overall impact of these agreements on the market for air service to/from New Zealand, the implications of Air NZ's JV agreements extend far beyond the prices paid by Air NZ's passengers. This is because the quality of a country's air service plays an integral role in developing commercial and cultural ties with other nations, as well as connecting smaller (and often remote) communities within a country to major cities, both domestically and abroad. These international *and domestic* transportation linkages provide enormous benefits to the development of the New Zealand economy by promoting travel and tourism to/from New Zealand, which in turn supports thousands of jobs within New Zealand.[13] Thus, a third goal of our whitepaper is to assess Air NZ's role in the ever-evolving global aviation industry and to determine if Air NZ's JVs have enabled the carrier to compete more effectively with other international carriers to the benefit of New Zealand's economy.

[13] As discussed in Section 4 below, the economic viability of many of Air NZ's domestic services depend critically on passengers connecting to/from its international services.

b) Summary of Key Findings

i. *Ex Post Empirical Analysis of Air NZ's JVs on Fares*

Using a rigorous statistical methodology that parallels previous work in the literature but that exploits the features of the detailed ticket data provided by Air NZ, our analysis shows conclusively that Air NZ's JV service provides substantial fare benefits to consumers who make international connecting trips to/from New Zealand, regardless of whether their journeys take them beyond the South Pacific region (e.g., Asia, Europe, etc.) or whether they travel locally across the Tasman Sea. Specifically, we find that Air NZ's connecting JV fares are not only well below its traditional interline and global alliance/codeshare fares (demonstrating the benefits predicted by theory from the reduction of double marginalization) but also statistically indistinguishable from online (i.e., single carrier) fares for trips beyond the region.[14] Therefore, our analysis provides clear and unique evidence of the fare benefits for connecting passengers of metal-neutral, revenue-sharing JV cooperation, which—unlike any other form of airline coordination—incentivizes Air NZ and its JV partners to set fares as if they were a single airline, thus resulting in the complete elimination of double marginalization. To the best of our knowledge, our study is the first of its kind to empirically establish this finding.

For reasons that are likely related to our reliance on data from a single carrier, our empirical results do not show the usual fare discounts associated with global alliances. Instead, with respect to Air NZ, these global alliance fares are indistinguishable from traditional interline fares. While this pattern may be due to statistical obstacles, when taken at face value it suggests that the fare benefits of global alliances to connecting passengers traveling to or from New Zealand *may not be realized outside of a JV structure*, a finding that should be of note to regulators. It is important to emphasize, however, that there are several *non-price* related benefits to passengers of global alliances not captured in our fare regressions, such as increased connectivity and schedule options, as well as frequent flyer program and airport lounge reciprocity.

We also consider the additional question of whether nonstop routes with overlapping service by JV partners are less competitive than routes where nonaligned carriers overlap. For this much

[14] As discussed in Section 3 below, we find that connecting JV fares are actually *lower* than online fares for trans-Tasman trips.

smaller set of markets, however, reliance on single-airline data presents more of an obstacle than it did in the case of connecting markets. In particular, while the data appear to indicate that nonstop routes with overlapping service by JV carriers become less competitive post-JV (i.e., exhibiting higher fares than would otherwise occur if the JV partners competed), the paucity of "natural experiments" prevents us from ascertaining the exact numerical magnitude of this effect with a high degree of reliability.[15] As a result, we conclude that JV overlaps on nonstop routes appear to reduce competition to some extent (vis-à-vis a "but for world" where both JV partners remained in the market) without being able to provide an exact number that we find credible. However, we also discuss why it is reasonable to assume that Air NZ would find it difficult to profitably sustain non-JV services on many of those routes, and thus, there is no guarantee that in the "but for" world, passengers would ever realize the potential fare savings that may come with multiple carriers offering competing non-stop service on long-haul international routes to/from New Zealand.

Moreover, it is important to emphasize that the vagueness of our results related to non-stop service does not and should not undermine the statistical robustness of our findings for connecting passengers, which demonstrate substantial fare savings due to Air NZ's revenue-sharing JVs. Thus, in judging the net benefits of Air NZ's joint-venture partnerships, regulators reading the results of this study must weigh the robust conclusions regarding the benefits to connecting passengers against less reliable evidence of reduced competition on nonstop routes, particularly in light of the fact that the vast majority (i.e., in excess of 75%) of passengers making use of the so-called Alliance Sectors for Air NZ's non-Tasman JVs are connecting passengers.[16]

ii. *The Importance of JVs to Air New Zealand and New Zealand's Economy*

Because Air NZ's JVs have enabled the carrier to dramatically increase the scope of its "virtual" network to include many international destinations it would be unable to serve on its own, our

[15] Indeed, as discussed in Section 3 below, an accurate analysis of the natural experiments that do exist (e.g., Auckland-Hong Kong and Auckland-Singapore) is made even more difficult due to the fact that Air NZ may not have even remained in these markets but for their JVs with Cathay and Singapore, respectively. Put differently, the fact that the statistical "identification" of the nonstop JV fare effect is based largely on routes that Air NZ found difficult to sustain pre-JV (i.e., Auckland-Singapore and Auckland-Hong Kong) suggest that the nonstop results should not be assigned much weight when viewed against the robust finding based on far more data that JVs substantially lower fares for connecting passengers.

[16] On the nine trans-Tasman routes where Air NZ and Virgin Australia offer overlapping non-stop service, approximately one-third of Air NZ's passengers make a connection.

study also finds that Air NZ's JVs are critical to ensuring that the carrier remains competitive in today's increasingly globalized airline industry. And while revenue-sharing JVs have become increasingly important to carriers of all sizes in order to give passengers the seamless network "ubiquity" they increasingly demand, such JVs are particularly important to Air NZ for several reasons.

First, with a population of less than five million people, New Zealand is a relatively small international market. Thus, unlike other larger and more populated countries (e.g., Australia), the demand for air services between New Zealand and many international destinations cannot economically support non-stop service, even by a single carrier. However, by pooling Air NZ's traffic flows from passengers traveling between all of New Zealand and the wide array of destinations beyond/behind the hubs of its JV partners (e.g., Singapore, Hong Kong, etc.), the JVs are able to profitably sustain (or enhance frequency/capacity) on the key gateway-to-gateway conduit routes linking Air NZ's Auckland hub and the hubs of its partner carriers.

In addition to its small local market, New Zealand is geographically isolated relative to most large global traffic flows,[17] making it even more challenging to sustain nonstop service between New Zealand and many international destinations.[18] To make matters worse, the fact that Australia—home to Air NZ's nearest (and arguably most important) competitor, i.e., Qantas—is geographically situated between New Zealand and the largest concentration of potential travelers to New Zealand (i.e., Asia), emphasizes the need for Air NZ to be able to offer the same (or higher) degree of integrated service that Qantas (either by itself or with its JV partner Emirates and joint

[17] *See, e.g.*, MOT Air NZ/Singapore Report, paragraph 33: "Alliance arrangements have become an essential part of Air New Zealand's overall international strategy. As an end-of-the-line carrier geographically isolated from many of its key markets, Air New Zealand faces significant challenges. While larger mid-point carriers (including Singapore Airlines) are able to act as global transit points, aggregating passengers from multiple origins, Air New Zealand is heavily reliant on point-to-point traffic."

[18] *See* "Analysis of Air New Zealand/Cathay Pacific application for authorisation of a North Asia Alliance Agreement and Code-share Agreement", October 18, 2012 (hereafter "MOT 2012 Air NZ/Cathay Report"), paragraph 119: "New Zealand is the most remote developed country in the world relative to its international markets. This is a significant competitive disadvantage for Air New Zealand in terms of its ability to compete in long-haul markets. Because all of Air New Zealand's routes originate in New Zealand, it is almost entirely reliant on passengers travelling between New Zealand and their origin or destination. In contrast, mid-point carriers (such as Cathay Pacific) are well placed to attract transit passengers travelling between any of the destinations that they serve (for example, New Zealanders travelling to the United Kingdom)."

business partner American) is able to offer to its passengers.[19] Indeed, as shown in Section 4 below, nearly half of all international visitors to New Zealand (excluding those from Australia and the South Pacific) travel to New Zealand via Australia. Because other, less integrated forms of cooperation between Air NZ and its alliance partners would not result in the elimination of double marginalization that is achieved through its revenue-sharing JVs, and because the small size of New Zealand's market would preclude Air NZ from serving on its own metal all but a handful of the international destinations its passengers want to reach, JVs have become essential to Air NZ's ability to compete and grow in today's global aviation market.

Moreover, there is little—if any—evidence to suggest that Air NZ's JVs have created a barrier to entry for carriers seeking to enter (or expand their existing services to) the New Zealand market. Not only have total seats to/from New Zealand by carriers other than Air NZ grown substantially over the past several years, but recently added (or announced) services to Auckland by Emirates (from Dubai), American (from Los Angeles) and Qatar (from Doha) indicate that international carriers can easily access the New Zealand market, often with little advance notice.[20] Thus, as discussed in greater detail in Section 4 below, expanded international service to/from New Zealand in recent years by Air NZ and other carriers has resulted in total seats to/from New Zealand increasing,[21] with Air NZ and its JV partners' share of international seats to/from New Zealand declining slightly since 2010 (the year prior to Air NZ's first JV with Virgin Australia became effective). Similarly, the number of passengers connecting from an Air NZ domestic flight to a non-JV carriers' flight at Auckland has increased by approximately 11% since 2011, confirming that non-JV carriers have not been precluded from gaining access to Air NZ's domestic feed at Auckland because of the carrier's JVs.

Finally, by enabling Air NZ to become more competitive (thereby accelerating the carrier's prospects for sustainable international growth), Air NZ's JVs provide a variety of additional

[19] Although both MOT and ACCC have approved Qantas and American's application for a full metal-neutral, revenue-sharing JV, the U.S. Department of Transportation has not yet issued a final decision. *See* "Qantas and American Airlines to add trans-Pacific routes in new joint venture", *The Sydney Morning Herald*, January 6, 2016.

[20] As noted in a recent CAPA report, "Emirates launched a non-stop Dubai-Auckland flight, taking the mantle of world's longest flight. Significantly, Emirates beat Qatar Airways to it. Qatar's public musing in Jan-2016 about opening a Doha-Auckland service prompted Emirates to put on the Auckland flight at short notice: the service was announced a week after Qatar's mention and flown a mere five weeks later." *See* "Gulf airlines in Australia/New Zealand: Auckland non-stops as Qatar Airways disrupts the status quo", CAPA, March 7, 2016.

[21] *See* Figure 18 below.

benefits to the New Zealand economy. To understand the full effect of Air NZ's JVs on the New Zealand economy, it is important to emphasize that just like any hub-and-spoke carrier, Air NZ's international services are intertwined with its domestic services. This is because approximately [half] of Air NZ's passengers traveling on a typical long-haul international flight from Auckland make a connection behind/beyond Air NZ's Auckland hub.[22] Unlike countries with larger populations (and hence, local markets for international air travel), New Zealand's population is insufficient for a New Zealand-based carrier to support long-haul international service from more than one gateway (i.e., Auckland). While it is feasible for a foreign carrier to serve multiple long-haul destinations in New Zealand from a hub where it aggregates large traffic flows (e.g., Singapore Airlines' service from Singapore to both Auckland and Christchurch), long-haul international service by Air NZ to most destinations from multiple gateways (e.g., Auckland *and* Christchurch or Wellington) would be economically impractical because it would need to rely almost exclusively on local (i.e., Christchurch or Wellington) traffic and/or would siphon connecting traffic away from Auckland, rendering that service unviable.

Thus, by strengthening its international network, Air NZ's JVs have also enabled the carrier to strengthen its *domestic network*. For example, in addition to supporting increased capacity between Auckland and other major cities in New Zealand such as Christchurch and Wellington, increased international flow traffic as a result of Air NZ's JV-enabled services has also helped Air NZ to sustain (or grow) service to several smaller destinations (such as New Plymouth, Nelson, or Tauranga), some of which are located in remote areas of the country. Likewise, by enabling Air NZ to expand the breadth of its "quasi-online" service and fares to thousands of additional international city-pairs it could not otherwise offer them (via a simple codeshare or interline agreement, for example), Air NZ's JVs have made New Zealand a more accessible (and affordable) destination for potential tourists. Thus, in addition to helping to sustain, additional New Zealand-

[22] It is also important to note that the hub cities of Air NZ's JV partners enjoy similar economic spillover benefits from increasing the amount of flow traffic over their hubs, thereby enhancing the viability of other routes to/from their hubs. For example, in 2015, 68.5% of passengers that flew on Air NZ between Auckland and Singapore made a connection beyond Singapore to their final destination on Singapore Airlines or Silk Air. While Singapore's small geographic area implies that these passengers are not "domestic" *per se* (in the same way that an Air NZ passenger connecting from Auckland to Nelson is), they nevertheless provide benefits to Singapore's local economy since they enhance the sustainability and scope of Singapore Airlines' network, which generates substantial employment and other related benefits for Singapore's economy. Similar economic benefits accrue to the local economies in Hong Kong, Australia and China because of Air NZ's revenue-sharing JVs.

based aviation industry jobs, Air NZ's JVs also help to support additional tourism and the increased service sector jobs that come with it.

The remainder of this whitepaper is organized as follows. Section 2 provides an overview of the economics of cooperative airline agreements, including a review of the published literature to date and a brief description of each of Air NZ's five current JVs. Section 3 describes our econometric analysis of the *ex post* fare effects of Air NZ's JVs on the market for passenger air service to/from New Zealand. Section 4 discusses the market of international air services to/from New Zealand, Air NZ's position in the evolving global airline industry and the growing importance of JVs (both Air NZ's and other those of other carriers') in the current competitive environment in for travel to/from the South Pacific. Section 4 also discusses the importance of Air NZ's JVs on the carrier's ability to sustain and expanded its services in both international and domestic markets, and the benefits that a healthy and profitable Air NZ provides to the not only New Zealand travelers, but also the New Zealand economy. Section 5 summarizes our conclusions.

2. Overview of the Economics of Cooperative Airline Agreements

In this section, we put Air NZ's revenue-sharing JVs into context by providing an overview of the evolution of airline alliances as well as a brief review of the existing economic literature analyzing the competitive effects of such agreements.

a) The Economics of Cooperative Airline Alliances

As discussed above, Air NZ currently participates in five revenue-sharing JVs (with Virgin Australia, Singapore Airlines, Cathay Pacific, Air China and United). These and other revenue-sharing JVs reflect—in many respects—the culmination of a multi-decade trend by Air NZ and other international carriers to expand the geographic scope of their networks through coordinated marketing agreements with other international carriers. Such efforts—which are aimed at providing passengers with a more seamless travel experience to/from destinations a carrier cannot economically serve (or can serve, but with less frequency) using their own network resources or "metal"—began in the early 1990s as simple codesharing agreements. Under a simple codeshare agreement, one carrier (e.g., Air New Zealand) places its two-letter marketing code (e.g., "NZ") on flights operated by another carrier (e.g., Air Canada), thereby enabling passengers to book travel to destinations combining the network resources of both carriers as if they were operated by a

single carrier (e.g., Air New Zealand).[23] The rates for using the services of codeshare partners is often established through specially negotiated prorate agreements between the partners. These special prorate agreements typically provide for lower mark-ups than could otherwise be achieved via the standard IATA prorate conventions for interlining carriers. Today, Air NZ has non-revenue-sharing bilateral codeshare agreements with more than a dozen carriers, including Air Canada, Aerolineas Argentinas, Lufthansa, Turkish Airlines, Virgin Atlantic, South African Air, ANA, Asiana, Thai Airways, Etihad, Air Vanuatu, Air Calin/Air Calédonie, Fiji Airways, and Air Tahiti Nui.

In the mid to late 1990s, several carriers (many of which were party to a variety of bilateral codeshare agreements with one another) formed several more closely-knit airline alliances, which subsequently evolved into the three broader multi-carrier global alliances: Star Alliance, oneworld and SkyTeam.[24] These global alliances seek to offer passengers access to a near ubiquitous network that can take them from "anywhere-to-everywhere", as well as (among other things) the ability to accrue and redeem frequent flyer points across all of its member carriers as if they were a single carrier.[25] Broader alliance partnerships also seek to exploit cost saving opportunities and create additional incentives for carriers to mitigate the double marginalization problem by coordinating certain aspects of the carriers' marketing and sales activities, lounge access, baggage and ground handling and other functions.

Although codesharing and alliances enable carriers to better meet the needs of passengers who want to travel between destinations that neither of the partnering carriers can serve solely using their own network resources (or serve, but with less frequent service), such agreements have been

[23] An example of such an itinerary would be travel between Auckland and Montreal, Canada, whereby a passenger travels on Air New Zealand between Auckland and Vancouver and on Air Canada between Vancouver and Montreal, with each flight of the itinerary marketed by Air New Zealand (i.e., the flights between Vancouver and Montreal operated by Air Canada also having an Air New Zealand flight number).

[24] A listing of each alliance's members as of December 2015 (and the year they joined their respective alliance) is included as Appendix 1. Air New Zealand became a Star Alliance member in March of 1999. *See* "Star Alliance: A Chronological History", available at

http://www.staralliance.com/documents/20184/22080/SCP_Star+Alliance+PDF/c22d550b-6202-477a-8b94-1002b6aec53b.

[25] As discussed in greater detail in Section 4 below, absent a revenue-sharing JV agreement, many carriers do not allow travelers that are members of an alliance partner's frequent flyer program to accrue (or redeem) program points as if they were traveling on their home carrier.

shown to be imperfect substitutes for the online service provided by a single carrier. A key reason for this is that simple codeshare and global alliance agreements do not enable partnering carriers to coordinate their prices and/or flight schedules with one another. As a result, simple codeshare agreements typically result in sub-optimal scheduling vis-à-vis what a single carrier or more integrated revenue-sharing JV partnership would be able to achieve.[26] Likewise, as discussed below, while numerous empirical studies have confirmed that codesharing enables carriers to achieve lower fares by reducing the so-called "double mark-up" or "double marginalization" problem,[27] these studies have also found that carriers with antitrust immunity ("ATI") that can jointly determine prices are far more effective at reducing double marginalization, and hence, can achieve lower fares than basic codesharing or global alliance membership can achieve.[28] Although immunized alliance partners can be expected to reduce double marginalization more than codesharing and/or global alliance partners, incentives remain for immunized alliance partners, absent metal neutrality, to make certain decisions independently (such as flight scheduling) because the bulk of a passenger's revenue accrues to the operating carrier of a flight, even among immunized alliance partners.[29]

Although a merger between two international carriers could—in principle—enable two carriers to achieve the network and other cost synergies that are achieved by a single carrier, most governments impose limits on the degree of foreign ownership of its home carriers.[30] As a result, a number of carriers—including Air New Zealand—have increasingly sought to form more highly-

[26] For example, even though passengers are likely to prefer flights on a given route to be spaced throughout the day, as discussed in greater detail in Section 4, it is frequently observed that codeshare partners that are not permitted to coordinate schedules will cluster their flights so they depart at or near the same time as one another (known as "wingtip" flying).

[27] For a discussion of the cause of double marginalization, see footnote 40 below.

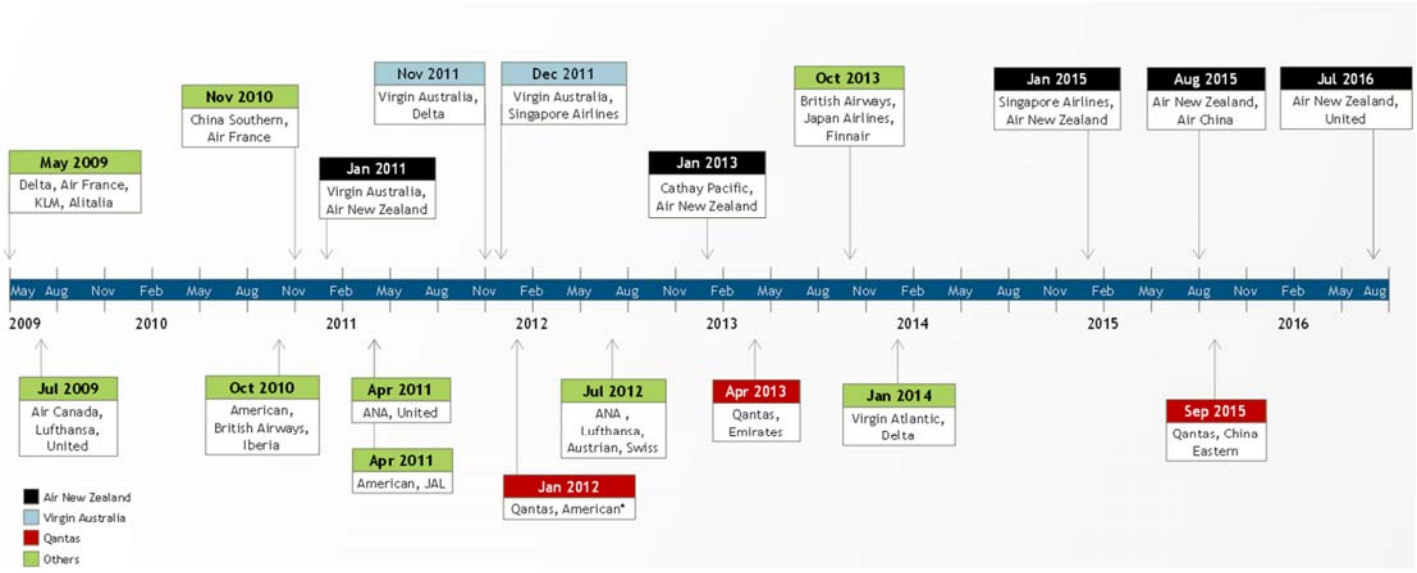
[28] A comprehensive review of economic literature pertaining to cooperative agreements between airlines is contained in Section 2(c) below.

[29] As noted earlier, all of Air NZ's revenue-sharing JVs are immunized and Air NZ does not participate in an immunized alliance agreement that is not a revenue-sharing JV. In a non-joint venture immunized alliance (such as those used by carriers outside of the New Zealand context), the operating carrier typically keeps all of the revenue associated with the flight segments it operates on a given ticket less a commission to its alliance partner if that partner sells the ticket under its own marketing code.

[30] *See, e.g.,* MOT Air NZ/Singapore Report, paragraph 25: "Restrictions on foreign ownership requiring airlines to be substantially owned and effectively controlled by nationals of their home State mean that cross-border mergers between airlines are rare."

integrated, "metal neutral", revenue-sharing JVs. As shown in Figure 1, since 2009, there has been a proliferation of revenue-sharing JVs covering all regions corners of the globe.[31]

FIGURE 1: TIMELINE OF SELECT MAJOR REVENUE-SHARING JOINT VENTURES SINCE 2009



Sources: New Zealand Ministry of Transport, Aviation Daily/Weekly, Websites of Air New Zealand, Singapore Airlines, Qantas and Virgin Australia
*Qantas/American JV approved by MOT and ACCC; still pending U.S. DOT approval.

Under a metal neutral revenue-sharing JV, partner carriers pool and share revenues across certain flights (typically some or all of the routes between the countries of the two carriers),[32] and in doing so, become indifferent as to which JV carrier transports any particular passenger.[33] By aligning the incentives of partner carriers to behave as though they were a single carrier, JV carriers become incentivized to offer a joint schedule that is likely to be the most appealing to passengers, rather than "competing" for passengers by offering flights at the similar (and sometimes identical) times of the day or biasing website search results to favor their own flights over those of their partner, even if their partner's flights have a more convenient schedule or a lower fare. Simply put, with

[31] Revenue sharing JVs originated in the early 1990s with the JV between Northwest Airlines and KLM Royal Dutch airlines in 1993 following the first Open Skies agreement between the United States and the Netherlands in 1992. *See* http://www.klm.com/corporate/en/about-klm/history/.

[32] Depending on the JV in question, revenue for segments behind and beyond the gateways of the respective carrier can be shared or, may accrue to the operating carrier of those non-conduit segments.

[33] As noted by ACCC: "Metal neutral' revenue allocation arrangements make it irrelevant, from the perspective if either applicant, which applicant's aircraft a passenger travels on." *See* Determination. Applications for authorisation lodged by Virgin Blue Airlines Pty Ltd & Others in respect of a joint venture between the applicants, 10 December 2009, page vi.

metal neutrality, the incentives of the partner carriers are fully aligned, such that JV carriers can be expected to pool the network resources of the two carriers to offer potential passengers the most attractive offerings (both in terms of price an schedule), thereby realizing the same degree of efficiency (and prices) as a single carrier.[34]

b) Survey of Economic Literature on the Fare Effects of International Airline Alliances

In this subsection, we briefly summarize the academic literature on the competitive effects of cooperative agreements between airlines. At the outset, two observations are worthy of note. First, detailed origin and destination ("O&D"[35]) transacted fare data for international passengers are not widely available, with the exception of the U.S. Department of Transportation's International O&D Survey Database ("U.S. DB1B data").[36] Thus, as discussed in greater detail below, most of the empirical studies to date on the effects of cooperative agreements between airlines have studied U.S.-international markets. Second, while several empirical studies—starting with the work of Brueckner and Whalen (2000)[37]—have examined the effects of various forms of cooperation (e.g., codesharing, alliances and ATI) on international airfares, the published literature to date has not yet directly studied the fare effect of revenue-sharing JVs such as the ones of interest in this whitepaper.

[34] For example, in approving the A++ JV between United, Lufthansa and Air Canada, the U.S. Department of Transportation noted that: "*By implementing an economic benefit-sharing agreement, carriers within the alliance are motivated to perform alliance-focused network planning, sales, and management, thereby benefiting a broad range of consumers seeking a better, seamless transportation product. To ensure that these merger-like efficiencies - which cannot be realized by merger given U.S. airline ownership/citizenship rules - are obtained and passed on as benefits to consumers, DOT tentatively approved this application… We therefore affirm our tentative finding that granting antitrust immunity in this case is necessary to enable carriers to achieve merger-like efficiencies and deliver public benefits that would not otherwise be possible.*"

[35] O&D passengers are counted based on the starting and ending points of their journey, regardless of whether their routing involves intermediate stops en route to their final destination. For example, a passenger traveling between Christchurch and Hong Kong *via Auckland* is an O&D passenger between Christchurch and Hong Kong, but not Auckland.

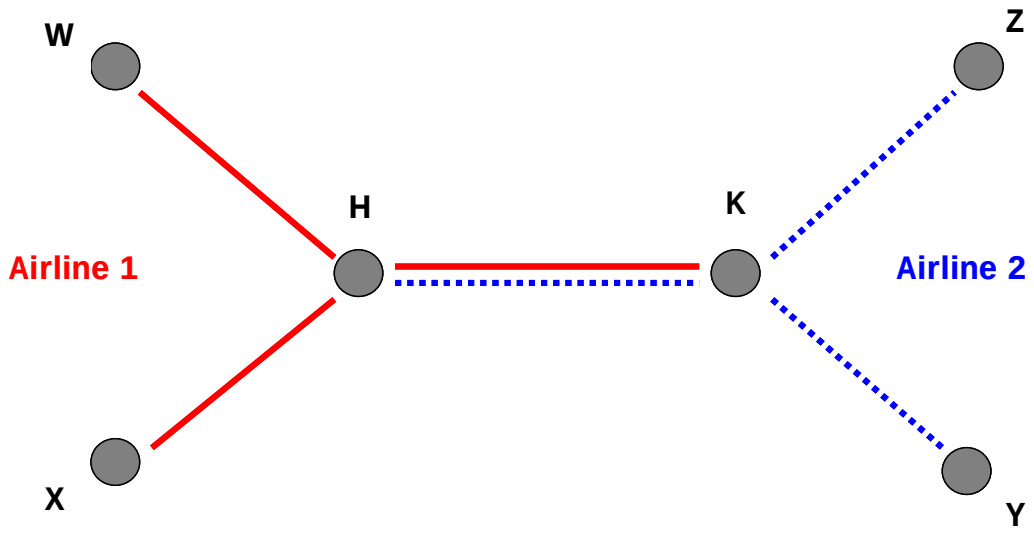
[36] The U.S. DOT's International O&D Survey data is a 10% sample of all international tickets to/from the United States for which at least one segment of the itinerary was operated by a U.S. carrier. Although the data's use is limited to U.S. carriers, the U.S. DOT has frequently made the data available to academic researchers.

[37] *See* Brueckner, J.K., Whalen, W.T., 2000. "The price effects of international airline alliances." *Journal* of *Law and Economics* 43, 503-545.

i. Theoretical Underpinnings

The empirical economics literature on the fare effects of international airline alliances mostly follows the framework first introduced by Brueckner (2001).[38] In that framework, airlines 1 and 2 operate partially overlapping hub-and-spoke networks, with respective hubs at the international-gateway cities *H* and *K*, as seen in Figure 2. The airlines provide overlapping nonstop service between the two gateways, and they jointly serve passengers traveling from behind airline 1's gateway (from cities *W* and *X*) to cities beyond airline 2's gateway (*Z* and *Y*).[39] These passengers make interline trips that cross the networks of both carriers.

FIGURE 2: STYLIZED AIRLINE ALLIANCE NETWORK FROM BRUECKNER (2001)



Source: As originally presented in Brueckner, J.K., 2001. "The Economics of International Codesharing: An Analysis of Airline Alliances", *International Journal of Industrial Organization* 19, 1475-1498.

Brueckner (2001) showed that, when airlines 1 and 2 operate as alliance partners whose goal is to maximize combined profit, potential procompetitive and anticompetitive effects may arise relative to the pre-alliance period. The potential procompetitive effect arises in the behind-beyond

[38] *See* Brueckner, J.K., 2001. "The economics of international codesharing: An analysis of airline alliances." *International Journal of Industrial Organization* 19, 1475-1498.

[39] By way of example, if airline 1 were Air New Zealand and airline 2 were Cathay Pacific Airways, *H* would represent Auckland while *K* would represent Hong Kong. *W* and *X* would represent cities served by Air New Zealand (but not Cathay Pacific) behind its Auckland hub (e.g., Christchurch or Papeete) while *Z* and *Y* would represent cities beyond Hong Kong served by Cathay Pacific (e.g., Taipei or Chengdu) but not served by Air New Zealand.

markets, where cooperative pricing of interline trips reduces the so-called "double marginalization" or "double-markup" problem,[40] thus tending to reduce behind-beyond fares (e.g., the fare from *W* to *Z*) relative to the pre-alliance period. The potential anticompetitive effect arises in the gateway-to-gateway (GTG) market connecting cities *H* and *K*, where the alliance potentially eliminates (or reduces) the pre-alliance competition between airlines 1 and 2, tending to raise fares in the *H-K* market.

Because of the complicated interconnections in Brueckner's theoretical model, neither of these fare effects is a guaranteed outcome. Guided by the theoretical framework, however, researchers have attempted to empirically measure the fare effects of various types of cooperative airline agreements, focusing separately on behind-beyond/behind-to-Gateway fares and GTG fares, where the theory suggests that potentially opposite effects could be found.[41]

ii. Review of Empirical Literature

The earliest published study of fare effects from airline cooperation based on Brueckner's alliance model using data measured at the origin and destination ("O&D") level is Brueckner and Whalen (2000). Because of the limitations of the 1997 U.S. DB1B data used in the study, airline cooperation on interline itineraries was measured by an "alliance" dummy variable[42] indicating whether the two carriers had a codesharing agreement (the variable was set equal to 1 for an interline itinerary even if the agreement did not cover that particular route). The results showed that fares for alliance itineraries were 25% lower than fares for interline itineraries on nonaligned

[40] When two airlines are nonaligned, the fare-setting process for such trips involves double marginalization, with each carrier introducing a separate markup over cost in determining the overall fare. While a higher markup may raise a carrier's own profit, the resulting decline in traffic (a consequence of the higher fare) reduces profit for the partner airline. By contrast, when the two airlines are able to coordinate pricing on joint itineraries (i.e., have antitrust immunity), each carrier takes account of the fact that its own markup hurts the other carrier. When maximization of total profit is the goal, both airlines limit their markups, which leads to a lower overall fare and higher interline traffic.

[41] Because the version of the U.S. DB1B data available to academic researchers does not include itineraries unless at least one segment was operated by a U.S. carrier, the empirical studies using this data set typically exclude Gateway-to-beyond city-pairs as the data will exclude a large portion of tickets in those markets (i.e., itineraries operated exclusively by foreign carriers).

[42] A "dummy" or "indicator" variable is a variable that takes the value 1 under certain conditions and is 0 otherwise. Dummy variables are used when the explanatory variable of interest is *qualitative* in nature (i.e. male versus female, an itinerary involves carriers that are codeshare partners, etc.).

carriers. In a follow-up study using more detailed U.S. DB1B data from 2000, Brueckner (2003)[43] relied on three measures of increasingly integrated airline cooperation: codesharing, alliance membership, and ATI,[44] each of which was associated with a successive fare discount relative to nonaligned itineraries.[45] Relative to these itineraries, codesharing reduced fares by 7%, alliance membership by an additional 4% and antitrust immunity by a further 16%, for a total fare reduction of 27% from the presence of all three types of cooperation (i.e., immunized codeshare service between alliance partners).

A limitation of both of the aforementioned studies was the use of cross-section data from a single quarter, but the panel-data study of Whalen (2007) remedied this drawback.[46] Using U.S. DOT DB1B data from the 1990-2000 period, Whalen's preferred model specification showed a 9% codesharing discount relative to nonaligned itineraries and a further 18% discount from ATI, for the same 27% total discount found by Brueckner (2003). The panel approach was also used by Willig, Israel and Keating (2009) in an unpublished study, which relied on U.S. DB1B data from the 2005-2008 period.[47] Their results, which focused on U.S.-transatlantic city-pairs, again showed interline fare discounts from codesharing and ATI relative to nonaligned fares.

Brueckner, Lee and Singer (2010) revisited these issues using a longer U.S. DB1B panel data set covering the 1998-2009 period, and their results showed somewhat smaller interline fare effects than most previous work.[48] The combination of codesharing, alliance membership, and ATI yielded a fare reduction of 11% relative to fares for nonaligned itineraries worldwide, although the

---

[43] *See* Brueckner, J.K., 2003. International airfares in the age of alliances: The effects of codesharing and antitrust immunity. *Review of Economics and Statistics* 85, 105-118.

[44] The pre-existing literature was conducted prior to the growth of most revenue-sharing JVs. Therefore, the measurement of ATI in the previous papers combines the effect of immunized carriers that were not part of a revenue-sharing JV agreement (e.g., American and Finnair) as well as those that were revenue-sharing JV partners (e.g., Northwest and KLM). More recently, and for all JVs in the context of New Zealand, ATI and revenue-sharing JVs come hand-in-hand.

[45] Unlike the 1997 data used in Brueckner and Whalen (2000), the 2000 data used in Brueckner (2003) identified both the operating and marketing carrier of each segment of a given itinerary.

[46] *See* Whalen, W.T., 2007. "A panel data analysis of code sharing, antitrust immunity and open skies treaties in international aviation markets." *Review of Industrial Organization* 30, 39-61.

[47] *See* Willig, R., Israel, M., Keating, B., 2010. "Competitive effects of airline antitrust immunity." Unpublished paper, Compass Lexecon.

[48] *See* Brueckner, J.K., Lee, D., Singer, E., 2011. "Alliances, codesharing, antitrust immunity and international airfares: Do previous patterns persist?" *Journal of Competition Law and Economics* 7, 573-602.

reduction was a larger 16% for transatlantic travel. The authors conjectured that this smaller discount might reflect reductions in nonaligned interline fares themselves in attempt to limit traffic losses to alliances, a reduction that would narrow the alliance discount.[49]

The most recent contribution in this series of studies is Gillespie and Richard (2012), who used panel data for the period 2005-2010 and focused on economy fares for U.S.-transatlantic travel.[50] In contrast to previous studies, the authors used individual fares rather than aggregating up to an average fare for each itinerary, and their results showed much smaller negative effects of airline cooperation on interline fares than previous studies. Alliance membership without ATI reduced interline fares by only about 1% relative to nonaligned fares, and the addition of ATI yielded at most an extra 1.8% reduction, for a total of about 3%. By contrast, the results of Brueckner, Lee and Singer (2011) for a subsample of economy transatlantic itineraries showed an alliance-plus-ATI reduction of 9% (with codesharing yielding an additional 3.5% reduction). Although the reasons for Gillespie and Richard's smaller effects are unclear, their results may reflect the use of disaggregated fare data. Overall, these empirical studies show that alliances reduce interline fares relative to the fares charged by nonaligned carriers, with nearly all of the studies showing substantial effects. As noted above, however, it is important to keep in mind that none of the aforementioned studies specifically examined whether the negative price effects resulting from increased airline coordination in connecting markets extend to revenue-sharing JVs such as the ones that Air NZ began forming starting around 2011.

Studies exploring the effect of alliances on nonstop gateway-to-gateway fares are fewer in number than those focusing on connecting interline fares. Brueckner and Whalen (2000) investigated this issue for U.S.-international non-stop routes along with their focus on interline fare effects. Their

[49] Another potential explanation for why interline itineraries may have become relatively less expensive is the growth of Internet metasearch engines that are able to search through vast number of other distributors' seat inventory and combine inexpensive flight segments across nonaligned airlines in ways that had previously not been possible. *See*, for example, "What's the best airfare metasearch site?", *USA Today*, February 19, 2014, which included the following discussion: "Who doesn't want to find the absolute lowest price? But cost may not always be the definitive factor. For example, after sifting through our seven [metasearch] sites, we found the lowest fare from New York to London was available for $795 via Kayak. But it consisted of an Air France itinerary with connecting flights on Ryanair. For $41 more, Momondo offered non-stops both ways — British Airways eastbound, Virgin Atlantic back. Personally, I consider paying $41 to avoid a connection a bargain; avoiding Ryanair is priceless."

[50] *See* Gillespie, W., Richard, O.M., 2012. "Antitrust immunity and international airline alliances." *Antitrust Law Journal* 78, 443-455.

GTG fare regression included a count of all the airlines serving the route along with a dummy variable indicating whether two of the airlines were alliance partners. An additional competitor reduced GTG fares by 4.5%, while the presence of two alliance partners among the competitors did not have a statistically significant fare effect, indicating no reduction in competition from overlapping alliance service. Like Brueckner and Whalen (2000), Willig, Israel and Keating (2010) also considered U.S.-transatlantic nonstop GTG fares along with their focus on connecting interline fares, and they used the same approach of including a dummy variable for overlapping immunized alliance service. Relying on 2005-2008 panel data, they found a 7.3% fare reduction from adding a second competitor to a GTG route, but their regression did not show a statistically significant effect from overlapping immunized alliance service, mirroring Brueckner and Whalen's (2000) findings.

Wan, Zou and Dresner (2009), not having access to the U.S. DB1B fare data, collected nonstop GTG fares for U.S. transatlantic routes from online travel agency Expedia's website.[51] Instead of counting competitors, they measured route competition using a standard measure of concentration (i.e., the Herfindahl index[52]), and instead of including a dummy for overlapping alliance service, they included dummy variables indicating whether the route connected alliance-partner hubs (with a separate inter-hub dummy for each of the three major alliances). These dummies are presumably good indicators of whether overlapping alliance service exists on a GTG route. In the regressions, greater route competition as measured by the Herfindahl index had no effect on fares, in contrast to the results of the other two studies. In addition, the alliance inter-hub dummy had either an insignificant or negative effect, showing no fare increase from overlapping alliance service.

Gillespie and Richard (2012), again using 2005-2010 U.S. DB1B panel data, offer the most recent addition to this set of results on GTG fares. They follow the first two studies above in using competitor counts along with a variable indicating the effect of adding an immunized alliance partner to the carriers already on a route. While extra independent competitors reduce GTG fares, adding an immunized alliance partner has no effect on fares, indicating that when two immunized

[51] *See* Wan, X., Zou, L., Dresner, M., 2009. "Assessing the price effects of airline alliances on parallel routes." *Transportation Research Part E* 45, 627-641.

[52] The Herfindahl index (also known as the Herfindahl-Hirschman Index or HHI) is standard measure of industry concentration calculated as the sum of the squared market shares. For example, if a relevant market of interest has four competitors, each with a 25% market share, the Herfindal Index would equal ($25^2 + 25^2 + 25^2 + 25^2$) = 2,500.

alliance partners both serve a GTG route, they do not compete with one another (acting instead as a single airline). This finding is at variance with those of the other studies, making the overall verdict on the fare effect of overlapping alliance service on GTG routes unclear.[53]

Two additional cautionary studies on the effects of alliances are by Bilotkach and Huschelrath (2013, 2015).[54] Also lacking access to U.S. DB1B fare data, these authors use traffic data to explore some possible negative effects of alliances. The 2013 study explores the possibility of "foreclosure" by alliances of non-alliance service to their hub airports. The logic is that the growth of alliances reduces or eliminates interline service between a nonaligned carrier and an alliance member, as that carrier increasingly relies on its partner(s) in providing interline service. Using a panel of U.S.-Transatlantic segment-level passenger data from the 1992-2008 period, the results confirm this expectation, with nonaligned traffic between alliance hubs and other non-hub endpoints falling as alliances are formed, indicating (according to the authors) market foreclosure.[55] Bilotkach and Huschelrath (2015) carry out a related study using U.S. DOT segment level data for the 2007-2013 period, when alliances were mostly mature but the introduction of revenue-sharing JVs was unfolding. Their results show no foreclosure effect on routes into global alliance hubs (with this effect having been mostly completed before the sample period), while indicating new foreclosure on routes into JV hubs. Evidently, the emergence of JVs strengthened the previous tendency of allied carriers to provide interline service with their partners rather than nonaligned carriers. It should be noted, however, that these tendencies are not necessarily detrimental to consumers. With alliance interline travel offering greater convenience and lower fares than interline travel on nonaligned carriers, concentration of traffic on alliances may be beneficial, in contrast to the pejorative implication of the foreclosure label.

---

[53] Using a different approach, Gayle and Brown (2014) study the effect on US domestic fares of overlapping service on a route by domestic alliance partners over the 2002-2003 period. Since domestic partners did not enjoy ATI, there was less reason for concern about fare increases from overlapping service than in the international context, and the results of the study confirm this expectation by showing no fare effects.

[54] *See* Bilotkach, V., Huschelrath, K., 2013. "Airline alliances, antitrust immunity, and market foreclosure," *Review of Economics and Statistics* 95, 1368-1385 and Bilotkach, V., Huschelrath, K., 2015, "Balancing competition and cooperation: Evidence from transatlantic airline markets." Discussion paper 15-059, ZEW (Centre for European Economic Research).

[55] Although access to the U.S. DOT's International O&D Survey data is restricted to U.S. carriers and certain academic researchers, the U.S. DOT's enplaned passenger data is publicly available. These data, however, do not allow one to distinguish the origin or destination of passengers on any particular flight segment.

Finally, a study prepared by consulting firm ICF SH&E on behalf the Competition Commission of Singapore analyzed the *ex post* effects of the JAL/American and ANA/United transpacific JVs.[56] While few details regarding the underlying methodology used in the study were provided in the publicly available summary of the report, the study purports to have found little evidence of lower fares and some evidence of higher fares for business class passengers resulting from these two JVs.[57] On net, however, the study also concluded that "Both JAL/AA and ANA/CO /UA appear to have delivered net benefit [to Singapore]."[58]

c) Air New Zealand's Current JVs

As noted above, Air NZ is currently authorized to participate in five revenue-sharing JVs. Before turning to our analysis of the *ex post* fare effects of these agreements, we provide a brief overview of each of Air NZ's five JVs.

i. Virgin Australia

Air NZ received authorization to form its first JV in December 2010, when the New Zealand Ministry of Transport ("MOT") and the Australian Competition and Consumer Commission ("ACCC") approved the JV for trans-Tasman services between Air NZ and Pacific Blue Airlines (NZ) Lt., Pacific Blue Airlines (Australia) Ltd., and Virgin Blue Airlines Virgin Australia (collectively referred to hereafter as Virgin Australia).[59] The Air NZ/Virgin Australia JV enabled the two carriers to share revenue and coordinate all aspects of their trans-Tasman passenger services—including (among other things) pricing, capacity planning, codesharing, harmonized frequent flyer plans, and reciprocal airport lounge access—on flights between New Zealand and Australia (the "trans-Tasman sectors") as well as for any international itineraries involving a trans-

[56] *See* "Summary Report on Net Economic Benefit of Joint Ventures Market Study on the Airline Industry", ICF SH&E, February 11, 2014 ("ICF SH&E Study"). Unlike the studies in the published literature that rely on the U.S. DOT's International O&D Survey data, the ICF SH&E study used IATA's PaxIS data, which is derived from tickets processed through IATA's Billing and Settlement Plan.

[57] *See* ICF SH&E Study, page 6: "Individual fares (i.e. the fare in each ticket class) didn't change as a result of the JVs – with the possible exception of business class fares for ANA/CO/UA, which appear to have gone up."

[58] Ibid, page 7.

[59] The Air NZ/Virgin Australia JV came into effect on January 7, 2011. *See* Determination: Applications for authorization lodged by Virgin Australia Airlines Pty Ltd, Air New Zealand Limited and Others in respect of an airline alliance between the applicants, September 3, 2013, (hereafter "ACCC Air NZ/Virgin Reauthorization Report"), Paragraph 17.

Tasman sector connecting to domestic flights within New Zealand and Australia ("Network Alliance Routes").[60] In September 2013, MOT and ACCC reauthorized the Air NZ/Virgin Australia JV until October 31, 2018.

In reauthorizing the Air NZ/Virgin Australia JV in 2013, MOT observed that there was "strong evidence" of many of the consumer benefits the carriers had predicted would occur as a result of the JV, particularly with regards to increased capacity, better scheduling, harmonized frequent flyer benefits and better (i.e., joint) airport lounge access.[61] Similarly, ACCC concluded that *"in the two years the Alliance has been in operation it has resulted in material public benefits in the form of enhanced products and services (particularly through new frequencies) and the promotion of competition on the trans-Tasman routes."*[62]

However, based on MOT and ACCC's analysis, the *ex post* fare effects of the Air NZ/Virgin Australia JV were less clear. In particular, MOT concluded that while average fares had fallen across the carriers' joint network, *"[t]here is little evidence to suggest that the fare reductions were achieved as a result of the Alliance itself."*[63] Likewise, while acknowledging that trans-Tasman fares had declined since the start of the Air NZ-Virgin Australia JV, ACCC concluded that *"at this stage it is difficult to determine whether changes in fares may be attributed to the Alliance"* and that it *"remain[ed] concerned that on certain trans-Tasman routes the Alliance may find it more profitable to raise fares rather than lower them."*[64] Moreover, with regards to the potential for lower fares on joint itineraries due to reduced double marginalization, ACCC also acknowledged that *"the removal of double-marginalisation under the Alliance is a benefit to trans-Tasman passengers who prefer to travel with one of the Applicants and utilise a connection in Australia or a connection in New Zealand beyond the trans-Tasman gateway destinations that would not have been available absent the Alliance"* but that *"…the magnitude of this benefit is*

[60] As part of the 2010 authorization of the Air NZ/Virgin Australia JV, the carriers were required to meet certain capacity thresholds on routes to and from Wellington (Wellington-Sydney, Wellington-Melbourne and Wellington-Brisbane) as well as Dunedin-Brisbane. *See* ACCC Air NZ/Virgin Reauthorization Report, Paragraph 13.

[61] *See* "Analysis of Air New Zealand/Virgin Australia application for reauthorisation of the Trans-Tasman Alliance, Ministry of Transport Report, September 2013, Table 8.

[62] *See* ACCC Air NZ/Virgin Reauthorization Report, Page ii.

[63] *See* "Analysis of Air New Zealand/Virgin Australia application for reauthorisation of the Trans-Tasman Alliance, Ministry of Transport Report, September 2013, Table 8.

[64] *See* ACCC Air NZ/Virgin Reauthorization Report, Paragraphs 288-289.

currently minimal, but is likely to result in small public benefits going forward as the number of passengers utilising such connections grows."[65]

ii. Cathay Pacific/Dragonair

On November 1, 2012, Air NZ received approval to implement its second JV, with Cathay Pacific/Dragonair, which became effective January 30, 2013.[66] Although MOT initially approved this JV for a three year period, the carriers received approval to extend the duration of the JV on August 24, 2015 until October 31, 2019.

Unlike many airline JVs, the Air NZ/Cathay JV is between carriers that are members of different global alliances (i.e., unlike Star Alliance member Air NZ, Cathay is a member of oneworld).[67] As a result of this and other factors,[68] the degree of coordination available under Air NZ's JV with Cathay is relatively less comprehensive than with its other three JVs. For example, while Air NZ and Cathay share revenues on all non-stop services between New Zealand and Hong Kong (currently limited to the Auckland-Hong Kong route, which is served by both carriers)[69] and coordinate activities related to scheduling and pricing on itineraries involving the Alliance segment and New Zealand "feeder routes" (i.e., domestic New Zealand segments that are part of an international itinerary involving the Auckland-Hong segment),[70] the parties do not revenue share, jointly price (or even codeshare) to destinations beyond Hong Kong. Nevertheless, while the JV does not extend to Air NZ placing its code on Cathay/Dragonair's flights beyond Hong Kong, the agreement does include a special interline pro-rate agreement that provides Air NZ with access to

[65] Ibid, Paragraph 284.

[66] Because Dragonair is a wholly owned subsidiary of Cathay Pacific, we refer to this JV throughout our discussion as the Air NZ/Cathay JV.

[67] *See* Appendix 1.

[68] For example, the current air services agreement between New Zealand and Hong Kong does not permit a third country carrier to codeshare on Cathay Pacific to destinations in China.

[69] Under the Air NZ-Cathay codeshare, the two carriers also engage in a two-way freesale codeshare on each other's flights between AKL and HKG. Air NZ currently operates a daily, year-round roundtrip frequency between AKL and HKG, while Cathay operates a daily AKL-HKG frequency between April and November, and two daily frequencies in December, January, February and middle of March. Source: OAG.

[70] *See* "Analysis of Air New Zealand/Cathay Pacific application for authorisation of a North Asia Alliance Agreement and Code-share Agreement", October 18, 2012 (hereafter "MOT 2012 Air NZ/Cathay Report"), paragraphs 1-3. While the revenues from the Auckland-Hong Kong leg of such itineraries is shared according to the revenue sharing agreement between the two carriers, revenues for segments beyond/behind AKL are split pursuant to the special pro-rate agreement between the carriers.

lower fares than it would otherwise receive, which provides incentives for the carriers to optimize their flights schedules to provide better connectivity between their flights.[71]

In its initial authorization of the Air NZ/Cathay JV in 2012, the MOT concluded that but for the JV, it was *"almost inevitable that one of the two carriers w[ould] exit the route (most likely Air New Zealand)"*[72] but that compared to the status quo, there was *"some risk of increases fares and/or reduced capacity for travel between Auckland and Hong Kong."*[73] In reauthorizing the JV in 2014, the MOT concluded that *"there is insufficient evidence to come to a conclusive view about the impact the alliance has had on fares"* but that they had *"not attempted to calculate a true and dependable assessment of the impact of the alliance on airfares. To do so would require significant external expertise and access to data that is not readily available to us."*[74]

iii. Singapore Airlines

On August 7, 2014, the MOT authorized a revenue-sharing JV between Air NZ and Singapore Airlines for a four year term, effective December 1, 2014.[75] Like the Air NZ/Cathay JV, the Air NZ/Singapore JV enables the two carriers to share revenue and coordinate all aspects of their services (capacity, pricing, frequent flyer programs, etc.) on the "Alliance Sectors" connecting New Zealand and Singapore (e.g., Auckland-Singapore and Christchurch-Singapore).[76] In addition, the JV enables the two carriers to expand their pre-existing codeshare agreement[77] and

---

[71] *See* MOT 2014 Air NZ/Cathay Report, page 36: "Air New Zealand has rescheduled its outbound flight to Hong Kong, in order to facilitate connections beyond Hong Kong on Cathay Pacific and Dragonair flights."

[72] *See* 2012 MOT Air NZ/Cathay Report, paragraph 26.

[73] Ibid, paragraph 27.

[74] *See* MOT 2014 Air NZ/Cathay Report, paragraph 62.

[75] *See* http://www.transport.govt.nz/air/internationalairservices/air-new-zealand-and-singapore-airlines-alliance-application/. This JV was also approved (indefinitely) by the Competition Commission of Singapore ("CCS") on April 17, 2014; however, the CCS retains jurisdiction to review its decision in the event of a "material change of circumstances". *See* "Notice of Decision Issued by Competition Commission of Singapore (CCS), Application for Decision by Singapore Airlines Limited and Air New Zealand Limited, April 17, 2014", ("CCS Air NZ/Singapore Decision").

[76] At the time the JV was announced, Air NZ did not offer non-stop service to Singapore (Air NZ had previously offered daily non-stop service between Auckland and Singapore but terminated that service in October, 2006). As part of the Air NZ-Singapore JV, Air NZ restored its Auckland-Singapore service (starting in January, 2015) by assuming the operations for one of Singapore Airlines' two daily frequencies on the route. In addition to its Auckland-Singapore service, Singapore Airlines had also served Christchurch-Singapore since 1986.

[77] Prior to entering into the JV, Air NZ and Singapore were party to a codeshare agreement whereby Singapore placed its code on nine domestic New Zealand sectors and nine trans-Tasman sectors operated by Air New Zealand. However, Air NZ did not place its code on any Singapore flights under this agreement. Under the JV, Singapore

coordinate pricing and marketing on flights beyond Singapore to a broad range of international destinations (referred to as "priority" destinations).[78]

Even though MOT concluded that *"the alliance would be a significant barrier to entry on both the Auckland-Singapore and Christchurch-Singapore routes"*,[79] MOT's analysis also recognized that the thin nature of the routes between New Zealand and Singapore implied that it was *"highly unlikely that another carrier would seek to operate on either route in the short to medium term regardless of whether the alliance is authorised."*[80] With regards to the impact of the JV on fares, however, MOT observed that *"[w]hile there is potential for fares to be lowered on connecting services, the Alliance may also provide opportunities for the Applicants to raise fares as a result of a stronger market position"* [81] and therefore concluded that *"[t]he impact of the Alliance on fares is uncertain."*[82] Similarly, the CCS concluded that *"in the absence of available figures, it is not possible to quantify the benefits arising from lower fares, or even the possibility of lower fares."*[83]

iv. <u>*Air China*</u>

Air NZ's JV with Star Alliance partner Air China was approved by MOT on September 1, 2015 and is authorized until March 31, 2021.[84] Under the Air NZ/Air China JV, the two carriers share revenue and coordinate all aspects of their services (capacity, pricing, frequent flyer programs, etc.) on the so-called "Alliance Sectors" between New Zealand and China (currently Air NZ's

---

continues to place its code on Air NZ's domestic and Trans-Tasman flights and Air NZ began placing its code on certain Singapore Airlines' flights beyond Singapore. *See also* footnote 78 below.

[78] The priority destinations include: Denmark (CPH), France (Still pending ASA), Germany (FRA/MUC), India (BLR, BOM, CCU, COK, HYD, & MAA), Indonesia, Italy (FCO not MXP), Malaysia (BKI, KCH, KUL, LGK, PEN), Netherlands (AMS), Philippines (MNL), Russia (DME), Spain (BCN), Switzerland (ZRH), Thailand (BKK, CNX, HKT, USM), Turkey(IST), United Kingdom (LHR, MAN) and Vietnam (DAD, SGN, HAN). Air NZ and Singapore also codeshare (but do not coordinate prices) on Singapore's flights to Brunei (BWN), Cambodia (REP, PHN), Saudi Arabia (RUH), South Africa (JNB), Sri Lanka (CMB) and the UAE (DXB).

[79] *See* "Detailed analysis to support the report to the Minister of Transport", New Zealand Ministry of Transport, July 28, 2014 ("MOT Air NZ/Singapore Report"), paragraph 63. *See* CCS Air NZ/Singapore Decision, paragraphs 20-21.

[80] *See* MOT Air NZ/Singapore Report, paragraph 63.

[81] Ibid, paragraph 161.

[82] Ibid, paragraph 162.

[83] *See* CCS Air NZ/Singapore Decision, paragraph 117.

[84] *See* http://www.transport.govt.nz/air/internationalairservices/internationalaircarriagecompetition/anzairchinaalliance/.

service between Auckland and Shanghai and Air China's service between Auckland and Beijing).[85] The JV also enables the carriers to coordinate schedules and jointly determine pricing on connecting itineraries involving an Alliance Sector and one or more domestic segments within New Zealand or China (referred to as "Alliance Routes").[86]

In authorizing the Air NZ/Air China JV, the MOT concluded that the potential benefits of the JV outweighed the potential risks, but nonetheless cautioned that *"[t]he alliance may dilute competition between Air New Zealand's alliance partners"* and that *"[t]he co-existence of Air New Zealand's alliances with Air China and Cathay Pacific makes it more likely that the fares Air New Zealand sets on connecting services through those alliances are aligned."*[87] MOT also cautioned that *"under an alliance with Air New Zealand, Air China may have less incentive to pursue an aggressive growth strategy. Air New Zealand typically takes a more cautious approach to growing capacity and could use the alliance to constrain the growth of Air China's capacity on Auckland-Beijing."*[88]

v. <u>*United Airlines*</u>

Air NZ's most recent JV is with Star Alliance partner United Airlines. Although MOT and the U.S. DOT granted the carriers ATI in 2002 (subject to certain carve-outs between Auckland and Los Angeles, a route United operated at the time), United suspended AKL-LAX service in 2003 after which the carriers reverted to a basic codeshare agreement without joint pricing. In April 2015, the carriers signed a Statement of Intent to deepen their partnership. United supported the recent launch of Air NZ's non-stop service to United's largest hub (Houston) in December 2015 and in March 2016, the carriers announced that they had entered into a revenue sharing JV.[89]

---

[85] Air China's service between Auckland and Beijing was announced as part of carriers' JV.

[86] As with the Air NZ/Cathay and Air NZ/Singapore JVs, only the revenues on the Alliance Sector on connecting itineraries is shared pursuant to the revenue sharing agreement.

[87] *See Authorisation Of A Strategic Alliance Between Air China And Air New Zealand*, Chair – Cabinet Economic Growth and Infrastructure Committee, Office of the Minister of Transport, ("MOT Air NZ/Air China Decision"), Paragraph 31.

[88] Ibid, Paragraph 35.

[89] *See* "Air New Zealand and United Airlines to Revenue Share on USA - New Zealand Routes", Air New Zealand Press Release, March 10, 2016.

Under the Air NZ-United JV, the carriers will share revenue and coordinate schedules and pricing (effective July 1, 2016) on alliance sectors between New Zealand and the United States (i.e., between Auckland and San Francisco, Los Angeles and Houston),[90] and the carriers are also seeking regulatory approval to remove the remaining local passenger carve-outs. As part of the JV, United will also launch non-stop service between San Francisco and Auckland on July 1, 2016. As with Air NZ's other JVs, United and Air NZ will harmonize FFP and premium passenger handling to support metal-neutrality.

As described above, a common challenge faced by regulators weighing the potential benefits and risks of authorizing or re-authorizing Air NZ's JVs has been the uncertainty regarding the actual *ex post* price effects of these agreements. As noted earlier, while the established literature has found that less integrated forms of cooperation between carriers (e.g., codesharing, global alliances and ATI) have yielded lower fares, there have been no published studies to date extending the empirical approach of these analyses to the revenue-sharing JVs that have more recently become the norm among airlines globally, and in particular, for Air NZ. In Section 3 below, we extend the empirical framework established in the earlier literature to explicitly measure the impact on airfares of Air NZ's JVs using a unique data set comprised of over ten years of Air NZ's ticketing data.

3. *Ex Post* Empirical Fare Analysis of Air New Zealand's JV Agreements

To empirically assess the effect of Air New Zealand's JVs on the international airfares to and from New Zealand, we estimated a set of standard fare regression models following previous published studies.[91] The regressions use a ten and a half year sample of Air NZ ticket data starting in the second half of 2005 and ending in December 2015.[92] The unit of observation is the individual

[90] Revenue sharing and pricing coordination does not currently extend to certain point-to-point traffic between AKL and LAX.

[91] Regression analysis is a standard analytical tool used by economists (and other researchers) to determine the relative importance of potential explanatory (i.e., "independent") variables in explaining the variation of a variable being analyzed (the "dependent" variable), which in this case is international airfares or traffic.

[92] The ten and a half year period corresponds to Air NZ financial periods 2006 P1 to 2016 P6. In order to eliminate tickets that may not be representative or are the result of coding errors, we eliminated observations if: (1) the origin airport of a segment is not equal to the destination airport of the previous segment, (2) the passenger count is less than or equal to zero, (3) the origin is equal to the destination, (4) **ticket_fare_nzd** was missing or less than 25 NZD per passenger, (5) there were more than five segments on the O&D, (6) the flown distance of the O&D was more than twice the minimum flown distance for the city-pair observed in the data, or (7) the fare per flown kilometer was greater

passenger ticket,[93] in which underlying roundtrip itineraries have been broken into one-way legs, with the corresponding roundtrip fare also being divided by two. While much of the existing literature has used average fares across a city- or airport-pair as their unit of observation,[94] we are able to perform our analysis at the individual ticket level using data provided by Air New Zealand. The richness of our data set allows us to exploit ticket-level characteristics such as days of advance purchase and duration of trip as separate control variables in our regressions, characteristics that have typically not been controlled for in earlier studies. Since we are using Air NZ's internal data, however, our data set is limited to tickets where Air NZ marketed or operated at least one segment of a passenger's itinerary.

As with the previous literature, we estimate our model on city-pairs in which no carrier offers non-stop services ("connecting markets") and city-pairs in which at least one carrier offers nonstop service ("nonstop markets") separately.[95] The variables used in the regressions are described in the context of the results, with summary statistics provided in Appendices 2 and 3 for connecting and non-stop markets, respectively.

a) Connecting Markets

Table 1 shows the regression results for connecting markets, using data for all fare classes and presenting results for trans-Tasman trips (involving travel between New Zealand and Australia) and all other connecting trips (denoted non-Tasman). The dependent variable is the natural log of the per-passenger fare for the one-way O&D trip (we use the **ticket_fare_nzd** variable).[96] The

---

than 1.5 NZD for first/business tickets, or greater than 0.6 NZD for economy class tickets. Only observations where the passenger type was an adult were used. Finally, carriers with common ownership or change in their two-letter airline code over the period are grouped (e.g., VA/DJ, QF/JQ, NZ/FOM, SQ/MI, CX/KA).

[93] Because some tickets contain multiple passengers, we weight the observations in the regressions by the passenger count.

[94] As is common in the literature, we rely on city-pairs as opposed to airport-pairs when constructing our units of observation. Thus, passengers traveling between Auckland and Tokyo-Narita are considered to be in the same market as those traveling between Auckland and Tokyo-Haneda. *See* CCS Air NZ/Singapore Decision, paragraph 58: "…the typical starting point for the market definition relating to the provision of air passenger transport services is the O&D pair routes of air services, usually city-pairs."

[95] Because less than daily service is common on many long-haul international routes, we define non-stop service as at least three roundtrips per week on average over the month. Because our sample consists of Air New Zealand data, the markets in the non-stop sample are limited to city-pairs with non-stop international service by Air New Zealand to/from New Zealand.

[96] As is frequently done, we have transformed the fare variables in our regressions analyses into natural logarithms so that we can interpret the estimated coefficients as percentage effects on fares. It should be noted that the estimated

table includes the estimated coefficients for each independent variable in addition to their standard errors (in parentheses).[97] Estimated coefficients noted with a single asterisk (*) are statistically significant at the 95% confidence level and estimated coefficients noted with two asterisks (**) are significant at the 99% confidence level.[98] The estimated coefficients are interpreted as the marginal effect of that variable on Air New Zealand's fares in the city-pair, *holding all other independent variables constant.*

Table 1: Connecting Markets, All Fare Classes

	(1) Non-Tasman	(2) Trans-Tasman
D(online)	-0.116**	0.00918
	(0.0320)	(0.0170)
D(JV)	-0.0879**	-0.0730**
	(0.0214)	(0.0139)
D(Alliance)	0.0156	
	(0.0170)	
Connect Comps	-0.00222	0.0490*
	(0.000956)	(0.0205)
D(Days<3)	Redacted – Confidential Information	
Days Prior		
D(Premium Ec)		
D(Business)		
D(First)		
Coupons		
D(roundtrip)		
D(NZ POS)		
Exchange		
ln(dist)		
D(Feb 2011)	-0.00951	-0.0933**
	(0.0106)	(0.0182)

coefficient on a dummy variable in a log regression differs from the percentage by an adjustment factor, which can be non-trivial for large estimated coefficients. However, to facilitate a simple discussion, this technical discrepancy is ignored in the discussion of results presented below.

[97] The standard errors reflect clustering by city-pair market, which is appropriate under the assumption that the error terms are correlated *within* but not across markets. For a recent exposition of the issues involved in clustering, *see* Chapter 8 of Angrist, J. and J.-S. Pischke, 2009, *Mostly Harmless Econometrics*, Princeton: Princeton University Press.

[98] It is standard practice among economists and statisticians to evaluate statistical significance based at the 5% and 1% levels (alternatively, the 95% and 99% confidence levels). Thus, when the probability of an observed value is greater than 5%, economists and statisticians typically agree that the observed value could have been the result of random variation.

Constant	6.269**	6.373**
	(0.820)	(0.805)
Observations	7,481,334	1,941,295
Adjusted R-squared	0.702	0.594

Standard errors clustered by citypair parentheses
City-pair year, and month fixed effects not displayed
** p<0.01, * p<0.05

i. Non-Tasman Connecting Markets

Consider first the non-Tasman regression (column 1 of Table 1), which has by far the larger number of observations (almost seven million), reflecting travel in 18,915 distinct city-pair markets. Before considering the main results, note that the two regressions in Table 1 include many control variables, including dummy variables for the ticket's city-pair and the month and year of travel.[99] The positive estimated coefficient of **ln(dist)** (i.e., the natural log of the trip distance) shows that longer connecting trips are more expensive (a result that is not statistically significant), while the negative estimated coefficient of the roundtrip dummy **D(roundtrip)** shows that round trips are about [redacted] less expensive (on a one-way basis) than trips booked as one-way.[100] The positive estimated coefficient of point-of-sale dummy **D(NZ POS)** shows that tickets with a New Zealand point of sale are about [redacted] more expensive than tickets bought elsewhere, and for a given distance, **Coupon**'s estimated coefficient shows that trips with an extra ticket coupon (an extra flight segment) cost slightly more (about [redacted]%), evidently reflecting the higher cost of carrying the passenger on multiple flight segments.[101] The negative estimated coefficient on **Days Prior**, a variable that measures the number of days between the purchase date and the flight date, reflects the benefits from early ticket purchase (relative to the first date of travel), while the positive estimated coefficient of trip length dummy variable **D(Days < 3)** shows that fares for trips lasting less than three days (presumably business trips) are [redacted] higher

[99] The monthly dummy variables primarily capture the seasonal fluctuations in fares that is common across markets, while the annual dummy variables capture time-varying effects on airfares (such as fuel prices and/or changes in GDP) that impacts markets in a common way. By including city-pair fixed effects, the regression analysis is effectively performing thousands of individual "case studies" (in the case of the connecting regression) of the impact of Air NZ's JVs on its fares in a particular city-pair and averaging the effect across all of the city-pairs contained in the data set. As is commonly done, the estimated coefficients on the city-pair, year and monthly dummy variables are not reported in the regression tables.

[100] The variable **ln(dist)** is the natural log of the sum of the flown segment distances in kilometers.

[101] Some other research shows a negative fare effect from an additional coupon, as would be expected if passengers require compensation in a lower fare for the added inconvenience of an extra stop.

than those for longer trips.[102] The dummy variables **D(Premium Ec)**, **D(Business)**, and **D(First)** indicate premium-economy, business-class, and first-class tickets,[103] respectively, and the ascending size of their estimated coefficients reflects the higher costs and hence fares associated with providing classes of service with higher levels of amenities and cabin space (relative to standard economy class service).[104]

As in previous studies, competition in connecting markets puts downward pressure on fares, but the estimated coefficient of **Connect Comps** is statistically insignificant, showing that the effect cannot be distinguished from zero.[105] The variable **Exchange** adjusts for currency fluctuations that affect the price of tickets (in NZD) bought outside of New Zealand when the revenues from those tickets are repatriated back to New Zealand.[106] Its negative sign shows that, when a currency depreciates against the New Zealand Dollar (making the variable larger), the fare in New Zealand Dollars falls.[107] The negative estimated coefficient of the dummy variable **D(Feb 2011)** shows

---

[102] The variable **Days Prior** is equal to the number of days before the flight that the ticket was purchased for flights purchased less than 90 days before departure and equal to 90 for tickets purchased more than 90 days in advance. The variable **D(Days < 3)** is equal to one for round-trip tickets where the total travel trip length was less than three days, and is 0 otherwise.

[103] While Air NZ does not offer a First Class cabin (separate from its Business Class cabin), some of its JV partners (e.g., Singapore) and interline and codeshare partners (e.g. Thai, Air Canada) offer both Business Class and First Class. Thus, the **D(First)** dummy variable would only take the value 1 for itineraries where the longest segment was a First Class segment on another carrier.

[104] As is routinely done when using a set of dummy variables to categorize a set of mutually exclusive and complete characteristics, we have omitted one of the dummy variables (here, for Standard Economy Class tickets) from the regression, and thus, the estimated coefficients from the other three classes dummy variables are relative to the excluded dummy. For tickets with mixed cabins (i.e. business class on one flight segment and economy class on another flight segment), the cabin class dummy variables are based on the cabin class for the longest segment of the O&D trip.

[105] The number of connecting competitors (denoted **Connect Comps**) is defined as the number of carriers that do not offer non-stop service on the route but serve both endpoints of the city-pair through a common hub with at least three roundtrips per week on each segment. For a carrier's connecting service to be considered competitive, the total distance of the connection had to be no more than 1.8 times the shortest available option on any carrier (non-stop or connecting). Following Brueckner, Lee and Singer (2011), **Connect Comps** is computed assuming that joint venture alliance partners do not compete with one another. As a result, a connecting market with two JV partners and a third carrier with no relationship with the JV partners would be counted as having two competing carriers.

[106] *See*, for example, "Air NZ suspends Osaka flights", Stuff.co.nz, May 14, 2013 (http://www.stuff.co.nz/travel/8671220/Air-NZ-suspends-Osaka-flights), reporting that "Air New Zealand has revealed it will cut its Osaka service and refocus its attention on Tokyo due to lower yields out of Japan… The weaker Japanese currency had impacted on the airline's profitability when repatriating revenues from the route."

[107] In order to compare across countries, this variable is constructed as an index of the monthly exchange rate where the value of the index is equal to 1 in June 2015. The index measures currency fluctuations for tickets with point-of-sale outside of New Zealand. For tickets with New Zealand point-of-sale, the variable is equal to 1. Exchange rate data is from the Reserve Bank of New Zealand, http://www.rbnz.govt.nz/statistics/tables/b1/ and is available for 96

that tickets purchased during February 2011, the month of the Christchurch earthquake, were slightly less expensive than tickets bought at other times, although the effect is not statistically significant (such an effect would presumably arise through tickets bought after the earthquake).

The main variables of interest are the dummy variables measuring airline cooperation: **D(JV)** and **D(Global Alliance).**[108] The **D(JV)** variable indicates that the connecting trip is interline and composed only of route segments operated by Air NZ and a revenue-sharing JV partner.[109] For example, if the observation involves a trip from Auckland to Beijing that combines an Air NZ segment to Hong Kong with a Cathay Pacific or Dragonair segment from Hong Kong to Beijing, then the **D(JV)** dummy variable would be set equal to one for that observation (i.e., because the Auckland-Hong Kong segment is a route on which Air NZ and Cathay Pacific operate a joint venture). The variable **D(Global Alliance)** is defined similarly, except that the cooperating carrier is a Star Alliance partner of Air NZ other than one of its revenue-sharing JV partners, for example, itineraries involving connections between Air NZ and Air Canada, United, or Lufthansa.[110] The variable **D(Online)** indicates that the connecting trip is flown entirely on a single carrier, which operates all the route segments.[111] The default (or excluded) category is a traditional interline trip, where the itinerary's carriers are unaligned, having no global alliance relationship (e.g., a connection between Air NZ and Qantas). Since airline "cooperation" is largely absent on such trips,[112] economic theory (and the pre-existing literature) predicts that they should have the highest

---

percent of passenger tickets. For tickets with a point-of-sale in a country without exchange rate data, the variable takes a value of 1.

[108] Our current study does not separately attempt to measure the price effect of ATI, separate from a revenue-sharing JV or global alliance effect. This is because during the period of analysis, Air NZ has not coordinated pricing with any of its global alliance partners outside of a revenue-sharing JV context. Although Air NZ and United were granted ATI in 2001, the carriers did not implement joint pricing between New Zealand and the United States until after the data sample ended.

[109] During the regression sample period, Air New Zealand's Joint Venture partners are Virgin Australia beginning August 2011, Cathay Pacific (including Dragonair) beginning February 2013, Singapore Airlines beginning January 2015, and Air China beginning December 2015.

[110] Air NZ and United had not yet commenced their revenue-sharing JV during the sample period.

[111] In this dataset, which uses Air NZ data, the carrier is Air NZ for 99% of the observations that are classified as online. The small number of online observations for which Air NZ is not the carrier are the result of splitting roundtrip itineraries into their respective inbound and outbound legs (e.g., a SYD-AKL-LAX-SYD itinerary whereby the outbound SYD-AKL-LAX leg was operated by Air NZ and the LAX-SYD return leg was operated by United).

[112] Many carriers that do not cooperate (in the sense of a codeshare or global alliance agreement) still have an interline pro-rate agreement (often the standard IATA pro-rate agreement) and coordinate the transfer of checked bags between connecting flights.

fares due to the problem of double-marginalization. Thus, the various cooperation variables (including **D(Online)**) should have negative estimated coefficients, indicating fare discounts relative to traditional interline trips.

In Column 1 of Table 1, the negative estimated coefficient for **D(Online)** indicates that online connecting fares are, on average, 11.6% below traditional interline fares, matching a pattern seen in previous research. The negative estimated coefficient on **D(JV)** shows that fares for connecting trips that involve a JV segment are also lower than traditional interline fares, with an average discount of 8.8%. Importantly, the hypotheses that this coefficient differs from the **D(Online)** coefficient cannot be rejected at the 95% confidence level, indicating that JV and online fares in non-Tasman connecting markets are statistically indistinguishable. This finding provides compelling statistical evidence that the incentives inherent in a metal-neutral revenue-sharing agreement have resulted in Air NZ and its JV partners behaving like a single online carrier in pricing their connecting trips. Moreover, although this finding is consistent with both the economic theory and the predictions of regulatory authorities and carriers alike, it is (to the best of our knowledge) the first empirical validation of the proposition that metal-neutral JVs eliminate double marginalization altogether.

The **D(Global Alliance)** coefficient is positive but statistically insignificant, indicating that connecting fares where Air NZ is paired with a Star Alliance partner (other than its JV partners Singapore Airlines and Air China) are indistinguishable from traditional interline fares. The absence of a global alliance fare effect differs from the negative effect found by previous researchers.[113] The reasons why the alliance effect does not match that found in previous research is unclear. However, a major difference between this and previous studies is the focus on connecting trips that pair a single airline (Air NZ) with various partners. The data for previous studies involved relatively unrestricted pairings matching a variety of U.S. carriers with a foreign airline (either an alliance partner or a nonaligned carrier), pairings that generated a large number of possible carrier combinations. Although the theory's predicted effect of airline cooperation on fares should, in principle, apply universally, the limited number (and possible idiosyncratic

[113] It is important to emphasize that that there are several *non-price* related benefits to passengers of global alliances not captured in our fare regressions, such as increased connectivity and schedule options, as well as frequent flyer program and airport lounge reciprocity.

features) of Air NZ's global alliance relationships, along with the unique nature the market for international air services to/from New Zealand, could conceivably make these predictions less applicable to New Zealand.[114]

Nevertheless, the current results strongly confirm the presence of a discount from online service, as found previously, and they offer a striking conclusion about the fare effects of joint ventures not seen before in the literature. In particular, the results show that the connecting fares charged by JV partners are *indistinguishable from online fares, indicating that the partners indeed operate as though they were a single airline*, providing substantial fare benefits to connecting passengers via full elimination of double marginalization. Given the relatively small size of New Zealand's local market (as discussed in detail in Section 4 below), the ability for Air NZ to partner with other international carriers to provide service and fare levels equivalent to its own online service to destinations Air NZ could not reach on its own should be viewed as a major benefit of the carriers' JVs to New Zealand travelers.

ii. *Trans-Tasman Connecting Markets*

Turning our attention to trans-Tasman markets in column 2 of Table 1, we first observe that the trans-Tasman regression has far fewer observations than the non-Tasman regression (1.9 million vs. 7 million), reflecting travel in many fewer city-pair markets (1,358 vs. 18,000+). The regression also differs from the non-Tasman regression in the omission of the global alliance variable, reflecting the absence of non-JV alliance service on these routes. The model also excludes the **D(First)** dummy variable, as first-class tickets constitute an extremely small proportion of tickets in most trans-Tasman city-pairs.

The negative estimated coefficient of **D(JV)** in Column 2 of Table 1 shows that trans-Tasman JV connecting fares are 7% lower than traditional interline fares. However, the positive but statistically insignificant estimated coefficient on the **D(Online)** variable shows that online fares are indistinguishable from traditional interline fares, a result that may reflect other unobserved differences between online and traditional interline tickets in these markets. With the exception

[114] As note earlier, the lack of a negative estimated coefficient on the global alliance dummy variable may also reflect the growth of internet metasearch engines that can often assemble relatively inexpensive interline fares by combining flight segments on nonaligned carriers, including trips between a traditional and low cost carrier. *See* footnote 49 above.

of **Connect Comps** (whose coefficient is now counterintuitively positive and significant), the estimated coefficients of the control variables mostly have the same signs as in the non-Tasman regression, although their magnitudes sometimes differ substantially, and they sometimes lose statistical significance.

These differences, along with the anomalous **D(Online)** coefficient, suggest that trans-Tasman connecting markets are atypical relative to the average connecting market that extends beyond Australia and New Zealand. For example, since nearly all large cities in Australia are served nonstop from multiple cities in New Zealand, the remaining Australian cities, which rely on connecting service, are small and relatively few in number. For example, in June 2015, Auckland-Cairns was the city-pair with *the most passengers* in the connecting trans-Tasman sample, with [40-50] passengers per day each way. In contrast, the city-pair with *the smallest amount of traffic* in the nonstop sample in June 2015 was Queenstown-Sydney with the same number of daily passengers. It is not surprising that connecting Trans-Tasman fare regressions relying on such a sample of city-pairs will show some unexpected features.

Since the regressions in Table 1 use control variables to capture fare differences across different cabins of service, the approach implicitly assumes that the effects of different levels of cooperation on fares are the same regardless of class. In Tables 2 and 3, we present separate regressions for the economy and business/first-class cabins, allowing the fare effects we estimate to differ by class of service.

iii. Breakdown by Connecting Fare Classes

The regressions using economy (Y) class tickets are shown in Table 2. For the non-Tasman economy case, the online and JV fare discounts relative to traditional interline fares are larger than those results in Table 1, which pertain to all fare classes. The **D(Online)** estimated coefficient shows that, for connecting travel, online economy fares are 16.7% less than traditional interline fares, while the **D(JV)** coefficient shows a 12.6% discount for JV fares. As in the regression from column 1 of Table 1, these coefficients are not statistically different from one another, indicating that online and JV economy-class fares are indistinguishable for non-Tasman trips. The estimated coefficient for **D(Global Alliance)** is statistically insignificant, indicating no difference between traditional interline fares and fares for global alliance itineraries. The coefficients for the control

variables are similar to those in column 1 of Table 1, although the economy fare rises with an increase in the number of coupons. Overall, the non-Tasman economy-class results once again show that JV fares are indistinguishable from online fares, demonstrating the fare benefits from the single-airline behavior that metal-neutral JV carriers are incentivized to mimic.

Table 2: Connecting Markets, Economy Class

	(1) Non-Tasman	(2) Trans-Tasman
D(online)	-0.167**	-0.0249
	(0.0301)	(0.0163)
D(JV)	-0.126**	-0.0913**
	(0.0222)	(0.0139)
D(Global Alliance)	-0.00401	
	(0.0163)	
Connect Comps	-0.00231	0.0524**
	(0.000995)	(0.0189)
D(Days<3)	Redacted – Confidential Information	
Days Prior		
Coupons		
D(roundtrip)		
D(NZ POS)		
Exchange		
ln(dist)		
D(Feb 2011)	-0.00950	-0.103**
	(0.0115)	(0.0194)
Constant	5.925**	6.318**
	(0.811)	(0.801)
Observations	6,249,944	1,858,368
Adjusted R-squared	0.608	0
		556

Standard errors clustered by citypair parentheses
City-pair year, and month fixed effects not displayed
** p<0.01, * p<0.05

In Table 2's trans-Tasman regression (column 2), the insignificant **D(Online)** estimated coefficient again shows no difference between online and traditional interline fares. As in the non-Tasman case, however, JV fares are significantly lower than traditional interline fares, with **D(JV)**'s estimated coefficient showing a 9.1% discount. The coefficients of the control variables are similar to those in column 2 of Table 2.

Even though the trans-Tasman regressions face challenges in replicating the results from the larger non-Tasman sample, a strong regularity emerges from the four regressions in Tables 1 and 2. In particular, regardless of whether the connecting itinerary is trans-Tasman or extends beyond Australia and New Zealand, and regardless of whether the sample includes all tickets or economy tickets, JV service consistently generates a large fare discount relative to traditional interline service. The discount is never smaller than 7.3% and is as large as 12.6%, showing the fare benefits from Air NZ and its JV partners' ability to operate the JV segments as though they were a single airline.

Restricting the sample to business and first-class tickets greatly reduces the number of observations, with the results shown in Table 3. In the non-Tasman sample (column 1), the online and JV fare discounts are smaller than in economy-class results of Table 2 (column 1), which explains why the online and JV discounts in the all-fare-class results of Table 1 (column 1) are of intermediate size. The online and JV coefficients are no longer statistically significant, indicating that they are indistinguishable from zero. One possible reason for the lack of a discount for these tickets would be if other quality dimensions are more important for premium class tickets, erasing the discount for online and JV tickets. The estimated coefficient on the global alliance dummy variable is now both positive and statistically significant, contrary to expectations, and the coefficient is of substantial size. The estimated coefficient on the **D(Business)** dummy shows that business-class fares are more than [redacted] below first-class fares (now the omitted category), and the effects of the remaining control variables are mostly the same as before.

Table 3: Connecting Markets, Business/First Class

	(1) Non-Tasman	(2) Trans-Tasman
D(online)	-0.0398	-0.0898**
	(0.02470)	(0.0201)
D(JV)	0.0410	-0.600**
	(0.0653)	(0.0769)
D(Global Alliance)	0.0956**	
	(0.0170)	
Connect Comps	0.00632	0.0636
	(0.0123)	(0.0700)
D(Days<3)	Redacted – Confidential Information	
Days Prior		
D(Business)		
Coupons		

D(roundtrip)	[redacted]
D(NZ POS)	
Exchange	
ln(dist)	
D(Feb 2011)	
Constant	
Observations	
Adjusted R-squared	

Standard errors clustered by citypair parenthe
City-pair year, and month fixed effects not displayed
** p<0.01, * p<0.05

The trans-Tasman regression in column 2 of Table 3 indicates a 9% fare discount from online service, but the JV discount is shown to be an extraordinary 60%. This implausible finding no doubt reflects the previous problems with the trans-Tasman regression amplified by the precipitous drop in the sample size in moving to business-class tickets (there are only 40,000+ such observations over the entire ten-year data set). The idiosyncrasies of this small sample are further reflected in the anomalous negative coefficient of route distance (**ln(dist)**).

Although limitations inherent in the relatively small number of business/first-class observations make the results shown in Table 3 unreliable, the overall conclusions regarding the effect of joint-venture cooperation on connecting fares can rest on the economy-results from Table 2. Those results (which are based on a far larger and more representative sample) show that JV fares in non-Tasman connecting markets are substantially below traditional interline fares, with the estimated discount of 12.6% being statistically indistinguishable from the somewhat larger estimated online discount. The gap between JV fares and traditional interline fares is somewhat smaller, at 9.1%, in trans-Tasman connecting markets, but it is actually larger than the online discount in these markets. The results thus show that, in connecting markets, JV service entails substantial fare benefits to consumers that are at least as large as the benefits from online service.

b) Nonstop Markets

Tables 4-6 presents results for the nonstop markets, again showing the non-Tasman and trans-Tasman cases separately. Although these nonstop markets have large numbers of ticket

observations (2.9 and 6.2 million for the non-Tasman and trans-Tasman samples, respectively), they involve far fewer individual city-pair markets than do the connecting markets. The non-Tasman sample includes only 22 markets, while the trans-Tasman sample contains 26 markets.[115] This small number of markets greatly limits the number of routes and carrier pairings that involve changes in airline cooperation, severely hampering our ability to accurately identify the effects of Air NZ's JVs on nonstop routes. For example, in the non-Tasman sample, the only global alliance route (i.e., a route with simultaneous non-stop service by both Air NZ *and a global alliance partner that was a Star Alliance member*) is AKL-SIN, but only for the months between the start of our sample period (July 2005) and October 2006 (when Air NZ exited the route).[116] Likewise, the only JV alliance routes are AKL-SIN following the initiation of the Singapore JV and AKL-HKG, served by the Air New Zealand/Cathay Pacific JV.[117] Because of the limited number of natural experiments, the statistical "identification" of the cooperation variables in the non-stop sample of city-pairs is tenuous at best and can be heavily influenced by route-specific factors not captured in the regression model.[118] Thus, care must be taken in generalizing the estimation results described in this section, in contrast to the results on connecting routes, which do not suffer from this challenge.

As in Brueckner and Whalen (2000) and Gillespie and Richard (2012), the question addressed by the regressions is whether a nonstop route with overlapping nonstop service by alliance or JV partners is less competitive than a route where the overlapping service is provided by nonaligned carriers. This question is addressed by including the variable **Competitors**, which counts the number of individual carriers providing nonstop service on a route, along with variables indicating whether some of these airlines are alliance or JV partners.[119] The dummy variable **Global Alliance**

[115] By contrast, Gillespie and Richard's (2012) sample of U.S.-endpoint nonstop routes contained 115 markets.

[116] Air NZ's recent re-entry on AKL-SIN in January 2015 coincides with the start of its JV with Singapore Airlines. Note that AKL-HKG prior to the JV agreement between Air NZ and Cathay would not qualify as a global alliance overlap route because Cathay is a oneworld member.

[117] CHC-SIN and AKL-PEK do not qualify as JV routes because they are only served by one of the two JV partners (Singapore Airlines and Air China, respectively). As a result, there is no potential for a *reduction* in competition on these routes because of the JVs.

[118] Moreover, as discussed at greater length in Section 4, it is questionable that Air NZ would even serve Singapore or Hong Kong but for its JVs with Singapore and Cathay, respectively. *See also* footnote 124 below.

[119] Carriers are defined as nonstop competitors if they serve the city-pair with at least three roundtrips per week on average over the month.

Competitor indicates that two of the carriers serving a route are global alliance partners (but not JV partners), while the dummy variable **JV Competitor** indicates that two of the carriers on the route are JV partners.

An extra competitor on a non-stop route would be expected to reduce the fares charged by all carriers, thus reducing Air NZ's fare (the only fare measured in our dataset). For example, if the estimated coefficient on the **Competitor** variable were approximately equal to -0.05, as in Brueckner and Whalen (2000), the implication would be that adding an extra nonaligned carrier to a route reduces Air NZ's fare by 5%. If the estimated coefficient for one of the alliance variables, say, **Global Alliance Competitor,** were +0.05, the implication would be that adding an extra carrier to a route that is a global alliance partner of Air NZ would have no effect on Air NZ's fares, indicating that the two carriers do not compete with one another. This interpretation follows because the increase in **Competitors** would reduce Air NZ's fare by 5% while increasing the **Global Alliance Competitor** dummy from zero to 1 (to capture the fact that the new carrier is a global alliance partner of Air NZ) would increase the fare by 5%, leading to no net change in the fare. On the other hand, if **Global Alliance Competitor**'s estimated coefficient were less than +5%, the net fare change would be negative, indicating that adding a global alliance competitor increases competition. If **Global Alliance Competitor**'s coefficient were +0.02, for example, the fare would fall by 3% when an alliance partner is added to the route, less than the effect of a nonaligned carrier but still negative. A similar discussion applies to the addition of a JV competitor.

i. Non-Tasman Nonstop Markets

Column 1 of Table 4 presents the non-Tasman results using tickets from all fare classes.[120] The estimated coefficient on **Competitors** shows that adding a nonaligned carrier to a non-Tasman nonstop route reduces the (Air NZ) fare by a relatively small 1.7%. However, the -0.0667 estimated coefficient of **Global Alliance Competitor** shows that, if the added carrier is a global alliance partner of Air NZ (but not a JV partner), the fare effect is even stronger than the effect of adding a nonaligned carrier (the total effect is -0.017 + (-0.0667) = -0.0837, or -8.4%). This

[120] Because of the small number of city-pair markets in the nonstop regressions, clustering of the standard errors is not appropriate and is thus not carried out.

conclusion is inconsistent with theory, which predicts that an alliance partner provides *at most* the same degree of competition as a nonaligned carrier, not more competition.[121] On the other hand, the **JV Competitor** estimated coefficient in the regression is positive, but its large 0.119 size implies that the net effect of adding a JV partner is a fare increase of 10% (-0.017 + 0.119 = 0.102). This conclusion is also inconsistent with theory, which predicts that, in the worst possible case, an added cooperating carrier has no effect on fares (not the positive net effect shown by the regression). The unexpected signs and magnitudes of these net fare effects are no doubt due to the small number of routes on which the **Global Alliance Competitor** and **JV Competitor** dummy variables have an effect. As noted above, **Global Alliance Competitor** equals 1 only on the AKL-SIN route prior to the Singapore Airlines JV in 2005 and 2006, and **JV Competitor** equals 1 only on that route after initiation of the JV and on the AKL-HKG route after initiation of the Cathay Pacific JV.[122] It is therefore difficult to disentangle the fare impacts of airline cooperation on these routes from route-specific fare trends, which are not captured under our formulation (it captures only route and time effects separately).

Table 4: Nonstop Markets, All Fare Classes

	(1) Non-Tasman	(2) Trans-Tasman
Competitors	-0.0170** (0.000899)	-0.0206** (0.000429)
Global Alliance Competitor	-0.0667** (0.00498)	0.105** (0.00201)
JV Competitor	0.119** (0.00211)	0.0115** (0.000392)
D(Emirates)		-0.164** (0.00782)
Connect Comps	-0.00923** (0.000476)	
Connect Comps Global Alliance	-0.0375** (0.000629)	
D(Days<3)	Redacted – Confidential Information	
Days Prior		
D(Premium Ec)		
D(Business)		

[121] One potential interpretation of this result is that because global alliance carriers are adding capacity on gateway-to-gateway segments (e.g., AKL-LAX, AKL-YVR) in anticipation of additional behind and beyond connections more so than non-aligned carriers, this additional capacity puts even greater downward pressure on local fares on these sectors.

[122] For example, in the case of the AKL-SIN, the change in the route's status (from a global alliance route to a JV route) occurs with nearly a ten year gap.

Coupons	[redacted]
D(roundtrip)	
D(NZ POS)	
Exchange	
ln(dist)	
D(Feb 2011)	
Constant	
Observations	
Adjusted R-squared	

Standard errors parentheses
City-pair year, and month fixed effects not disp
** p<0.01, * p<0.05

Since nonstop fares are disciplined by connecting competition, the non-stop regressions also include two new control variables. **Connect Comps** counts the number of carriers providing online connecting service, while **Connect Comps Global Alliance** counts the number of carriers among the competitors that are global alliance partners. If global alliance partners do not compete with one another in providing connecting competition for a nonstop route, then the **Connect Comps Global Alliance** coefficient should be positive, following the logic behind the **Alliance Global Competitor** and **JV Competitor** coefficients. However, the estimated coefficients for both the **Connect Comps** and **Connect Comps Global Alliance** variables are negative, with the latter coefficient actually larger in absolute size (at -3.8%). While this pattern does not conform to the theory, the negativity of the two coefficients does show that connecting competition exerts downward pressure on nonstop fares. The performance of the other control variables is similar to that in the connecting non-Tasman regression from Table 1.

ii. *Trans-Tasman Nonstop Markets*

Turning to the trans-Tasman regression in Column 2 of Table 4, an extra nonaligned nonstop competitor reduces fares by 2.1%, although the effect is much larger if this competitor is Emirates, which provides trans-Tasman nonstop service as part of its JV with Qantas. In that case, the fare reduction is an additional 16.4% for a total of 18.5%, a result that shows the substantial downward

pressure on fares resulting from Emirates' service on Trans-Tasman routes.[123] As in the non-Tasman regression, adding an extra global alliance competitor raises the fare, with the effect now 8.4% (-0.0206 + 0.105). While this positive effect is inconsistent with theory, the effect from the regression of adding a JV competitor is theoretically plausible. Since the estimated coefficient of **JV Competitor** is positive and smaller in absolute value than the estimated coefficient of **Competitors**, the effect of adding a JV competitor is negative, equal to -0.9% (-0.0206 + 0.0115), but not as negative as the -2.1% effect of adding a nonaligned carrier. While this finding, by itself, would imply that a JV competitor provides incremental competition (albeit not as much as a nonaligned carrier), the anomalous estimated coefficient on **Global Alliance Competitor** reinforces our doubts as to the overall reliability of the non-stop regressions (due once again to the extremely small number of identifying events). As for the other control variables, their performance is similar to that in the non-Tasman regression.

As with the non-Tasman nonstop regression, the trans-Tasman nonstop results are undoubtedly affected by the small number of cooperative combinations seen on these routes. The only JVs providing service over the entire sample period are Air NZ/Virgin Australia (11 routes) and Qantas/Emirates (4 routes), and the only global alliance partners providing trans-Tasman service are LAN/Qantas (one route) and Air NZ/Thai (two routes). As a result, it is difficult to disentangle the effects of airline cooperation from other idiosyncratic effects, despite the use of route and time fixed effects.

iii. Breakdown by Nonstop Fare Classes

For completeness, the results for economy-class nonstop tickets are shown in Table 5, and they are very similar to the results in Table 4. The signs and magnitudes of the estimated coefficients of **Competitors**, **Global Alliance Competitor**, **JV Competitor**, **Emirates**, **Connect Comps**, and **Connect Comps Global Alliance** all closely match those in Table 4, in both the non-Tasman

[123] In our sample period, Emirates did not yet offer non-stop service between its hub in Dubai and destinations in New Zealand. Thus, its services between Australia and New Zealand are so-called "tag" flights (e.g., Dubai-Sydney-Auckland-Sydney-Dubai) marketed not only to passengers traveling between New Zealand and the variety of destinations served by Emirates from its Dubai hub, but also local Trans-Tasman passengers. The large negative estimated coefficient on the **D(Emirates)** is unsurprising in light of the fact that it operates approximately three-quarters of its trans-Tasman flights using extremely large Airbus A-380 aircraft with several times the seating capacity of the many of the aircraft used on trans-Tasman flights. As noted above, Emirates recently began serving Dubai-Auckland non-stop.

(column 1) and trans-Tasman (column 2) regressions. Therefore, the previous discussion of these estimated coefficients again applies. The performance of the other control variables is also very similar between the two tables.

Table 5: Nonstop Markets, Economy Class

	(1) Non-Tasman	(2) Trans-Tasman
Competitors	-0.0175** (0.000946)	-0.0241** (0.000433)
Global Alliance Competitor	-0.0798** (0.00565)	0.110** (0.00201)
JV Competitor	0.114** (0.00236)	0.0187** (0.000395)
D(Emirates)		-0.165** (0.00785)
Connect Comps	-0.0148** (0.000518)	
Connect Comps Global Alliance	-0.0349** (0.000679)	
D(Days<3)	Redacted – Confidential Information	
Days Prior		
Coupons		
D(roundtrip)		
D(NZ POS)		
Exchange		
ln(dist)		
D(Feb 2011)	-0.0371** (0.00320)	-0.0199** (0.00182)
Constant	10.05** (0.0850)	3.285** (0.0420)
Observations	2,480,534	5,992,597
Adjusted R-squared	0.691	0.497

Standard errors parentheses
City-pair year, and month fixed effects not displayed
** p<0.01, * p<0.05

First-class fares are absent on most trans-Tasman routes, but the business-class results in Table 6 exhibit a new pattern of competition coefficients, which is mostly inconsistent with theory. In both the non-Tasman (column 1) and Trans-Tasman (column 2) regressions, the positive estimated coefficient of **Competitors** implies that adding an extra nonaligned carrier to a route *raises*, rather than lowers, business-class fares. The **Global Alliance Competitor** estimated coefficients are negative in both regressions, contrary to expectations, while the **JV Competitor** estimated

coefficients take different signs in the non-Tasman and trans-Tasman regressions, with both being large in absolute value. The signs of the **Connect Comps** and **Connect Comps Global Alliance** estimated coefficients are positive and negative, respectively, opposite to the pattern predicted by theory. However, the remaining control variables, as well as the **D(Emirates)** coefficient, perform mostly as before.

Table 6: Nonstop Markets, Business Class Passengers

	(1) Non-Tasman	(2) Trans-Tasman
Competitors	0.0192**	0.0593**
	(0.00299)	(0.00309)
Global Alliance Competitor	-0.157**	0.0711**
	(0.0119)	(0.0102)
JV Competitor	0.248**	-0.165**
	(0.00554)	(0.00281)
D(Emirates)		-0.0525
		(0.0648)
Connect Comps	0.0279**	
	(0.00133)	
Connect Comps Global Alliance	-0.109**	
	(0.00183)	
D(Days<3)	[redacted]	
Days Prior		
Coupons		
D(roundtrip)		
D(NZ POS)		
Exchange		
ln(dist)		
D(Feb 2011)	0.0207*	0.316**
	(0.00973)	(0.0145)
Constant	7.446**	5.216**
	(0.221)	(0.226)
Observations	232,876	198,466
Adjusted R-squared	0.810	0.343

Redacted – Confidential Information

Standard errors parentheses
City-pair year, and month fixed effects not displayed
** p<0.01, * p<0.05

iv. Implications of Non-Stop Regressions

With regards to the nonstop regressions, the question we have sought to address is whether a route with overlapping nonstop service involving global alliance or JV partners is less competitive than a route where the overlapping service is provided by a nonaligned carrier. What do the preceding

results say regarding this question? Discounting the business-class results, which reflect a small minority of tickets, an imperfect answer emerges from economy-class results of Table 5. First, the addition of a nonaligned carrier to a nonstop route, non-Tasman or trans-Tasman, reduces the fare by a small amount, around 2%. However, if a JV partner of an existing carrier is instead added to a route, this fare reduction is reversed, either partially or more than fully. In the non-Tasman case, the reversal is more than complete (contrary to theory), with the fare rising by 9.7% (-0.0175 + 0.114), while in the trans-Tasman case, the reversal is partial, with the fare falling by 0.5% (-0.0241 + 0.0187). Although the inconsistent sign pattern of the **Global Alliance Competitor** coefficient undermines our confidence in these regressions, their implication appears to be that a JV partner provides less competition on a nonstop route than would a nonaligned carrier. The poor overall performance of the non-stop regressions resulting from the small sample of routes, however, suggests that these numerical magnitudes should be interpreted with caution, although the qualitative conclusion cannot be ruled out.

4. Impact of Air NZ's Joint Venture Agreements on Air New Zealand, New Zealand Consumers and the New Zealand Economy

As described in detail in Section 3 above, an analysis of Air NZ's internal ticket data for the last ten and a half years finds that the carrier's JVs have enabled Air New Zealand to effectively eliminate the double marginalization inefficiency that comes with standard interline or codeshare arrangements on connecting itineraries. As a result, Air NZ's JVs have enabled substantial numbers of Air NZ passengers to benefit from the lower fares (and more highly coordinated and convenient service) that normally comes only with online service. Put differently, Air NZ's JVs have enabled passengers traveling to/from New Zealand to benefit from a far broader "virtual" network that that extends well beyond the scope that Air NZ would be able to offer on its own. Our analysis in Section 3 also suggest that if Air NZ and its JV partners were to offer competing non-stop service on their respective Alliance Sectors, fares for non-stop passengers traveling on those sectors (e.g., Auckland-Hong Kong and Auckland-Singapore) would be somewhat lower. However, for the reasons described in this section, it is reasonable to assume that Air NZ would find it difficult to profitably sustain services on those routes absent its JVs, and thus, there is no guarantee that in the "but for" world, passengers would ever realize the potential fare savings that may come with multiple carriers offering competing non-stop service on long-haul international

routes to/from New Zealand.[124] In this regard, it is noteworthy that Air NZ's Alliance Sectors (e.g., Auckland-Singapore, Auckland-Hong Kong and Auckland-Shanghai) are among the only long-haul international routes from New Zealand currently served by more than one carrier.[125] Indeed, it important to point out that globally, approximately three quarters of long-haul routes like the ones served from New Zealand (i.e., greater than 4,000 miles) are served by only a single carrier.[126]

Even assuming that Air NZ could profitably sustain non-JV services on these routes, however, the overall welfare implications from Air NZ's JVs to passengers traveling to/from New Zealand would need to weigh any increase in fares for the small subset of passengers whose travel exclusively on the non-Tasman "Alliance Sectors" (i.e., Auckland-Singapore and Auckland-Hong Kong), versus the lower fares and improved convenience for connecting passengers, which comprise the vast majority of passengers on the Alliance sector flights.[127] For example, as shown in Figure 3, more than [redacted] of Air NZ's passengers traveling on its flights between Auckland and Hong Kong connect at one or both endpoints.[128] Overall, less than [redacted] of Air NZ's long-haul international passengers travel on city-pairs where both Air NZ and its JV partner offer

[124] *See* MOT 2012 Air NZ/Cathay Report paragraph 34: "Our view is that the likely counterfactual is that one of the airlines (most likely Air New Zealand) would withdraw from the Auckland – Hong Kong market altogether, with the other (most likely Cathay Pacific) maintaining at least a daily service." *See also See* CCS Air NZ/Singapore Decision, paragraph 74: "CCS agrees with the Parties' submissions that the Proposed Strategic Alliance will have minimal impact on competition between the Parties with regard to direct services operated on the Singapore-New Zealand O&D City-Pairs. In particular, we note that Air NZ does not operate direct flights between Singapore and New Zealand, and will not be considered as a competitor for direct services operating on the Singapore-New Zealand O&D City Pairs."

[125] Source: OAG. The only other international long-haul route currently served by more than one carrier is Auckland-Honolulu (served by Air NZ and Hawaiian). Other routes that will gain a second non-stop carrier later in 2016 include Los Angeles (American) and San Francisco (United). Source: OAG.

[126] For example, of the 919 international long-haul routes of 4,000 miles or longer served at least two times per week on average in 2015, 74% are served by one carrier, and 93% are served by two or fewer carriers: Source: OAG, 2015.

[127] As discussed in detail in Section 3 above, while the large sample of *connecting* city-pairs in our data set allows us reliably identity the effect of Air NZ's JVs for connecting passengers, the sparse number of *non-stop* routes in our data set prevents us from determining—with any degree of certainty—the fare effects of Air NZ's JVs for non-stop passengers on the Alliance sectors in a way that would serve as a meaningful basis to guide policy decisions.

[128] Similarly, since Air NZ began service between Auckland and Singapore in January 2015, approximately [redacted] of its passengers traveling on the Alliance Sector made connections behind Auckland and/or beyond Singapore. Source: Analysis of Air NZ data.

overlapping non-stop service (i.e., on the Alliance Sectors between Auckland and Singapore/Hong Kong).[129]

FIGURE 3: DISTRIBUTION OF AIR NZ PASSENGERS FLYING ON AUCKLAND-HONG KONG BY TYPE OF ITINERARY

Passenger Type	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Gateway to Gateway	Redacted – Confidential Information										
Behind to Gateway											
Gateway to Beyond											
Behind to Beyond											
Grand Total	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

Source: Analysis of Air New Zealand data.
Note: Numbers reflect the passengers travelling on either AKL-HKG or HKG-AKL segments operated by Air New Zealand in their itinerary. Years reflect calendar years.

Moreover, in assessing the overall costs and benefits of Air NZ's JVs to New Zealand, it is also important to take account of a host of other factors, including: (1) the ability of Air NZ to remain competitive in a globalized airline market where it increasingly competes versus other much larger carriers and JV alliances, (2) other non-price related benefits of JVs including more convenient scheduling, harmonization of frequent flyer and lounge benefits between Air NZ and its JV partners, (3) the important role that Air NZ plays in providing New Zealanders with integrated access to the global aviation ecosystem and promoting inbound tourism to New Zealand, and (4) other the positive spillover effects of Air NZ's international growth on New Zealand's local economy, such as increased aviation sector employment. In the remainder of this section, we discuss each of these areas in greater detail.

a) Air New Zealand's Competitive Position in the Global Airline Industry

In order to understand the critical role of JVs in ensuring that Air NZ can effectively compete in an international airline industry where passengers increasingly value and expect ubiquitous airline

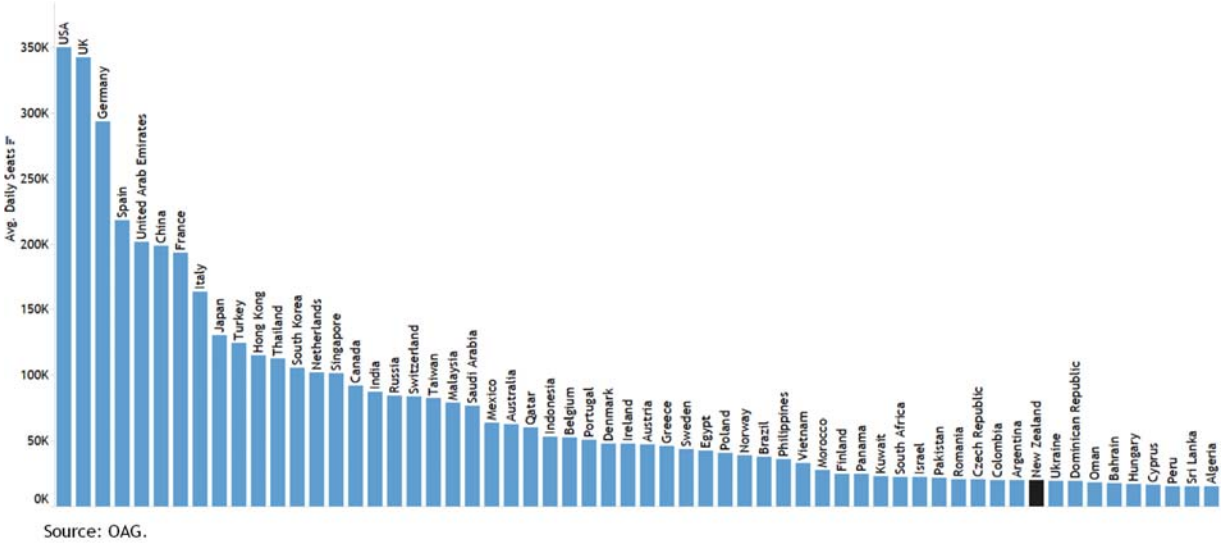
[129] Source: Analysis of Air NZ data. Long-haul international passengers exclude those traveling solely within the within the South Pacific, including Trans-Tasman.

networks, it is important to put the market for international passenger airline service to/from New Zealand in the broader global context.

i. *Overview of the Market for International Passenger Airline Service to/from New Zealand*

In 2014, New Zealand had an estimated population of 4.5 million inhabitants.[130] Although New Zealand is a growing tourist destination (the number of foreign tourists visiting New Zealand increased from 1.78 million in 2000 to 2.7 million in 2013[131]), the combination of the country's small population and its remote location have resulted in New Zealand being a relatively small international aviation market.[132] As shown in Figure 4 below, for example, New Zealand ranked 51st worldwide in terms of average daily international seats in 2015.

FIGURE 4: RANKING OF AVG. DAILY INTERNATIONAL SEATS, TOP 60 COUNTRIES (2015)



As its closest commercial and cultural partner, Australia represents the largest source of international visitors to New Zealand by a wide margin. Over the past decade, however, the *fastest growing* source of foreign visitors to New Zealand has been from China. As shown in Figure 5, by 2012, China surpassed both the United States and the UK to become New Zealand's second

[130] *See* http://www.stats.govt.nz/browse_for_stats/snapshots-of-nz/nz-in-profile-2015/population.aspx.

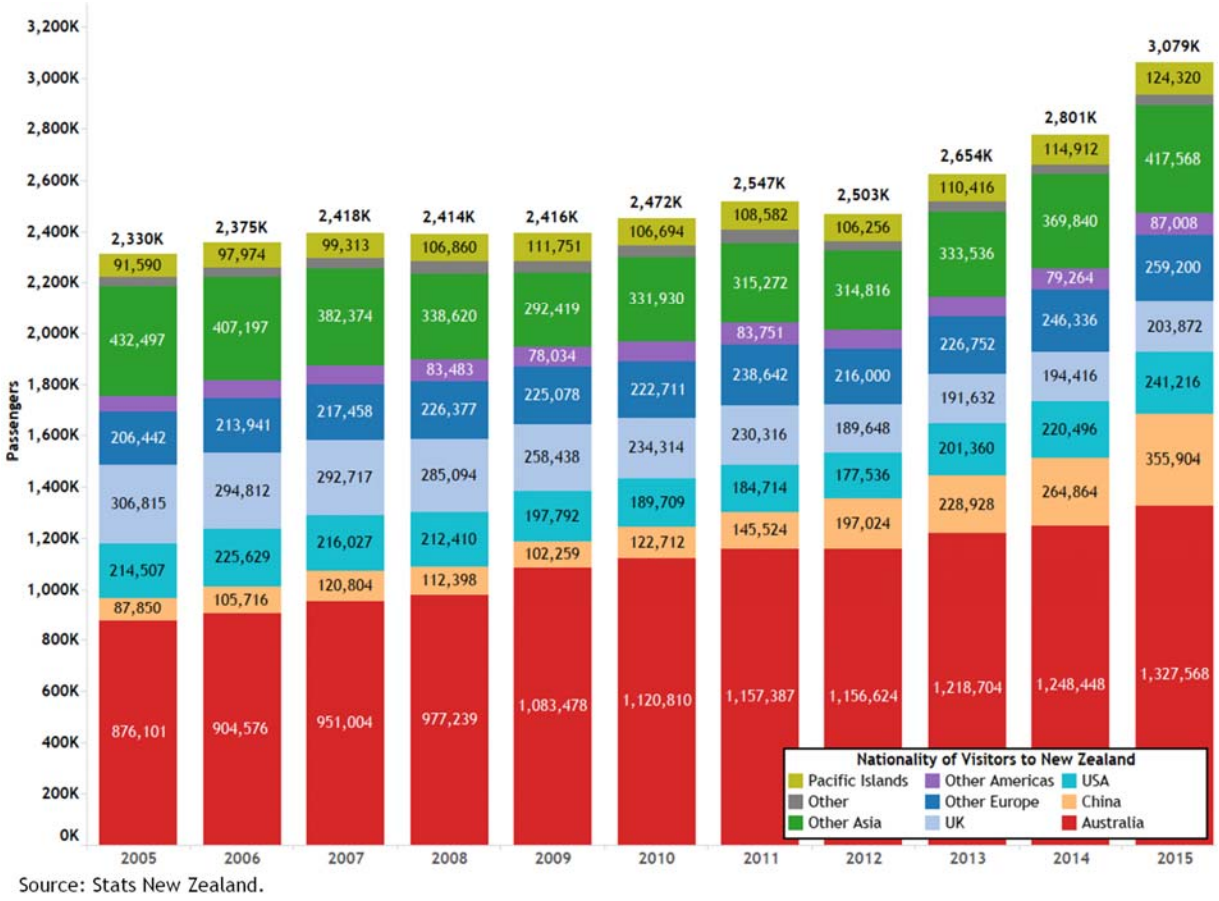
[131] Source: The World Bank (http://data.worldbank.org/indicator/ST.INT.ARVL?order=wbapi_data_value_2013+wbapi_data_value+wbapi_data_value-last&sort=asc).

[132] *See* footnotes 17 and 18 above.

largest source of foreign visitors (after Australia), and in 2015 accounted for nearly 12% of foreign visitors to New Zealand. Moreover, because visitors from China (as well as Europe, North America and other more distant locations) tend to stay in New Zealand much longer than visitors from Australia or other smaller countries in the South Pacific, the growth in tourism expenditures for New Zealand has become increasingly dependent on the growth in visitors from regions outside of Australasia.[133]

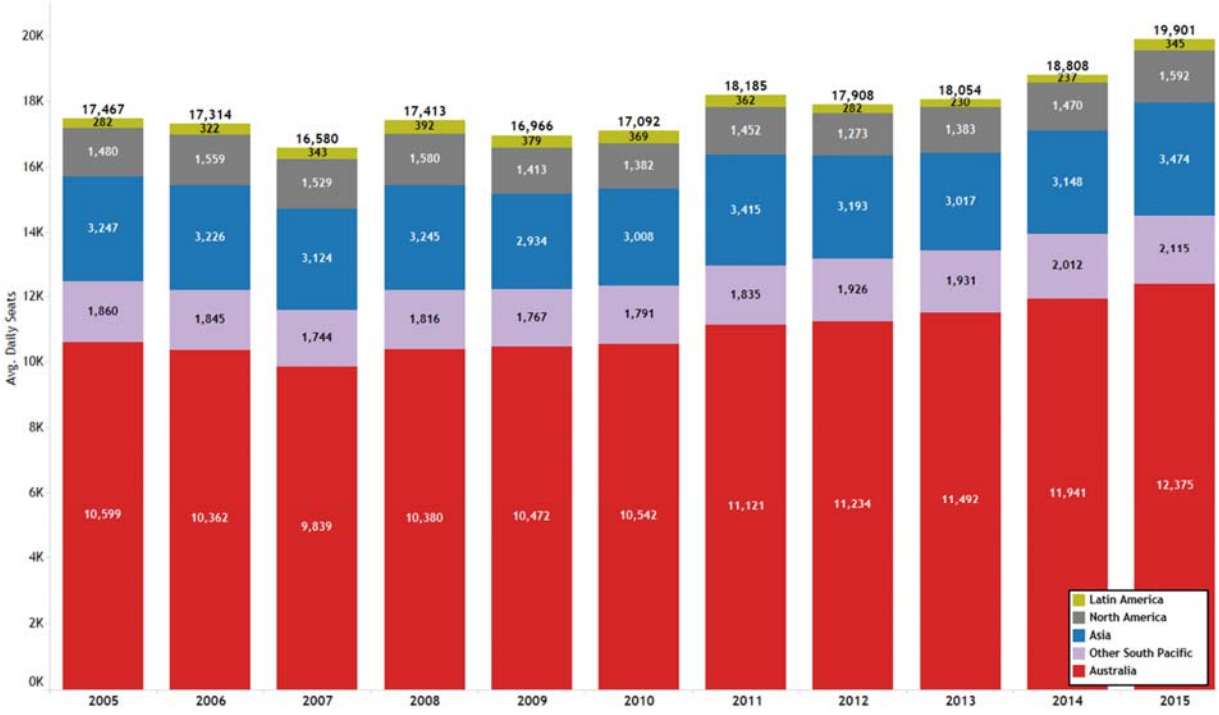
[133] *See*, for example, *New Zealand Economic and Financial Overview 2015*, New Zealand Treasury, page 26: "The largest component of services exports is tourism... Arrivals from Australia and China have increased, resulting in higher total visitor numbers. However, because Australian visitors stay in New Zealand for relatively short periods of time, this has resulted in lower average expenditure per visitor. On the other hand, the increasing number of visitors from China is expected to continue to underpin total tourist expenditure."

FIGURE 5: FOREIGN VISITORS TO NEW ZEALAND BY NATIONALITY, 2005-2015



Even though less than half (i.e., 43.1% in 2015) of all foreign visitors to New Zealand in 2015 are Australian, Figure 6 shows that Australia accounts for nearly two thirds of all international seats from New Zealand.

FIGURE 6: AVERAGE DAILY INTERNATIONAL SEATS FROM NEW ZEALAND, 2005-2015

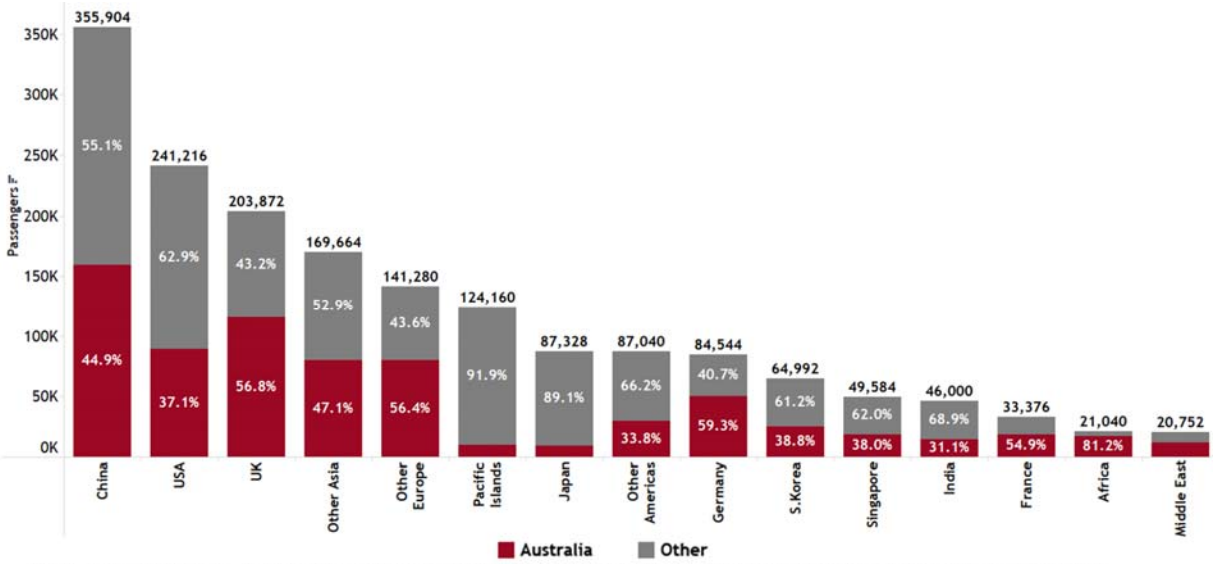


Source: OAG.

One reason for the "share gap" between Australia's share of New Zealand's international visitors (i.e., 43%) and its share of international seats (i.e., 62%) is the fact that many foreign visitors to New Zealand from Asia, Europe, North America and elsewhere fly to New Zealand *via Australia*.[134] For example, as shown below, over half of visitors from the UK, Germany and the rest of Europe arrive in New Zealand via Australia, while more than and third of American visitors use Australia as their gateway to New Zealand. Overall, in 2015, 44.8% of visitors to New Zealand with nationalities other than Australia and other countries from the South Pacific arrived into New Zealand from Australia.

[134] *See* CCS Air NZ/Singapore Decision, paragraph 59: "Further competition [between Singapore and New Zealand] is provided by one-stop services (particularly via Australia), catering for nearly [redacted] of passenger traffic in the market."

FIGURE 7: PROPORTION OF NON-AUSTRALIAN FOREIGN VISITORS ARRIVING TO NEW ZEALAND VIA AUSTRALIA, 2015

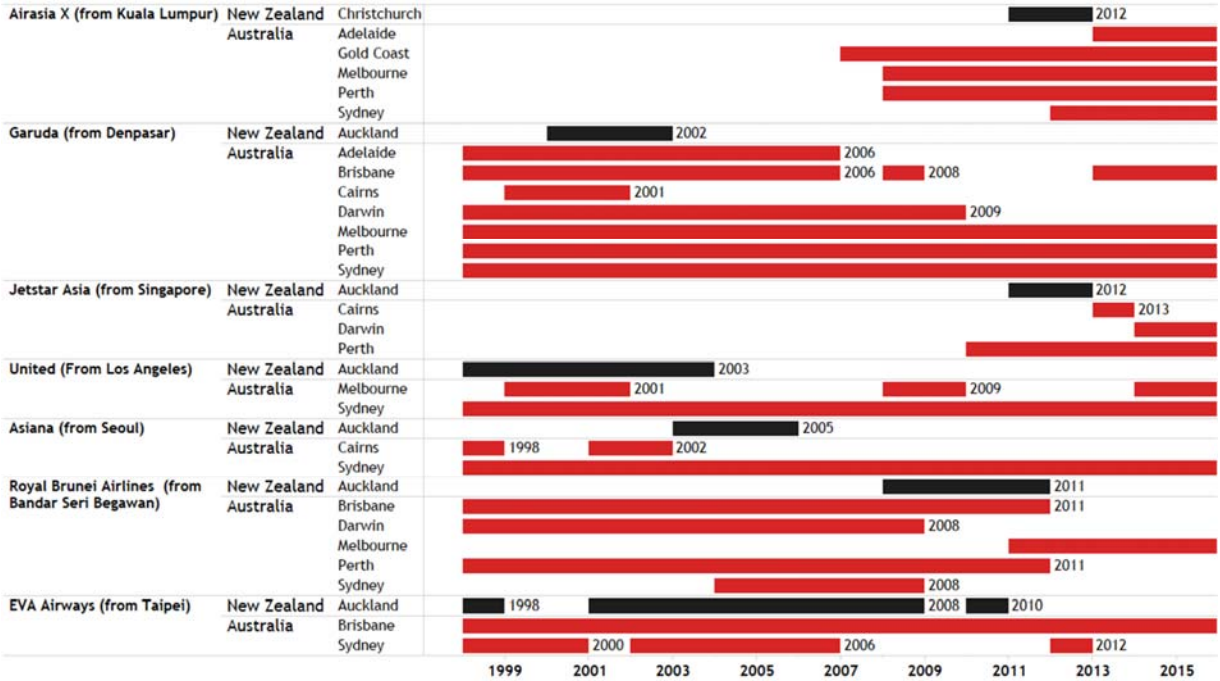


Source: Stats New Zealand. Numbers represent all short term visitors to New Zealand (excluding Australian nationals) by nationality. Colors represent passengers' last port of departure prior to arriving in New Zealand.

The fact that almost half of all long-haul visitors to New Zealand arrive via Australia reflects a number of factors. First, as discussed above, with only 4.5 million inhabitants, New Zealand is a relatively small aviation market, and thus, many international destinations cannot sustain non-stop service to/from New Zealand. In contrast, with a population of nearly 24 million (i.e., six times that of New Zealand), there is sufficient traffic to support non-stop service between Australia and many more destinations worldwide. Indeed, as shown in Figure 8 below, since 1998, several carriers have launched, but subsequently terminated, long-haul services from their own hubs to New Zealand (principally Auckland), while maintaining comparable (or far more) service to Australia.[135]

[135] Air Asia-X recently announced that it would begin daily service between Kuala Lumpur and Auckland via Gold Coast in Australia starting March 2016. *See* "AirAsia X Launches Auckland to Kuala Lumpur Sales", January 12, 2016, http://www.airasia.com/nz/en/press-releases/airasia-x-now-flies-to-new-zealand.page.

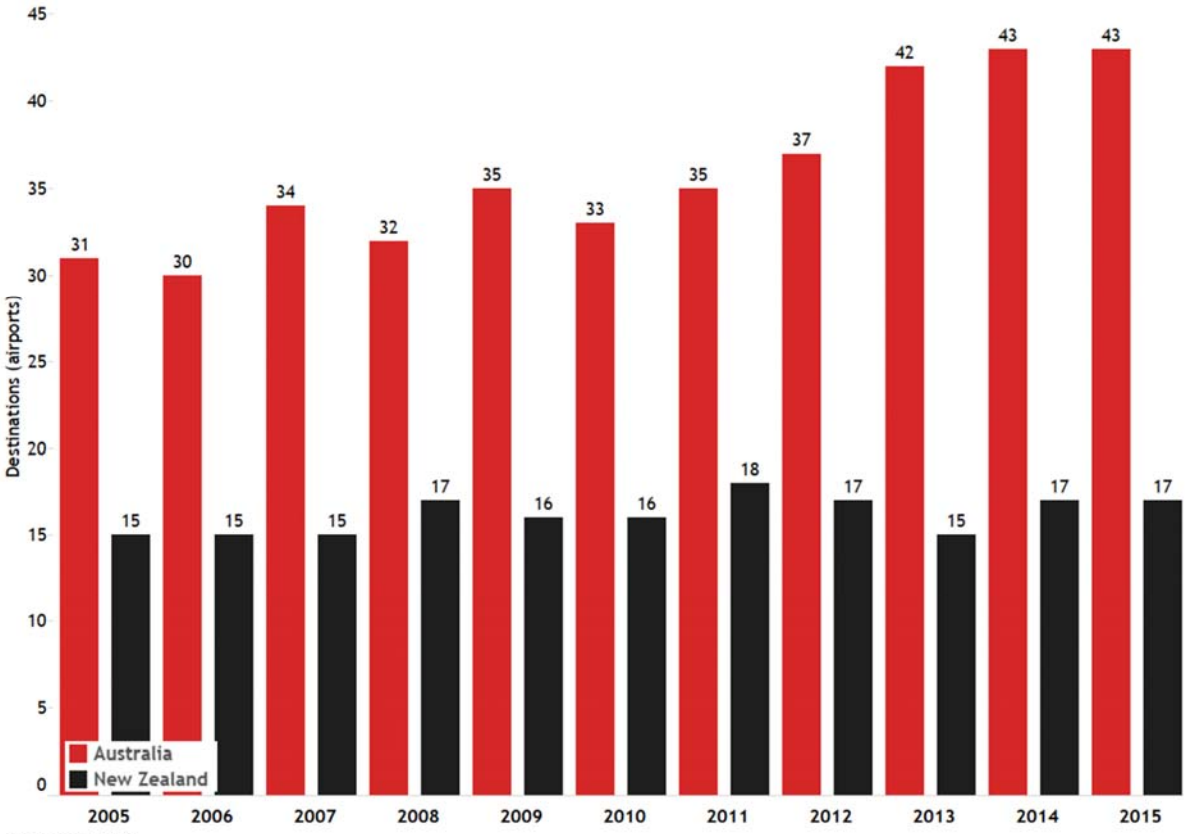
FIGURE 8: LONG-HAUL ROUTES BY FOREIGN CARRIERS THAT HAVE BEEN DISCONTINUED TO NEW ZEALAND BUT WHERE SERVICE HAS BEEN MAINTAINED TO AUSTRALIA



Source: OAG.

As a result, notwithstanding the fact that Air New Zealand has recently added new long-haul services to Houston and Buenos Aires, the total number of long-haul international destinations served non-stop from New Zealand (i.e., excluding those within Australasia) has remained relatively flat over the past decade, while the number of international destinations from Australia has been growing steadily, as shown in Figure 9.

FIGURE 9: INTERNATIONAL ROUTES SERVED FROM NEW ZEALAND VS. AUSTRALIA (EXCL. WITHIN AUSTRALASIA), 2005-2015



Source: OAG.
Notes: Figures show the number of destinations served from Australia/New Zealand outside of Australasia by any carrier.

In addition to its larger home market, Australia (and its carriers) benefit from the country's geographic location *between* New Zealand and other countries in Asia and Europe. Hence, for many passengers traveling to and from New Zealand, Australia serves a convenient connecting point en route to New Zealand. And although passengers prefer—all other things equal—fewer stops (particularly non-stop service over connecting service), many tourists to New Zealand also visit Australia as part of their overall journey.[136] Thus, because Australia's larger market size enables it to support non-stop service to more long-haul destinations, it is often more convenient

[136] *See* "NZ to Host Trans-Tasman Ministerial Tourism Meeting", quoting the Associate Minister of Tourism, Todd McClay: "The fact is also that many northern hemisphere travellers visit both Australia and New Zealand during the same trip. It's therefore important we work together to promote our unique countries internationally." available at: https://www.national.org.nz/news/news/media-releases/detail/2014/07/21/nz-to-host-trans-tasman-ministerial-tourism-meeting.

for tourists and other visitors who plan to travel to both Australia and New Zealand on the same trip to fly from their home country to Australia and then visit New Zealand as part of a trans-Tasman trip.[137]

Simply put, the result of New Zealand's relatively small local base of local traffic and its geographic position "behind" Australia for many potential passengers make it challenging for carriers (both Air NZ and foreign carriers) to sustain and grow international services to/from New Zealand. Indeed, as shown in Figure 10, with the exception of Air NZ's recently added services to Houston and Buenos Aires, Australia receives non-stop service to all of the long-haul international destinations that New Zealand enjoys service to (on Air NZ and other carriers), plus several others that have proven challenging for carriers (including Air New Zealand) to sustain.[138]

[137] Indeed, several of Air NZ's competitors (e.g., Qantas and its JBA partner American) actively promote Sydney as a gateway to New Zealand for passengers from the United States visiting the South Pacific region. For example, in promoting its new services Australia, American Airlines' website reminds potential passengers to that "Once you're there, you can fly around the South Pacific with Qantas to over 60 destinations, including… Auckland [and] … Christchurch." *See* http://www.aa.com/i18n/urls/australia.jsp. American has also announced that it will commence non-stop service from Los Angles to Auckland in June 2016. *See* https://www.aa.com/i18n/travelInformation/destinationInformation/auckland/auckland.jsp.

[138] Air NZ's recently added service to Houston would not be possible but for its recent revenue-sharing JV with United. Air NZ has also recently began seasonal service to Ho Chi Minh City, Vietnam (a destination also served non-stop from Australia) three times per week. *See* http://www.airnewzealand.co.nz/flying-to-ho-chi-minh-city-vietnam.

FIGURE 10: AVERAGE DAILY INTERNATIONAL SEATS (EXCL. WITHIN AUSTRALASIA) FROM AUSTRALIA VS. NEW ZEALAND, JUNE 2016

Source: OAG. Pie chart depicts share of average daily seats originating in Australia and New Zealand. Destinations are non-stop destinations served by any carrier in FYE June 2016 from Australia or New Zealand excluding destinations in the Oceania region.

ii. Air New Zealand's Competitive Position in the Evolving Global Airline Industry

Based on the relatively small size of New Zealand's local market and the fact that the bulk of Air New Zealand's passengers represent local passengers traveling to/from New Zealand,[139] it should come as no surprise that Air NZ is also a relatively small carrier measured by international seats, ranking 68th in the world in 2015.[140] In addition to extensive trans-Tasman services from the largest cities in New Zealand (e.g., Auckland, Christchurch, Wellington and Queenstown), Air NZ currently offers non-stop service to eight destinations in the South Pacific and 11 international destinations in Asia and the Americas from its hub in Auckland.[141]

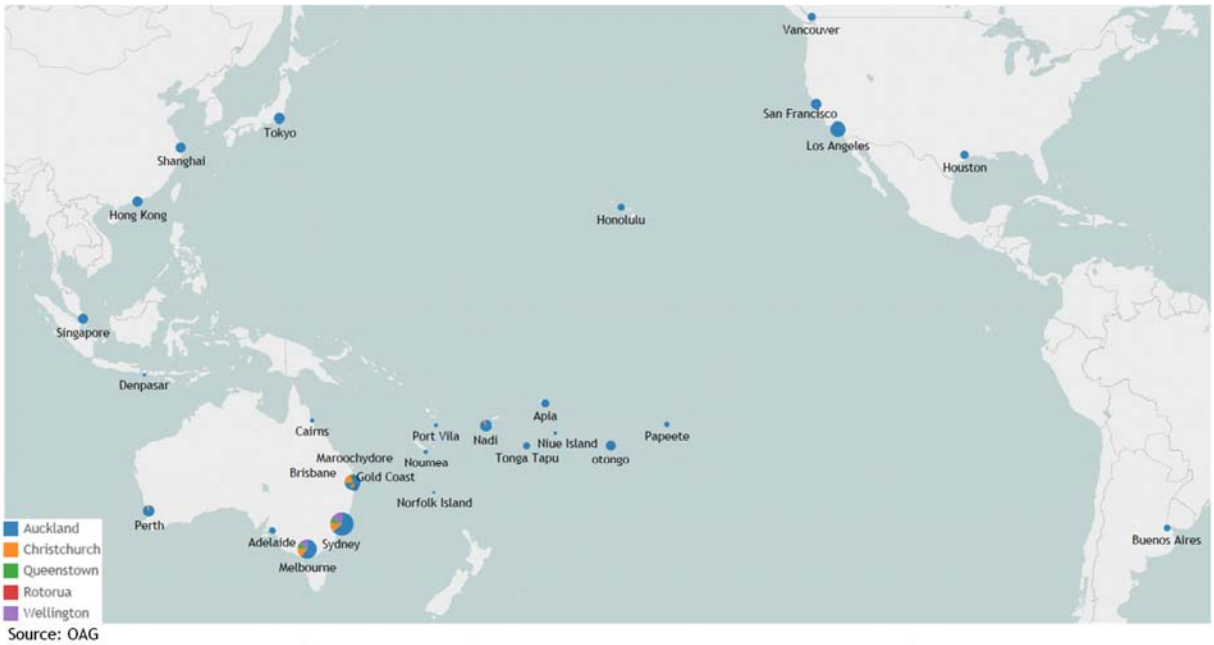
---

[139] Approximately [redacted] of Air NZ's international O&D passengers are so-called sixth freedom passengers (i.e., passengers originating in another country that make a connection in New Zealand en route to a third country), approximately [redacted] of which are traveling between Australia and the United States. Source: Analysis of Air NZ data.

[140] In 2005, Air NZ's ranked 41st by international seats. However, as carriers in Asia and other regions of the world with larger and faster growing economies rapidly expanded over the past decade, Air NZ's worldwide rank dropped to 68th by 2015. Among the carriers that have surpassed Air NZ in terms of international seats since 2005 include Etihad (ranked 104 in 2005 and 18th in 2015), Air Asia (ranked 100th in 2005 and 31st in 2015) and Jet Airways (ranked 187th in 2005 and 48 in 2015). Source: OAG.

[141] Air NZ also offers continuing service between Los Angeles and London and, as noted above, has recently added seasonal service to Ho Chi Minh City, Vietnam three times per week starting effective June 2016.

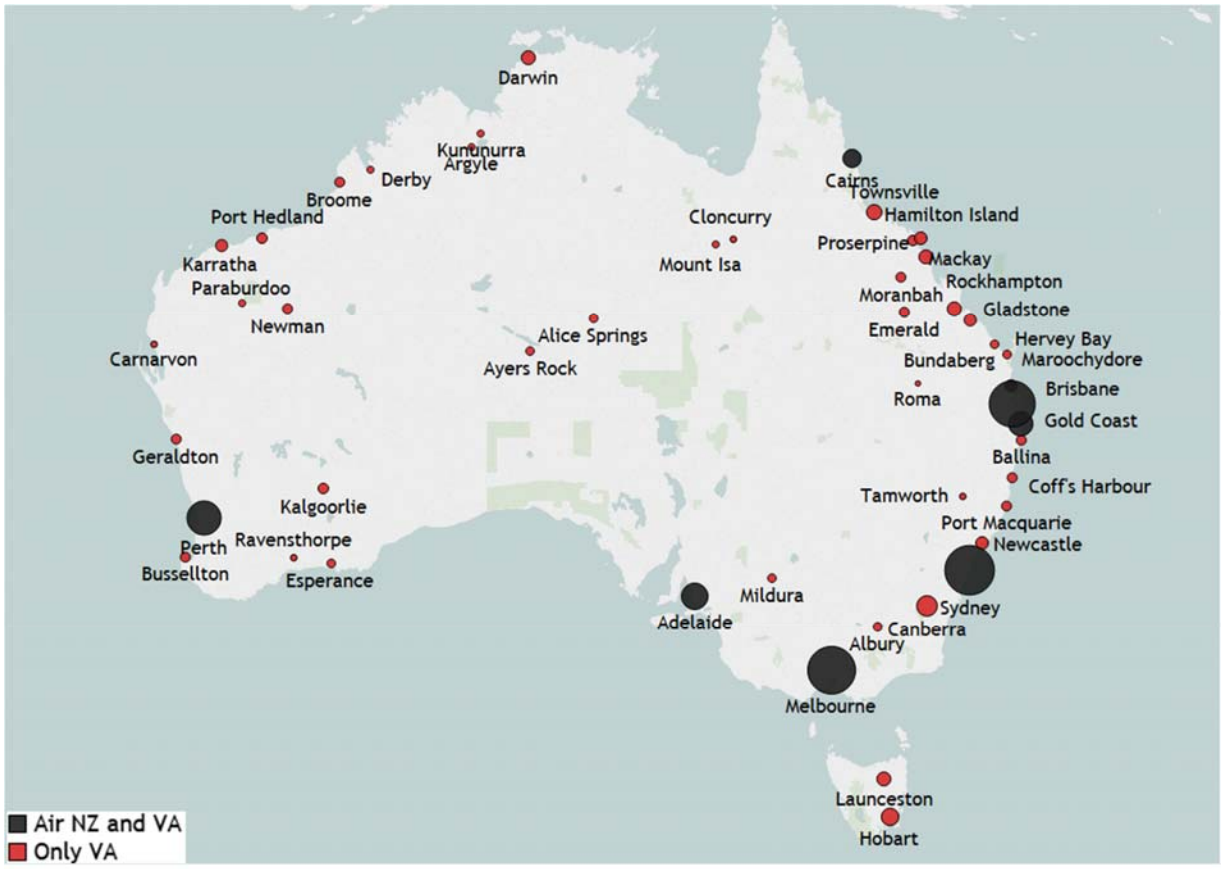
FIGURE 11: AIR NZ AVERAGE DAILY INTERNATIONAL SEATS BY NEW ZEALAND ORIGIN, MARCH 2016



Source: OAG
Note: Pie chart shows the share of New Zealand city of origin. The size of the pie is based on average daily seats from New Zealand to these destinations on Air New Zealand in FYE March 2016. Air New Zealand has announced Auckland-Ho Chi Minh in June 2016.

Passengers traveling between New Zealand and Australia/South Pacific represent the largest portion of Air NZ's international passengers, accounting for [redacted] and [redacted] of the carrier's O&D passengers in 2015, respectively. While the level of passenger demand is sufficient to support non-stop service between most major cities New Zealand and Australia, there are more than two dozen small (and often remote) destinations in Australia, many of which that generate only a handful of passengers each day traveling to/from New Zealand. Therefore, travel to/from these smaller Australian destinations from New Zealand requires connections over a larger Australian gateway such as Sydney, Brisbane, Melbourne or Perth. The only feasible (and most cost-effective) way for Air NZ to access such passengers is via a partnership with an Australian carrier. As shown in Figure 12, through its JV with Virgin Australia, Air NZ has been able to extend its "virtual" network so as to offer passengers access to a much broader range of Australian destinations than it could otherwise offer if it had to rely solely on its own network.

FIGURE 12: AUSTRALIAN DESTINATIONS SERVED IN 2015 BY AIR NZ AND VIRGIN AUSTRALIA



Source: OAG, 2015.
Note: Size indicates average daily seats to the destination from New Zealand and Australia by the carriers.

Moreover, the travel needs of New Zealanders encompass a wide array of destinations across the globe (and likewise, New Zealand is an attractive tourist destination for passengers from all regions of the world). Thus, even though Air NZ's international network is relatively modest (albeit growing) in scope, Figure 13 below shows that Air NZ's "virtual" (i.e., alliance) network takes passengers between New Zealand and numerous destinations the carrier does not currently (and will never) serve using its own metal. Figure 13 also shows that that there are vast regions—particularly Japan, Europe and parts of the Americas—where Air NZ does not yet have the ability to offer passengers the type of harmonized service (and lower fares) that come only with single-carrier service, or with a metal-neutral, revenue-sharing JV.[142] Overall, of the passengers

[142] As shown in detail in Section 3 above, while less integrated forms of coordination would still allow Air NZ to serve to passengers wanting to travel between New Zealand and these destinations, they would not result in the elimination

represented in Figure 13 traveling beyond Australia/South Pacific, [40%-60%] traveled to destinations not served by Air NZ using its own metal. Of these passengers, less than half [(i.e., 40%-50%)] traveled to their destinations on one of Air NZ's five JV partners (i.e., Singapore, Cathay, Virgin Australia, Air China or United), highlighting the need for Air NZ to expand the scope of its JV network in order to remain competitive.[143] For example, the deeper level of coordination between Air NZ and United that will be achievable through their revenue-sharing JV will enable those carriers to match the level of coordination currently enjoyed by passengers traveling on the Virgin Australia/Delta JV for U.S. originating passengers visiting both Australia and New Zealand on the same trip,[144] and soon be enjoyed by passengers traveling online on American between hundreds of destinations in the Americas and Auckland.[145] Moreover, it will enable Air NZ and United to better compete against a potential Qantas/American JV.[146]

Moreover, because passengers are drawn to the more convenient and higher quality of service offered by single carrier or JV services (as well as the lower fares that they can provide due to the elimination of double marginalization),[147] Air NZ would be *at even greater competitive disadvantage* in many markets vis-à-vis not only Qantas (and its JV partner Emirates and potential

---

of double marginalization, making Air NZ's offerings in these city-pairs relatively less attractive than those of other carriers/JVs.

[143] Although Air NZ and Star Alliance partner United (indicated in blue in Figure 13) were previously granted ATI (subject to certain carve-outs) between New Zealand and the United States, the carriers announced their intention to revenue-share on routes between New Zealand and the United States only recently. In anticipation of that JV, Air NZ launched non-stop service to United's largest hub (Houston) on December 15, 2015. Likewise, United recently announced that it would resume service between San Francisco and Auckland in July 2016 after having terminated its Los Angeles-Auckland service in March, 2003. (Source: OAG) *See also* "Air New Zealand lands in Houston" PR Newswire, December 15, 2015 and "Air New Zealand, United Agree on Revenue-Share Deal", *Aviation Daily*, March 11, 2016.

[144] Of Air NZ's passengers in 2015 that originated in the United States, approximately 13% stopped in both New Zealand and Australia on the same itinerary.

[145] As noted above, American has announced that it will commence a daily non-stop service between Los Angeles and Auckland on June 23, 2016, enabling the carrier to offer online service from 285 destinations in North and Central America (including the Caribbean, but excluding other airports in the Los Angeles metropolitan area) to Auckland. Source: OAG.

[146] *See* footnote 19 above.

[147] *See* Willig, R., Israel, M., Keating, B., Orszag, J., 2010 "Measuring Consumer Benefits from Antitrust Immunity for Delta Air Lines and Virgin Blue carriers", Appendix to Joint Applicants' Response to Show Cause Order 2010-9-4, *Joint Application of Delta Air Lines, Inc.; Virgin Blue Airlines PTY LTD; Virgin Blue International Airlines PTY LTD d/b/a V Australia; Pacific Blue Airlines (NZ) LTD; and Pacific Blue Airlines (Aust) PTY LTD*, Docket DOT-OST-2009-0155 at paragraph 24: "… the large, positive coefficient on online itineraries [from the author's nested logit model] indicates that consumers value these itineraries substantially more than any other type of service."

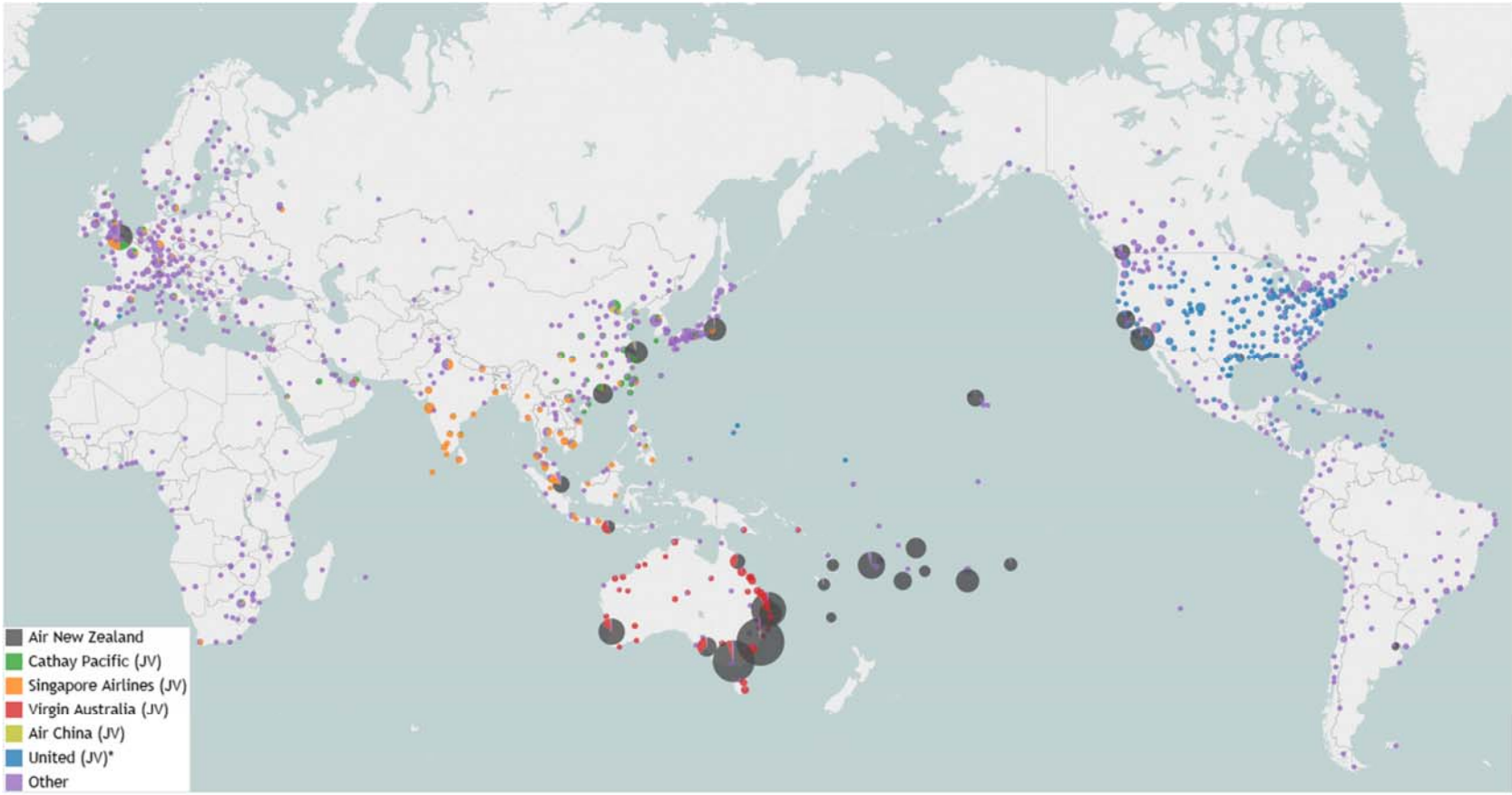
JV partner American), but also Virgin Australia (and is JV partners Singapore and Delta) if it were unable to also offer comparably integrated services with its current JV partners in the city-pairs where they compete.

To illustrate the magnitude of Air NZ's network gap vis-à-vis Qantas and Virgin Australia, Figure 14 compares the scope of Air NZ's network (with and without its JV partners) versus the networks of Qantas and Virgin Australia (including their JV partners).[148] Figure 14 demonstrates that without the "virtual" network reach of its JV partners, Air NZ's network would pale in comparison to those of Qantas and Virgin Australia (including their respective JV partners, excluding Air NZ).[149] Figure 14 also, shows, however, that including its JV partners, Air NZ's network is comparable to that of Qantas and Virgin Australia throughout most of Asia, but still lags far behind those carriers' reach in the Americas (and is substantially less comprehensive to Europe, Africa and the Middle East compared to Qantas/Emirates).

[148] Although the Qantas/American JV has not yet received approval from the U.S. Department of Transportation (*see* footnote 19 above), Figure 14 includes American in Qantas' JV grouping, as we believe it is reasonable to assume that the carriers will ultimately secure DOT approval. Moreover, as noted above, American will launch non-stop service between Los Angeles and Auckland effective June 23, 2016.

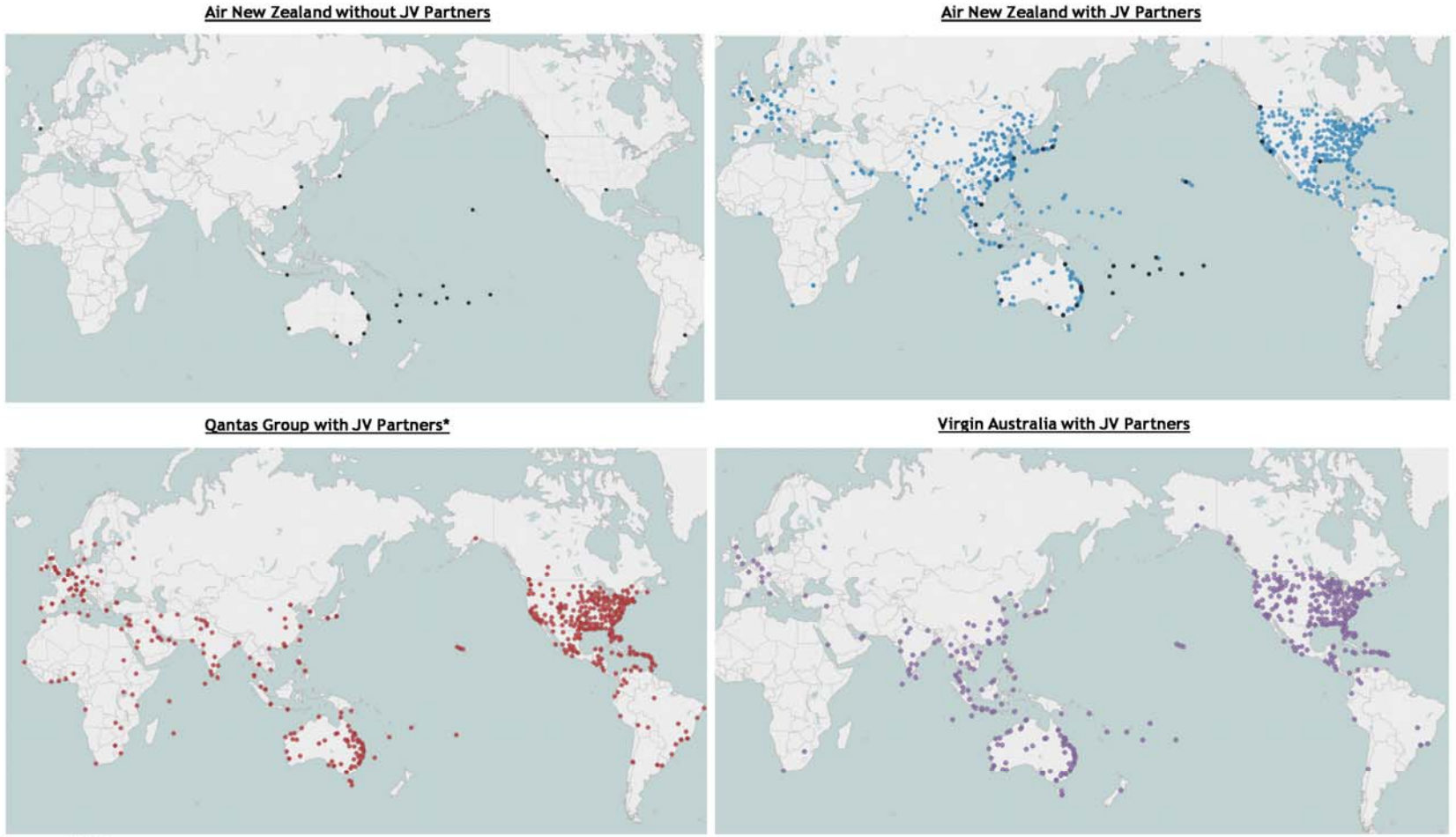
[149] In 2014, excluding Australia and the South Pacific, the international destinations served by Air NZ using its own metal accounted for only [50%-70%] of the carrier's international passengers and [50%-70%] of the carrier's international revenue. Source: Analysis of Air NZ data; figures reflect New Zealand and non-New Zealand points of origin.

FIGURE 13: DESTINATION OF AIR NZ INTERNATIONAL PASSENGERS BY CARRIER OF FINAL FLIGHT SEGMENT, 2015



Source: Analysis of Air New Zealand data. Pie chart reflects the share of last operating carrier to a destination in 2015. Limited to flights originating in New Zealand and figure does not include domestic flights.
*Air NZ-United JV to commence on July 1, 2016.

FIGURE 14: DESTINATIONS SERVED BY AIR NZ (WITH AND WITHOUT ITS JV PARTNERS), VS. QANTAS AND VIRGIN AUSTRALIA (WITH THEIR JV PARTNERS*)



Source: OAG.
Notes: Air New Zealand JV partners include Virgin Australia, Singapore Airlines, Cathay Pacific, Air China and United. Qantas JV partners include Emirates and American Airlines. Virgin Australia JV partners include Singapore Airlines and Delta Air Lines but excludes destinations served exclusively by Air New Zealand. Destinations served as of 2016.
*Qantas/American JV still pending U.S. DOT approval.

In sum, in order to effectively compete for the substantial and growing numbers of international passengers traveling to/from New Zealand that originate or are destined to points not served by Air NZ using its own metal, it is critical that Air NZ be able to match the level of service integration and prices that can be offered by its competitors and their JV partners. And while Air NZ has been able to expand its long-haul international network in recent years with the addition of new destinations including Singapore, Houston and San Francisco, these destinations would be far riskier (making year-round daily non-stop service in these markets more difficult to sustain) or simply not be served by Air NZ but for the carriers' existing JVs.[150] Simply put, given the relatively small size of New Zealand's local market and the fact that many inbound tourists originate from points that do not generate sufficient traffic to warrant non-stop service (on any carrier) to New Zealand (or are too far to serve non-stop from New Zealand), JVs are essential to maintaining Air NZ's competitiveness in the global aviation market.[151] Likewise, by reducing the cost (and hence risks) of expanding its network,[152] Air NZ's JVs have enabled the carrier to expand its network in a profitable and sustainable manner and are likely to incent Air NZ to exploit additional growth opportunities it would not otherwise pursue but for its JVs.[153] Indeed, excluding the services of the three state-owned Gulf carriers (e.g., Emirates, Qatar and Etihad) of the 319 long-haul international services of 4,000 miles or longer that were started between 2010 and 2014, 94 are no longer flown, highlighting the challenges of profitably sustaining service on such routes.[154]

Finally, JV agreements are complex commercial agreements that often take years to negotiate, gain regulatory approval, and implement. Moreover, international long-haul route planning—including the acquisition of the special-purpose long-range aircraft needed to reach New Zealand from many

---

[150] *See* e.g., footnote 124 above. As discussed in Section 3 above, ATI is not a substitute for a full, metal neutral JV with respect to eliminating double marginalization.

[151] *See* footnote 17 above. *See also* MOT Air NZ-Cathay Reauthorization Report, paragraph 6: "In principle, we have taken the view that alliances are a necessary tool for airlines (particularly those with small and remote home markets, such as Air New Zealand) to overcome restrictions imposed on them by bilateral air services agreements."

[152] *See* Air New Zealand: long-haul network grows to record highs, adding Ho Chi Minh, Houston & Buenos Aires, CAPA Center for Aviation, December 26, 2015: "Air NZ's Singapore service, which commenced in Jan-2015, was part of a JV with Singapore Airlines and thus carried significantly less risk…. with Air NZ reducing costs and bringing its long-haul network to profitability (largely through JVs), growth opportunities have been opened up."

[153] Ibid, "It is JVs that arguably define Air NZ's international markets, with such deep partnerships covering almost all of its markets. Existing and new JVs should continue to fuel growth."

[154] Source: OAG.

parts of the world—also requires substantial lead times and financial commitments. Because of the substantial resources (both time, manpower and capital expenditures) that are required to implement a new JV, time-limited authorisations of JVs (like those currently in place in New Zealand) have a chilling effect on the incentives of JV carriers to form new JVs and to introduce new Alliance Sectors within existing JVs. The demonstrable benefits to consumers from Air NZ's JVs and the length of time required to negotiate and implement JVs (plus the time required to plan, launch and develop new long-haul international routes) strongly suggests that time-limited authorisations of only three to five years are sub-optimal.[155]

b) Air NZ's JV Have Provided Other Benefits to New Zealand Travelers

As discussed in Section 3 above, Air NZ's JVs have enabled the carrier to effectively eliminate the double marginalization inefficiency that is known to result in higher fares for interline itineraries for connecting passengers. This has resulted in Air NZ's connecting fares with its JV partners being statistically equivalent to the fares Air NZ is able to offer for its own "online" connecting services to scores of international destinations where it would be infeasible for Air NZ to provide online service. Moreover, as shown in Figure 13 above, additional JVs with carriers whose networks offer more comprehensive network coverage in Europe and the Americas would extend these fare benefits to *hundreds* of additional destinations.[156] However, it is important to emphasize that the benefits that come with incentivizing Air NZ and its JV partners to act as a single carrier are not limited to the elimination of double marginalization on connecting itineraries. As discussed below, the "metal neutral" feature of revenue-sharing JVs extends to a broad range of capacity and schedule planning areas, in addition to the harmonization of JV partners' in-flight service levels and frequent flyer program benefits, all of which provide substantial benefits to New Zealand travelers.

---

[155] Moreover, unlike a merger that involves substantial changes in the pre-merger carriers' structure (including integrating workforces, relocating headquarters, standardizing operating procedures and aircraft livery, etc.), JVs can be reversed. Put differently, unlike a merger, there are no "eggs to be unscrambled" as a result of a JV.

[156] Additional JVs would also better position Air NZ to compete with Emirates, which now offers one-stop service (via Dubai) between Auckland and scores of destinations in Europe, North America, Africa, the Middle East and South Asia.

i. Air NZ's JVs Have Resulted in More Convenient Schedules for New Zealand Travelers

It is well understood that when two carriers compete on the same route, they often schedule their flights to depart at times that are in close proximity to one another. This phenomenon—referred to as "wingtip flying"—is the result of the two carriers choosing their departure times taking into account not only the desired departures times of potential passengers, but also, *the departure times each other's flights*. A typical result of such schedule rivalry is pairs of tightly clustered flights (one by each carrier). This result occurs because competing carriers will schedule their departure times so as to minimize the potential that passengers will choose their rival's service over their own because their rival's flight departs closer to the passenger's desired departure time.[157]

By way of example, consider a route served by two carriers in which each carrier offers two daily flights. If the two carriers compete, both carriers may schedule a morning flight and an evening flight, and schedule competition between the two carriers will tend to result in two morning flights (and two evening flights) departing at or near the same time. While this scheduling ensures that neither carrier "loses" a passenger to the other because it offers a less schedule to passengers, such schedule rivalry typically does not result in the optimal *overall* schedule for passengers traveling on the route, whose demand for departures times will be spread throughout the day. If, on the other hand, the same total number of flights (e.g., four) were operated *by a single carrier*, rather than pairs of closely clustered morning and evening flights, the single carrier would spread the four flights more evenly throughout the day. This is because—unlike two competing carriers—a single carrier (*or metal neutral JV*) can schedule all four flights in a way that provides the most attractive schedule to potential passengers. Importantly, a combined flight schedule that offers the greatest benefits in terms of schedule convenience to passengers is far from assured (and is often not observed) when two carriers are non-JV alliance members because under such agreements, the operating carrier receives all (or virtually all) of the passenger revenue from the flights it operates. Thus, notwithstanding their non-JV alliance agreements, partner carriers are still incented to schedule flights to maximize *their own profitability*. It is only when alliance members are part of

[157] *See*, for example, Borenstein, S., & Netz, J. (1999). "Why do all the flights leave at 8 am?: Competition and departure-time differentiation in airline markets." *International Journal of Industrial Organization*, 17(5), pp. 611-640.

a metal neutral, revenue-sharing JV that the carriers are incented to offer schedules that minimize wingtip flying.[158]

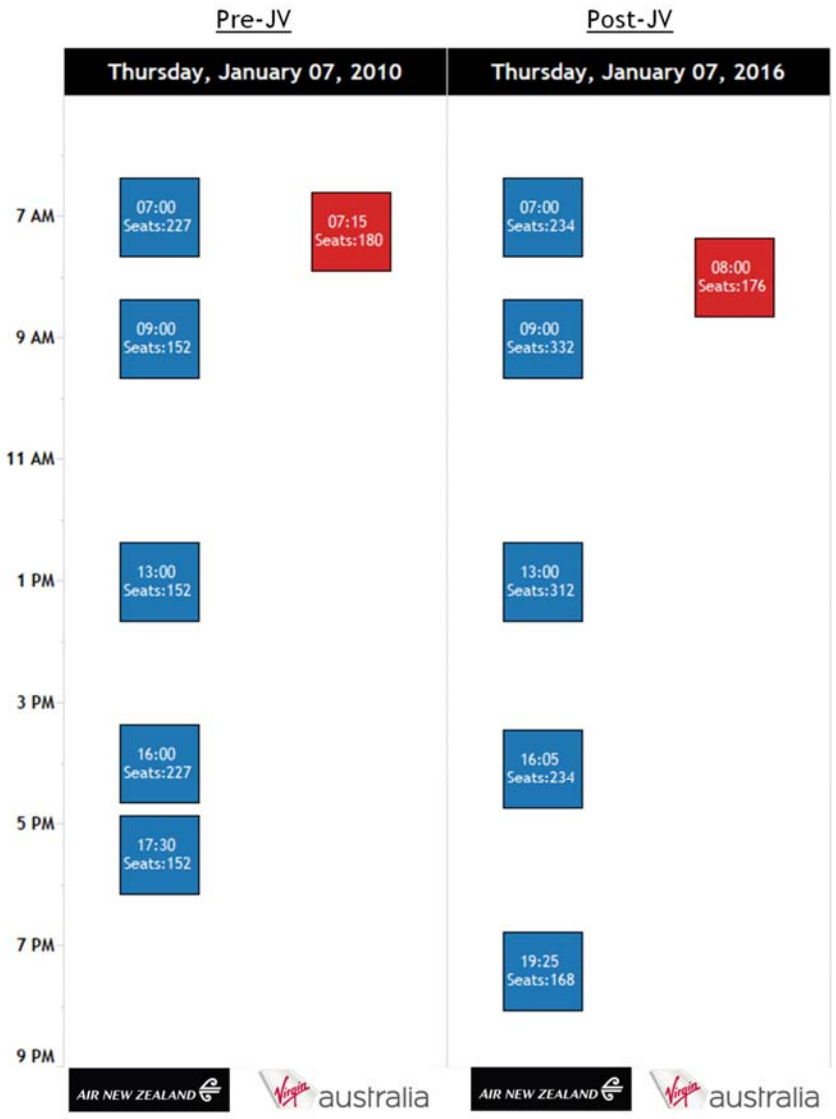
As an example of the improved schedule convenience for passengers because of Air NZ's JVs, Figure 15 compares Air NZ and Virgin Australia's Auckland to Sydney flight schedule pre- and post-JV for a typical weekday in the January. As shown in Figure 15, prior to the Air NZ/Virgin Australia JV, (e.g., on Thursday, January 7, 2010), Virgin Australia's one daily flight between Auckland and Sydney departed at 07:15, only 15 minutes after Air NZ's first morning departure at 07:00 (i.e., the two flights were "wingtip to wingtip"). Because of today's metal-neutral, revenue-sharing JV, however, Air NZ and Virgin Australia are incented to offer the most convenient array of schedule options to passengers in order to better compete with Qantas/Emirates and other carriers on the route.[159] Therefore, Air NZ/Virgin Australia evenly space their morning flights to depart at 07:00, 08:00 and 09:00, respectively, providing passengers in Auckland with three distinct flight options for morning travel to Sydney.[160]

[158] For example, even though American Airlines and British Airways were founding members of the oneworld alliance and had an extensive codeshare agreement with one another, prior to their transatlantic JV, 8 of 11 daily summer season flights they offered from London and New York City departed within 25 minutes of one another (i.e., AA at 8:30 AM and BA 8:55 AM; AA at 4:45 PM and BA at 5:00 PM; AA at 6:30 PM and BA at 6:05 PM; AA at 8:05 PM and BA at 8:00 PM). Today (post-JV), the carriers' 12 daily flights resemble an hourly "shuttle service" and are evenly spaced through (the two closest departures occurring 35 minutes apart at 9:40 AM and 10:15 AM), providing enormous schedule benefits to passengers. Source: OAG schedules for Thursday June 17, 2010 and aa.com for Thursday, June 16, 2016.

[159] In addition to service by Air NZ/Virgin Australia and Qantas/Emirates, China Airlines and LAN also offer nonstop service between Auckland and Sydney.

[160] Under their JV, Qantas/Emirates' also offer six daily flights between Auckland and Sydney, with morning departures at 06:00, 07:30 and 08:40. Notably, LAN airlines also operates a daily non –JV codeshare flight with oneworld partner Qantas between Auckland and Sydney, departing at 07:35, i.e., *only five minutes after Qantas' 07:30 flight*. Source: http://book.qantas.com.au/.

FIGURE 15: AIR NZ/VIRGIN AUSTRALIA NORTHERN WINTER FLIGHT SCHEDULE, AUCKLAND TO SYDNEY

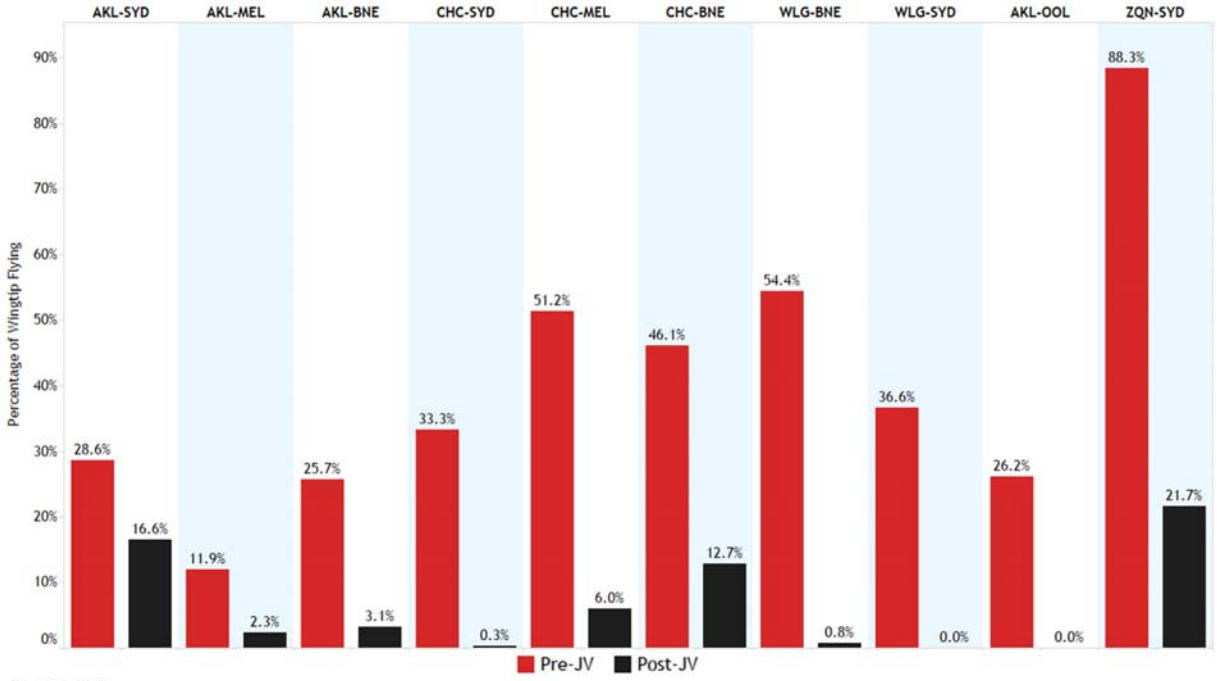


Source: OAG

Reduced wingtip flying is not unique to Auckland-Sydney. As shown in Figure 16, wingtip flying has been substantially reduced on every major trans-Tasman route post-JV. Overall, only 6.3% of Air NZ/Virgin Australia's trans-Tasman flights today in their Northern Winter schedule represent wingtip flying today, versus 31.6% pre-JV.[161]

[161] For the small handful of Air NZ/Virgin Australia flights that reflect wingtip flying today, the flights are typically scheduled much further apart than prior to the JV. For example, the mean time between wingtip flights pre-JV was approximately 36 minutes. Today, the mean time between wingtip flights (to the extent they remain) is 65 minutes.

FIGURE 16: % OF AIR NZ/VIRGIN AUSTRALIA WINGTIP FLIGHTS ON TRANS-TASMAN ROUTES, NORTHERN WINTER FLIGHT SCHEDULE PRE- AND POST-JV



Source: OAG.
Notes: Pre-JV Northern Winter refers to the time period between November 1, 2009 and March 31, 2010. Post-JV Northern winter refers to the time period between November 1, 2014 and March 31, 2015. Definition of Wingtip flying based on VA/ANZ Application for Reauthorization, page 47:[Wingtip flying] "refers to when there are 2 flights, on the same sector, and they both depart in the same morning or afternoon or less than 3 hours apart. When there are more than two flights per day on a given sector, wingtip flying is defined as any flights that depart within 1 hour of each other".

ii. Air NZ's JVs Have Created New, Metal-Neutral Service for Passengers Traveling in Thousands of Connecting City-Pairs

Better scheduling and improved network access is not limited to the Alliance Sectors. To the contrary, a substantial benefit of Air NZ's JVs has been a dramatic expansion in the number of international *connecting* city-pairs that—for the first time—have access to metal-neutral pricing and scheduling. Such pricing and scheduling has traditionally been available on city-pairs that could be served online by a single carrier. However, as demonstrated in Section 3, Air NZ's revenue-sharing JVs achieve the same degree of pricing as its pure online services.

Absent Air NZ's JVs, there are fewer than 250 non-Tasman international connecting (e.g., behind Auckland) city-pairs served by Air NZ on its own metal (e.g., Queenstown-Tokyo, Napier-Vancouver, Wellington-San Francisco). However, including the non-Tasman destinations served

Source: Comparison of OAG schedule data from November 1, 2009-March 31, 2010 vs. November 1, 2014 to March 31, 2015.

by Air NZ's JV partners (but not Air NZ), the number of non-Tasman connecting city-pairs that can be served by Air NZ's "virtual" network expands by nearly 4,000, the *vast majority of which are not served online by any other carrier*.[162] This number of new, quasi-online connecting city-pairs would grow even further—thereby providing even further benefits to travelers behind Auckland—with the addition of new JV partners.

iii. Access to Lower Fares Because of Metal-Neutral Fare Combinability

In addition to eliminating the pricing inefficiency caused by double marginalization, Air NZ's metal-neutral JVs also increase schedule options because of increased possibilities for fare combinability. Consider a passenger traveling from Auckland to Hong Kong on the Air NZ/Cathay JV. Four roundtrip routings on the JV partners are possible: (1) Air NZ's flight on both the outbound and return legs; (2) Cathay's flight on both the outbound and return legs; (3) Air NZ on the outbound leg and Cathay on the return leg, or (4) Cathay on the outbound leg and Air NZ on the return leg. Suppose that on the dates a passenger wants to travel, only Cathay has seat availability in a low fare bucket for the outbound leg, while only Air NZ has seat availability in a low fare bucket for the return leg. Absent a metal-neutral JV, the carriers are not incentivized to combine the two segments into a roundtrip that makes use of lowest fares in each direction to create the lowest possible roundtrip fare for a passenger. This is because under non-revenue-sharing alliance agreements, each carrier receives the revenue from the passengers it transports *on its own metal*. Thus, both Cathay and Air NZ would be incentivized to try to book the passenger on their own flights for both legs, *even if this results in a higher fare*. With metal neutrality, however, the JV partner carriers are indifferent between which of the four options a particular passenger travels on, and thus, the carriers are incentivized to offer passengers the lowest possible fare to win the passenger's business.[163]

[162] Source: Analysis of OAG data.

[163] Fare combinability benefits are not limited to non-stop routes. To the contrary, the ability to mix and match flight segments in a metal-neutral way dramatically increases the number of potential itinerary options (and hence potential fare choices) for passengers traveling in wide variety of non-stop and connecting city-pairs for each of Air NZ's JVs.

iv. *By Harmonizing In-Flight Service Levels and Frequent Flyer Plan Benefits Between Partners, Air NZ's JVs Provide Additional Benefits to Passengers*

As discussed above, a key benefit of revenue-sharing metal-neutral JVs is that they incent partner carriers to be indifferent as to which carrier transports any particular passenger. By eliminating the incentives for carriers to "steer" passengers onto their own flights rather than those operated by their partners, JVs enable the partner carriers to mix and match flight segments across a much broader set of flights in order to find the itinerary that is the most convenient for passengers at the lowest possible fare.

Although metal neutrality guarantees that JV partner carriers will be indifferent as to which of the carriers transports any particular passenger, this does not imply that potential passengers will necessarily be indifferent as to which of the JV carriers they fly on. This is because passengers may prefer one JV partner's service over the other's because of perceived (or actual) differences in service levels and/or frequent flyer program benefits. For example, even with today's global alliances, members of one alliance carrier's frequent flyer program (e.g., Air New Zealand's Airpoints programme) may not be eligible to earn points (or earn points, but at lower accrual rates) on another alliance' members' flights.[164] Under Air NZ's metal-neutral JVs, however, Airpoints members generally accrue programme points at identical rates regardless of whether they are flying on Air NZ flights or their JV partners flights.[165] Likewise, Airpoints "tier-level" members (i.e., those with Silver, Gold or Elite status) enjoy most of same additional benefits (such as access to priority seating) when traveling on their JV partner flights as if they were traveling on flights operated by Air NZ.[166]

[164] For example, Air NZ Airpoints members do not receive any points for travel on Star Alliance partner Air Canada for flights booked in L, A, K, G, I, X, R, and F booking classes. Likewise, although Air NZ Airpoints members accrue Status Points at higher rates when flying in Air NZ's Premium Economy class of service, they only accrue Status Points at the Economy level when traveling in Premium Economy on Air Canada. Source: http://www.airnewzealand.co.nz/star-alliance-air-canada.

[165] For travel on the Air NZ/Cathay JV, frequent flyer benefits are limited to flights between Auckland and Hong Kong. Source: http://www.airnewzealand.co.nz/co-operation-partners-cathay-pacific.

[166] While this is true for most of Air NZ's JV partners, the benefits for Airpoints elite/gold members when flying on Singapore Airlines are the standard Star Alliance gold benefits.

c) Air NZ's Joint Ventures Have Not Prevented Entry and Expansion by Other Carriers

While Air NZ's JVs have enabled the carrier to expand (or sustain) its presence in many markets it would otherwise find difficult to serve, there is little evidence to suggest that these JVs have resulted in entry barriers for carriers wanting to access the New Zealand market. For example, as shown in Figure 17 below, since Air NZ's first JV became effective in 2011, several carriers that are not JV partners of Air NZ have entered (or announced that they will enter) the New Zealand market, including several Chinese carriers (e.g., China Southern, China Airlines and China Eastern),[167] as well as Hawaiian Airlines, Philippine Airlines and American.

[167] Source: OAG. *See also* Auckland Airport, Annual Report 2015, page 13: "The Chinese market continued its amazing growth story this financial year: up by 28.8% on the previous 12 months. China Southern Airlines increased its Guangzhou-to-Auckland summer service frequency from 10 to 14 flights per week between October 2014 and March 2015. The airline also upgauged from a B787 to a B777 aircraft on its night flight over the summer peak season, adding 17,000 more seats to the route. As a result of the success of its additional flights, China Southern Airlines will implement a year-round, double-daily service from October 2015. Building further on that growth, China Eastern Airlines started a seasonal service between Auckland and Shanghai over the summer peak season. This new service was so successful that China Eastern Airlines will operate four flights per week year-round from September 2015, adding 100,000 seats to this all-important route every year."

FIGURE 17: AVERAGE WEEKLY SEATS TO NEW ZEALAND (EXCLUDING AIR NZ AND JV PARTNERS (SEPTEMBER 2011-SEPTEMBER 2016)

Carriers	September 2011	September 2012	September 2013	September 2014	September 2015	September 2016
Qantas Group	27,751	25,459	25,707	25,144	25,348	28,767
Emirates	10,857	10,381	11,844	13,314	13,314	15,176
LATAM	3,375	3,277	2,045	3,500	3,652	5,530
China Southern Airlines	780	1,603	1,526	2,234	2,187	3,814
Fiji Airways	2,527	2,303	2,313	2,290	2,704	3,001
Airasia X	1,329					2,639
China Airlines	949	1,680	1,899	2,006	1,934	2,149
Malaysia Airlines	1,711	1,645	1,645	1,974	1,981	1,981
China Eastern Airlines					164	1,638
Thai Airways International	1,499	1,431	1,226	1,295	1,158	1,499
American Airlines						1,424
Korean Air	1,882	1,543	1,194	1,035	1,032	1,035
Hawaiian Airlines			1,029	892	892	892
Air Tahiti Nui	549	617	549	823	823	823
Philippine Airlines					1,092	655
Air Vanuatu	336	378	311	317	357	516
Air Caledonie International	452	423	423	422	504	462
Aerolineas Argentinas	1,389					
Jetstar Asia	1,620					
Royal Brunei Airlines	1,197					
Grand Total	**58,202**	**50,740**	**51,709**	**55,246**	**57,144**	**72,002**

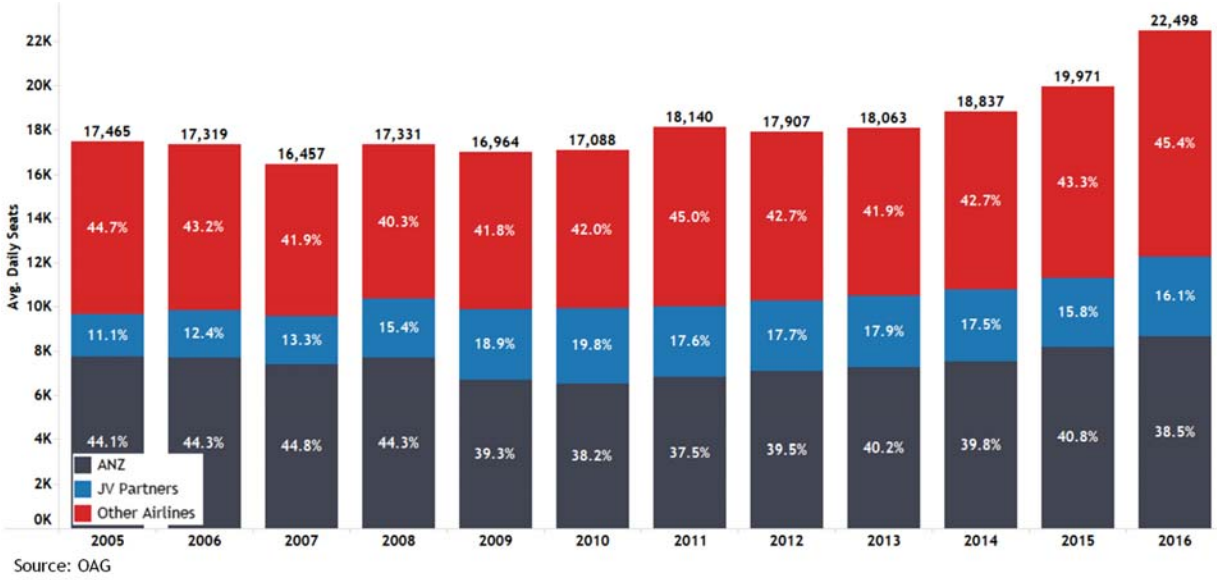
Source: OAG.

Thus, while the relatively small nature of New Zealand's local market has made sustaining services to New Zealand challenging for some carriers,[168] there is little indication that the formation of Air NZ's JVs have prevented other carriers from entering (or expanding service) to the New Zealand market. Indeed, as shown in Figure 18, the share (and absolute number) of international seats to New Zealand by carriers *other than Air NZ and its JV partners* has increased from 42% to 45.3% since 2010 (the year prior to Air NZ's first JV). Moreover, as noted earlier, Emirates recently launched new non-stop service between Dubai and Auckland, and Qatar Airways has announced that it will launch non-stop announce non-stop service between Doha and Auckland.[169] This provides further evidence that Air NZ's JVs have not created entry barriers for other carriers seeking to access the New Zealand market.

[168] *See* Figure 8 above.

[169] *See, e.g.* "Gulf airlines in Australia/New Zealand: Auckland non-stops as Qatar Airways disrupts the status quo", CAPA, March 7, 2016: "Mr Al Baker, speaking at the 03-Mar-2016 inauguration of the airline's Sydney service, said Qatar would launch Doha-Auckland non-stop service in an unspecified time in late 2016." The report also noted that "Emirates' non-stop Auckland service and a potential non-stop entry from Qatar could see Gulf airline capacity in Auckland grow 34% over a year, assuming Qatar, like Emirates, offers a daily 777-200LR service."

FIGURE 18: AVERAGE DAILY INTERNATIONAL SEATS TO NEW ZEALAND (2005-2016)



Finally, some critics of JVs have suggested that metal-neutral revenue sharing have resulted in JV carriers limiting access to behind-gateway connections at their hubs only (or predominantly) to their JV partners, thereby foreclosing competition from non-JV carriers in city-pairs that required a behind-gateway interline connection which, in turn, makes entry into a JV carrier's hub more difficult.[170] While an expected (and consumer welfare enhancing) result of JVs will be increased numbers of passengers connecting between JV partners, there is no evidence to suggest that Air NZ has been restricting access to non-JV carriers (even those from other alliances) wanting to access passengers from other New Zealand cities by connecting to a domestic Air NZ flight behind Auckland. For example, between 2011 and 2015, the number of passengers connecting from a domestic Air NZ flight to an international flight operated by a non-JV partner of Air NZ increased by approximately 11%, with Qantas (oneworld), China Southern (SkyTeam), LAN (oneworld) and China Airlines (SkyTeam) all experiencing significant increases in connections.[171]

---

[170] *See* "Joint Ventures, Competition and the Consumer", Presentation of Mark Dunkerley, Hawaiian Airlines President and CEO, Australian Pacific Aviation Summit, August 3-5, 2015, (video available at http://www.centreforaviation.tv/australia-pacific-aviation-summit-3-5-aug-2015/hawaiian-airlines-joint-ventures-competition-and-the-consumer/). *See also* Bilotkach, V., Huschelrath, K., 2013. "Airline alliances, antitrust immunity, and market foreclosure," *Review of Economics and Statistics* 95, 1368-1385.

[171] Source: Analysis of Air NZ data.

d) Air NZ's JVs Generate Other Substantial Benefits for the New Zealand Economy

The quality of a country's air service plays an integral role in promoting commercial and cultural ties not only with other nations, but also, between communities within the country. Because New Zealand is more geographically isolated than any other developed country in the world, high quality air service is even more important to ensuring that New Zealand continues to expand its economic and cultural ties with other developed and developing nations.

Like virtually all countries, New Zealand benefits from a mixture of service from its home carrier (Air NZ) and an array of foreign carriers.[172] While service from both types of carriers is important, Air NZ plays a unique role in New Zealand as the only carrier that can offer fully integrated international *and domestic services*, thereby providing all of New Zealand with connectivity to the global aviation ecosystem through its Auckland hub. And as discussed below, Air NZ's hub service also creates other substantial benefits to the New Zealand economy. Not only are the direct aviation sector employment benefits (and hence, local economic impact within New Zealand) of Air NZ's services far greater than those of a foreign carrier serving New Zealand, Air NZ's comprehensive domestic and trans-Tasman services paired with its international network (on its own metal and through its alliances) helps to promote inbound tourism from visitors across the globe, which in turn supports thousands of jobs within New Zealand. Although a thorough analysis of the local economic benefits that accrue in the countries of Air NZ's JV partners is beyond the scope of our current analysis, the improved connectivity and competitiveness generated by each of Air NZ's JVs will result in similar (albeit slightly different) economic benefits in Singapore, Hong Kong, Australia and China.[173]

i. Air NZ's JVs Help to Support the Carrier's Domestic Services

Air NZ—like most other international carriers—operates a hub-and-spoke network. From its Auckland hub, Air NZ offers non-stop service to 20 domestic and 28 international destinations, including 11 long-haul international destinations outside of the South Pacific region.[174] As with any international hub-and-spoke network, passengers traveling on Air NZ's long-haul flights

[172] *See* Figure 17 above.

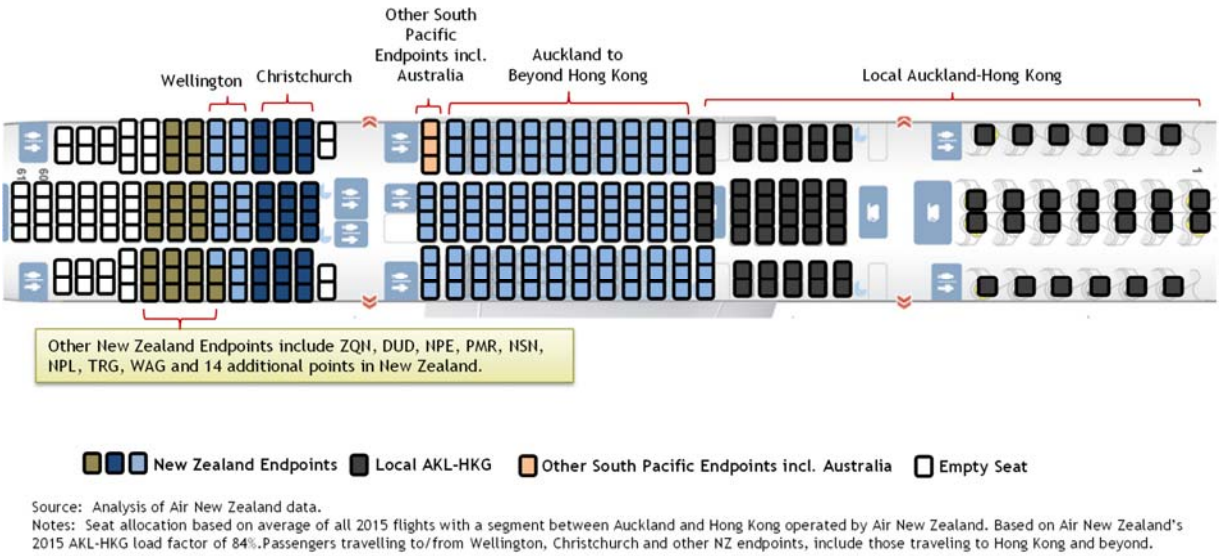
[173] See footnote 22 above.

[174] Source: OAG.

to/from its Auckland hub originate from (or are destined to) not only Auckland, but also a wide variety of domestic and shorter-haul international destinations within the South Pacific. Overall, approximately half of the passengers onboard a typical Air NZ long-haul international flight are passengers traveling to/from Auckland, underscoring the intertwined relationship between the carrier's long-haul international and domestic/Tasman services.[175]

To illustrate the interdependency between Air NZ's international and domestic/Trans-Tasman services, consider the following seat map, which shows the distribution of passengers on a typical Air NZ flight between Auckland and [one of ANZ's JV partners' hubs]. As shown below, approximately two-thirds of passengers onboard Air NZ's [alliance sector] flights are traveling between Auckland and [its partners hub/destinations beyond its partners' hub], with the balance of passengers making connections in Auckland to/from multiple destinations within New Zealand (as well as other points in the South Pacific).

FIGURE 19: REPRESENTATIVE SEAT MAP ON AIR NZ 777-200 FLIGHT FROM AUCKLAND TO HONG KONG



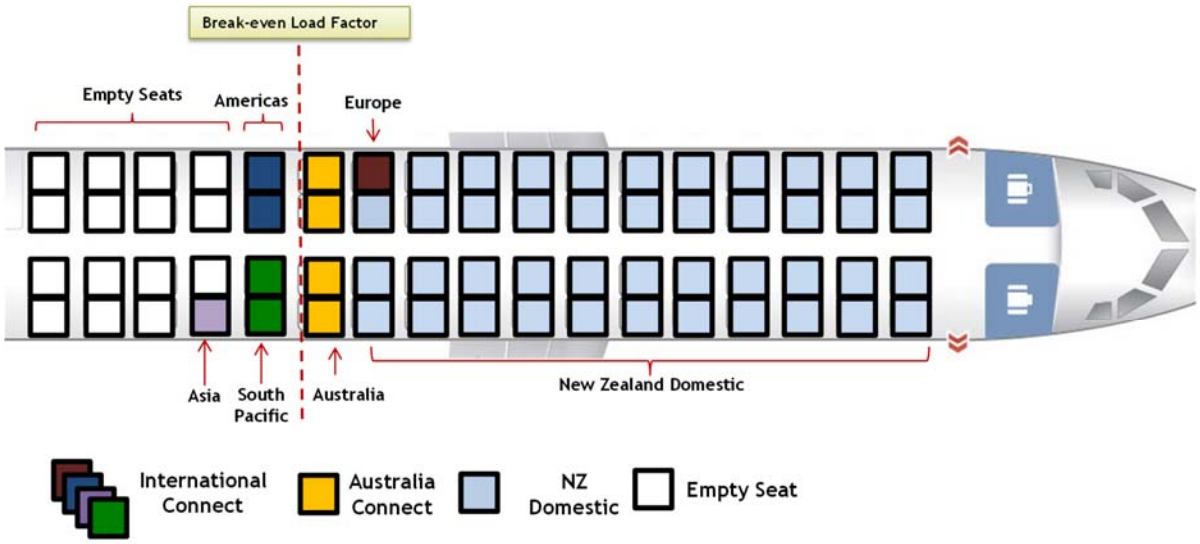
Source: Analysis of Air New Zealand data.
Notes: Seat allocation based on average of all 2015 flights with a segment between Auckland and Hong Kong operated by Air New Zealand. Based on Air New Zealand's 2015 AKL-HKG load factor of 84%.Passengers travelling to/from Wellington, Christchurch and other NZ endpoints, include those traveling to Hong Kong and beyond.

Now consider a comparable seat map for one of Air NZ's domestic services [between Auckland and a small New Zealand community]. As shown below, passengers making long-haul international connections at AKL comprise about 8% of passengers onboard on a typical flight

[175] Moreover, this figure is likely to overstate the number of passengers traveling only to/from Auckland, as many passengers visiting New Zealand from abroad purchase separate tickets for the "domestic" portion of the trip.

between Auckland and [that community] (with other international connections within the South Pacific accounting for an additional 12% of onboard passengers). Figure 20 also demonstrates that without these international connecting passengers, the load factor on [this domestic route] would drop below break-even levels, making it challenging for Air NZ to sustain (much less expand) its capacity on that route.[176]

FIGURE 20: REPRESENTATIVE SEAT MAP ON AIR NZ ATR-72 FLIGHT FROM AUCKLAND TO NELSON



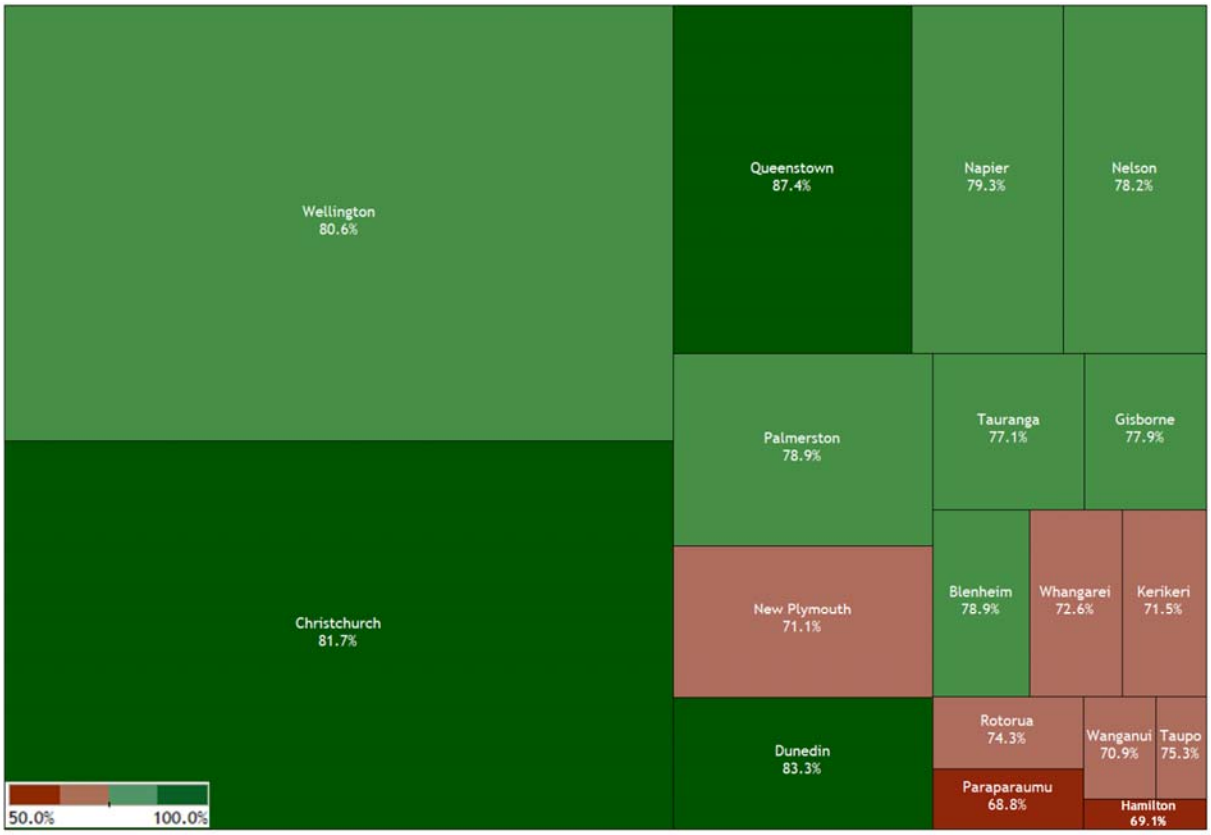
Source: Analysis of Air New Zealand data.
Notes: Seat allocation based on average of all 2015 Air New Zealand flights on the AKL-NSN route. Based on Air NZ's 2015 average load factor of 78% and break-even load factor of 70% on the AKL-NSN route. Air New Zealand operates a 68 seat ATR 72-500 on this route.

Taken together, Figure 19 and Figure 20 demonstrate the delicate symbiotic relationship between Air NZ's international and domestic services. Not only would Air NZ's [alliance sector] service be unviable without the behind-Auckland feed from other points within New Zealand destined to [its JV partners' hubs] and beyond, but Air NZ's ability to serve many of its thin domestic routes ([redacted]) would likewise be compromised if the carrier had to rely solely on local traffic. And as shown in Figure 21 below, many of Air NZ's thinnest domestic routes from Auckland—which provide critical transportation links from those communities to Auckland and hence, the global

[176] Between 2010 and 2015, Air NZ increased its average daily seats between Auckland and Nelson by 20%. Source: OAG.

aviation ecosystem—tend to have low load factors, making service on those routes economically challenging.

FIGURE 21: AIR NZ 2015 LOAD FACTORS ON DOMESTIC ROUTES TO/FROM AUCKLAND



Source: Analysis of Air New Zealand Load factor data.
Notes: Figure reflects load factors on domestic Air New Zealand routes in 2015 to/from Auckland. Boxes are sized according to the number of seats on the routes.

By enabling Air NZ to offer passengers more convenient and lower priced connecting service to scores of international destinations it cannot serve on its own, revenue-sharing JVs ensure that Air NZ can effectively compete with other, much larger carriers that have natural advantages over Air NZ (i.e., Qantas) and that have formed (or are forming) extensive JV networks of their own. Moreover, as demonstrated in Section 3 above, the level of fares achievable through revenue-sharing JVs is not possible through other, less integrated forms of cooperation (i.e., basic codesharing with Star Alliance partners and other carriers). Simply put, because Air NZ's JVs have made the carrier more competitive internationally, and because of the interdependency between a hub-and-spoke carrier's international and domestic services, JVs have also served to

strengthen Air NZ's *domestic network*, thereby helping it to maintain (and some cases increase) service in domestic markets.

ii. Given Its Small Local Market, New Zealand Can Only Support One Long-Haul International Gateway

As previously discussed, New Zealand's relatively small population of only about 4.5 million inhabitants combined with its remote location removed from most major international traffic flows have made sustaining long-haul international service to/from New Zealand difficult for many carriers, including Air NZ.[177] As described above, by consolidating traffic flows at a central hub (Auckland), Air NZ has been able to sustain (and more recently through its alliances) grow its long-haul international services.

Because a strong base of local traffic (both business and leisure) is essential to the viability of a hub, virtually all major airline hubs are located in the largest city (or cities) within a particular country. As New Zealand's largest city by a wide margin, Auckland—with a greater metropolitan population of approximately 1.5 million—is the natural (and only economically logical) location for Air NZ to maintain a hub from which to serve long-haul international destinations.[178] While other New Zealand cities such as Christchurch or Wellington (with populations of approximately 500,000 each[179]) can support non-stop international service to short-haul trans-Tasman destinations that can be served using smaller, narrow body aircraft, these cities do not generate sufficient local traffic to economically support *long-haul* widebody international services to many

[177] *See* Figure 8 above. In addition to the long-haul services terminated by foreign carriers, Air NZ has (over time) discontinued service on several long-haul international routes, including Auckland-Beijing, Auckland-Osaka, Christchurch-Osaka, Auckland-Taipei, Auckland-Singapore and Auckland-Nagoya. Source: OAG. Auckland-Singapore was re-instated in January 2015 as part of Air NZ's JV with Singapore Airlines.

[178] Source: http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7501.

[179] Sources: http://ecan.govt.nz/about-us/population/how-many/Pages/estimates.aspx#popestimates and http://nzdotstat.stats.govt.nz/wbos/Index.aspx?DataSetCode=TABLECODE7501. Population for Christchurch includes the three greater Christchurch territorial authorities (e.g., Waimakariri District, Christchurch City and Selwyn District); population for Wellington reflects the Wellington region.

destinations.[180] Indeed, only a small handful of cities worldwide with populations comparable to that of Christchurch have *any* long-haul international service.[181]

Finally, even though Auckland is—far and away—the largest source of O&D traffic in New Zealand (and thus, Air NZ's only current long-haul international gateway), the benefits of Air NZ's JVs are distributed across all the domestic destinations served by Air NZ. For example, as shown in Figure 22, while the growth rate in O&D traffic between Auckland and Asia between 2010 and 2015 was 14.5% (well in excess of GDP growth rates in New Zealand and Asia over this period), many smaller cities and towns in New Zealand that are domestic "spokes" on Air NZ's Auckland hub enjoyed *even faster growth* rates in traffic to/from Asia. Moreover, it is important to note that the growth rates shown in Figure 22 are likely to understate the actual rate of growth in visitors between Asia and cities such as Christchurch and Wellington, as many foreign passengers that visit New Zealand travel by other modes (or buy separate domestic tickets) once reaching Auckland.

[180] As noted earlier, while it can sometimes be feasible for a foreign carrier to serve multiple long-haul destinations in New Zealand from a hub where it aggregates large traffic flows (e.g., Singapore Airlines service from Singapore to both Auckland and Christchurch), long-haul international service to multiple destinations by Air NZ from a second gateway (e.g., Christchurch) would be economically impractical because it would need to rely almost exclusively on local (i.e., Christchurch) traffic and/or would siphon connecting traffic away from Auckland, rendering that service unviable.

[181] The exceptions tend to be small tropical islands such as Aruba, Montego Bay (Jamaica) or Punta Cana (in the Dominican Republic). These cities tend to have small populations but receive some scheduled long-haul service which caters almost exclusively to vacationers traveling to/from those destinations.

FIGURE 22: COMPOUND ANNUAL GROWTH RATE OF AIR NZ PASSENGERS TRAVELING BETWEEN ASIA AND NEW ZEALAND CITIES, 2010-2015

Source: Analysis of Air New Zealand data.

iii. *By Enabling Air NZ to Offer Higher Quality and Lower Priced Service Between New Zealand and Scores of Additional Destinations, JVs Help Stimulate Tourism and Other Economic Economy Activity Within New Zealand*

Tourism is a major component of New Zealand's economy. For the year ending March 2015, total tourism expenditures in New Zealand were estimated at just under $30 billion, more than one-third of which was attributable to visitors from abroad.[182] Not only do the expenditures by tourists provide a direct economic benefit to New Zealand businesses and the New Zealand Government

[182] *See* "Tourism Satellite Account: 2015: The contribution made by tourism to the New Zealand economy", Statistics New Zealand, October 2015, page 9.

(through the collection of the Goods and Services Tax), but the spending by tourists re-circulates throughout the New Zealand economy, thereby creating so-called indirect and induced economic activity.[183] Tourism is also a major contributor to New Zealand employment. For example, it is estimated that tourism directly employs 168,000 people in New Zealand, with an additional 128,000 of indirectly supported jobs.[184] Overall, the combined (direct and indirect) employment attributable to New Zealand's tourism industry (i.e., 296,000 jobs) accounts for 12.1% of all employment within New Zealand.

By enabling Air NZ and its JV partners to offer potential tourists from around the world integrated, more convenient service not only to Auckland, but to destinations throughout New Zealand *at fares that are equivalent to those offered by a single, online carrier*, Air NZ and its JV partners have made New Zealand a more attractive destination for potential tourists that are contemplating visiting New Zealand vs. other destinations. Thus, Air NZ's JVs have helped to stimulate additional foreign tourism to New Zealand (and its associated economic impact).[185]

Finally, it is important to note that while the economic impact of foreign tourists' spending in New Zealand is independent of whether they arrive in New Zealand on Air NZ or another carrier, the *total economic impact* is greater when foreign visitors choose Air NZ as their carrier of choice vis-à-vis other carriers. This is because the overwhelming majority of Air NZ's more than 10,000 employees are based in New Zealand, and thus, earn and spend the bulk of their incomes within the New Zealand economy. While most foreign airlines that serve New Zealand employ a small handful of employees (typically airport staff and sales agents) in New Zealand, the bulk of their employees are located in their home countries. Thus, by enabling Air NZ to remain competitive in the global airline marketplace and grow its long-haul international services to/from New Zealand, JVs help to facilitate continued growth in direct airline employment for New Zealanders.

---

[183] "Indirect" economic activity is the result of businesses in the tourism industry (i.e., hotels, restaurants, etc.) purchasing a wide array of services to support their businesses (i.e., food, energy, furniture, etc.). "Induced" economic activity is the result of the wages and spending created by direct and indirect economic activity being re-spent and circulating throughout the economy.

[184] *See* "Tourism Satellite Account: 2015: The contribution made by tourism to the New Zealand economy", Statistics New Zealand, October 2015, page 19.

[185] *See, e.g.*, "Australia, New Zealand in 'arms race' for Chinese tourist dollars", *The Sydney Morning Herald*, September 30, 2015, reporting that "Australia and New Zealand risk losing a global arms race for big-spending Chinese holidaymakers unless they improve their services and infrastructure, jeopardising hopes that tourism will fill the economic hole left by the commodities downturn."

5. Conclusions

Over the past few years, metal-neutral, revenue-sharing JVs have become the preferred form of cooperation by international carriers seeking to provide passengers with network scope that extends beyond reach of their own, native networks. Although the benefits to consumers from the predecessors of these highly-integrated alliances (e.g., codesharing and antitrust immunity) have been thoroughly demonstrated in the literature, some regulatory authorities and other industry observers have questioned whether these benefits extend to today's JVs.

Relying on a data set consisting of detailed fare and ticket data provided by Air NZ, we provide empirical evidence on the fare benefits generated by Air NZ's JV partnerships. Because the relatively recent emergence of JVs has meant that no previous studies of fare effects from airline cooperation focused on JVs, this evidence is unique. We find that the connecting fares for trips that combine Air NZ with one of its JV partners are indistinguishable from Air NZ's online fares, implying that Air NZ and its partners behave as a single airline in setting connecting fares, with substantial benefits to consumers. Notably, we find no fare benefits from lesser forms of airline cooperation involving Air NZ (e.g., a basic codeshare or Star Alliance relationship). Thus, our evidence suggests that, in the New Zealand context, the fare benefits from airline cooperation on connecting trips may not be realizable outside of a metal-neutral, revenue-sharing JV structure.

We also ask whether overlapping nonstop service by Air NZ and its JV partners reduces route competition relative to the case where the service overlap involves nonaligned carriers. Since the focus on a single carrier's alliances limits the number of possible overlap combinations, answering this question in a statistically reliable fashion is difficult. Nevertheless, the evidence we develop suggests that JV service overlaps reduce competition to some extent (relative to the counterfactual in which Air NZ and its JV partners offered competing non-stop service on an Alliance Sector). However, due to the small number of "testable" nonstop routes, we are unable to reliably pin down an exact size for the effect, and caution regulators from generalizing our nonstop finding to other contexts. Moreover, it is reasonable to assume that Air NZ would find it difficult to profitably sustain non-JV services on these routes, and thus, there is no guarantee that in the "but for" world, passengers would ever realize the potential fare savings that may come with multiple carriers offering competing non-stop service on long-haul international routes to/from New Zealand.

Indeed, the fact that Air NZ found difficult to sustain service on several of its Alliance Sectors pre-JV (i.e., Auckland-Singapore and Auckland-Hong Kong) suggests that the nonstop results should not be assigned much weight when viewed against the robust finding, based on far more data, that JVs substantially lower fares for connecting passengers.

Finally, we find that because of several unique features of New Zealand's international aviation market, it is essential that Air NZ—the only carrier capable of offering coordinated domestic and international airline service to New Zealanders—be able to extend the reach of its network to destinations it cannot economically serve on its own. By enabling Air NZ to offer passengers highly integrated service to scores of destinations it could not serve on its own *at fares that are equivalent to its own online fares*, Air NZ's existing JVs have not only made Air NZ more competitive and enabled to it grow, but have also provided substantial benefits to travelers to/from New Zealand and to the New Zealand economy.

Appendices

Appendix 1: Global Alliance Members as of December 2015

Star Alliance	SkyTeam	oneworld
Air Canada (May 1997)	Aeromexico (June 2000)	American Airlines (February 1999)
Lufthansa (May 1997)	Air France (June 2000)	British Airways (February 1999)
Scandinavian Airlines (May 1997)	Delta Air Lines (June 2000)	Cathay Pacific (February 1999)
Thai Airways (May 1997)	Korean Air (June 2000)	Qantas (February 1999)
United Airlines (May 1997)	Czech Airlines (March 2001)	Finnair (September 1999)
Air New Zealand (March 1999)	Alitalia (July 2001)	Iberia (September 1999)
All Nippon Airways (October 1999)	KLM (February 2004)	LAN (June 2000)
Austrian Airlines (March 2000)	Aeroflot (January 2006)	Japan Airlines (April 2007)
Singapore Airlines (April 2000)	Air Europa (September 2007)	Royal Jordanian (April 2007)
Asiana Airlines (March 2003)	Kenya Airways (September 2007)	S7 Airlines (November 2010)
LOT Polish Airlines (October 2003)	China Southern (November 2007)	Airberlin (March 2012)
Adria Airways (November 2004)	TAROM (June 2010)	Malaysia Airlines (February 2013)
Croatia Airlines (November 2004)	Vietnam Airlines (June 2010)	Qatar Airways (October 2013)
TAP Portugal (March 2005)	China Eastern (June 2011)	TAM Airlines (March 2014)
South African Airways (April 2006)	China Airlines (September 2011)	SriLankan Airlines (May 2014)
Swiss International Air Lines (April 2006)	Saudia (May 2012)	
Air China (December 2007)	Middle East Airlines (June 2012)	
Turkish Airlines (April 2008)	Aerolíneas Argentinas (August 2012)	
EgyptAir (July 2008)	XiamenAir (November 2012)	
Brussels Airlines (December 2009)	Garuda Indonesia (March 2014)	
Aegean Airlines (June 2010)		
Ethiopian Airlines (December 2011)		
Avianca (June 2012)		
Copa Airlines (June 2012)		
Shenzhen Airlines (November 2012)		
Eva Air (June 2013)		
Air India (July 2014)		

Sources: http://www.staralliance.com/member-airlines; http://www.skyteam.com/en/About-us/Our-members/; https://www.oneworld.com/member-airlines/overview.

Appendix 2: Summary statistics of Regression Data Set, Connect Markets

[REDACTED – CONFIDENTIAL INFORMATION]

Note: Weighted by passengers. Distances are in kilometers, fares are NZD. Includes all cabin classes.

Appendix 3: Summary Statistics of Regression Data Set, Non-stop Markets

[REDACTED – CONFIDENTIAL INFORMATION]

Note: Weighted by passengers. Distances are in kilometers, fares are NZD. Includes all cabin classes.