



Restructuring Argentina's airline networks: Successes and challenges

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ABSTRACT

Argentina's aviation networks underwent significant restructuring after the 2015 election of President Mauricio Macri. Historically constrained by poor aviation infrastructure, economic uncertainty, currency devaluations, labor unrest, comparatively weak passenger demand, and operational barriers to low-cost carriers (LCCs), Argentina's airline networks have experienced deep restructuring in both providers and network interactions. With less than 0.3 trips per capita in Argentina, compared to 3.0 in the mature U.S. aviation market, analysts argue that there is significant potential for moving bus and automobile travelers to airlines, and to expanding Argentina's airline connectivity profitably throughout the region. LCCs such as Flybondi, Norwegian, Air Europa, Sky, JetSmart, and others are challenging long-standing transportation relationships in the region and developing new routes for consumers. A set of interlinked questions aims to understand Argentina's changing aviation geography. Comparing O-D data from 1972, 1982, 1996, and 2019, the results indicate a significant reorganization of Argentina's domestic and regional network interactions, with modest adjustments to its global north-south connections. Challenges include outcomes of a recent change in Argentina's government and the long-term impact of the global COVID19 pandemic on the aviation system.

1. Introduction

Since the 1970s the global aviation industry has experienced significant growth in seat capacity, number of travelers, and origin-destination relationships, driven in part by aircraft technology enhancements, tourism demand, and globalization of the economy. This growth in aviation demand within and between regions, especially in Asia and Latin America, led to enhanced competition from start-up airlines, especially contemporary low-cost carriers (LCC) and ultra-low-cost carriers (ULCC), that challenged the historical dominance of national airline operators, or traditional flag carriers, such as Air France, Aerolíneas Argentinas, British Airways, Japan Airlines, etc. (Bowen, 2013; Khanna, 2016; O'Connell and Williams, 2016). LCCs and ULCCs have been defined variously as airlines with budget fares, no-frills service, fewer comforts, additional charges for extras like checked baggage, operating from secondary cities, and with a standardized fleet, although the consensus definition is simply an airline with much lower operating costs than legacy or traditional flag carriers (Gross and Lück, 2016; Bachwich and Wittman, 2017). Myriad perspectives on these changes have contributed to a growing body of research on aviation geographies, including tourism (Pezzullo, 2009), network growth impacts (Bowen, 2013), liberalization strategies (Liu and Oum, 2018; Njaya et al., 2018), codesharing (Morandi et al., 2015), carbon footprints (Lu and Wang, 2018), environmental externalities (Ryley, 2016),

world-city networks (Derudder and Witlox, 2008), and LCCs (Alderighi et al., 2012; Bowen, 2019), among other important themes. Research on LCCs specifically has exploded recently, with attention focused on issues such as hubs, seat demands, cost curves, competition, and travel patterns (Bowen, 2016; Amankwah-Amoah, 2018; Dobruszkes et al., 2017; Hirsh, 2017; Malighetti et al., 2016; Fu et al., 2015; Francis et al., 2007; Francis et al., 2006). The literature also has explored the strong relationship between the state and airline markets (see Bowen and Leinbach, 1995), the importance of contestability theory in aviation economics when LCCs enter the marketplace (Baumol, 1982), and the widely experienced effects of liberalizing air transport services in the USA, Europe, and other areas of the world (Francis et al., 2006).

In Latin America, cross-border and domestic ground and air transport networks and infrastructure traditionally have been weak, compared to more advanced economies, and dominated by the region's major urban centers and their links to the Global North economies (Keeling, 2008). Until recently in Argentina, for example, domestic airline traffic frequently routed through Buenos Aires, with few connections from interior cities to contiguous countries, and much of the external traffic connecting Argentina to the global system routed primarily to or through Global North aviation hubs and major cities (Miami, New York, Madrid, London, etc.). Since the 1990s, regional trade alliances such as the North American Free Trade Agreement (NAFTA), the Southern Cone Common Market (MERCOSUR), the

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Andean Community (CAN), and the Caribbean Community (CARICOM), among many others, have focused new attention on intraregional transportation and encouraged a heightened level of connectivity among trading partners. Most countries within Latin America began to develop policies and strategies to address inadequacies in cross-border infrastructure and regional transport integration, leading to the Initiative for the Integration of the Regional Infrastructure of South America (IIRSA), along with other regional projects (Camacho and Molina, 2005). LCC operations evolved in Latin America after late-2000 with the emergence of Brazilian airline, *Gol*, following the expansion across Europe and North America of the contemporary low-cost aviation model (Lohmann and Lipovich, 2013). Between 2001 and 2010, available seat capacity in South America grew by over 40%, which spurred LCC growth, primarily in Brazil, and drove the region's LCC share of global seat capacity up from 2.74% in 2001 to about 7% in 2010 (Lipovich, 2014; Lohmann and Lipovich, 2013). However, with the exception of early LCC growth in Brazil (but also Mexico and Colombia to a lesser extent), significant change in the aviation industry across Latin America generally has been slow, with LCC expansion beyond Brazil proving sporadic until 2015 when countries such as Argentina, Chile, and Perú entered the contemporary LCC market aggressively. For this analysis, contemporary LCCs in Latin America are considered as those established post-2000, because there are examples of earlier no-frill operators worldwide (Freddie Laker's transatlantic Skytrain in the 1970s and 1980s, LAPA in Argentina, Loftleiðir in Iceland during the 1960s, etc.), most of which are now defunct or have been absorbed by other operators.

Analysis of the Latin American aviation environment between 2014 and 2016 by organizations as diverse as the World Economic Forum (WEF), Oxford Economics, the Air Transport Action Group (ATAG), the United Nations Economic Commission for Latin America and the Caribbean (ECLAC, 2017), individual governments in the region, and academics (e.g., Bowen, 2013; Lipovich, 2014; Khanna, 2016), among others, argued that enormous growth potential existed in aviation. Encouraging development of the aviation sector by restructuring regulatory and economic policies could triple seat demand in the short run and serve as a powerful multiplier effect for the region's economies. In 2016, Argentina ranked 66th in global aviation competitiveness and ranked fourth in Latin America in air connectivity, behind Mexico, Brazil, and Colombia (ECLAC, 2017), so room for improvement certainly existed. Thus, recent policy changes in Argentina are inextricably intertwined with the rapidly changing scope and impact of restructuring the region's domestic and international airline markets and the resulting spatial reorientation of network relationships driven, in part, by the growth of LCCs.

Contextualizing the challenges in understanding the myriad potential long-term impacts of aviation restructuring in general has seen other important research conducted on issues such as LCC impacts on the catchment areas of major international airports (Wang et al., 2017; Pantazis and Liefner, 2006), changes in charter and national airline operations (Zuidberg, 2019; Rodríguez and O'Connell, 2018), and on competition for and by secondary airports in the network (Bowen, 2019; Wong et al., 2019). There is a limited literature, however, on understanding the geographical impact of airline network changes over time in Latin America, and specifically in Argentina. An examination of changes in the airline industry in Argentina thus raises several questions about the country's aviation geography, LCC growth, and connections to Global South and North economies. First, how have origin-destination (O-D) relationships between Argentina and the global aviation network changed over time? O-D discussions hereafter refer specifically to non-stop flights between city pairs (Buenos Aires to Atlanta, e.g.); they do not refer to the origin or destination of individual travelers (Buenos Aires-Atlanta-Nashville, e.g.). Second, where are new non-stop destinations from Argentina evident in its contemporary regional and global aviation network? Third, which 2nd and 3rd tier cities in Argentina have benefited from enhanced non-stop connections to

contiguous countries or to destinations further afield? Fourth, what role are LCCs playing in the changing geography of Argentina's O-D relationships? Finally, how might the future growth of LCCs in Argentina prove vulnerable to supply/demand relationships and to changing political-economic-health circumstances? This paper does not address aviation econometrics such as seat revenue, ticket pricing, demand curves, load factors, aircraft leasing, or other indicators of airline economic viability, as these issues are addressed by others (e.g., see Holloway, 2018; Ison, 2017; and Gross and Lück, 2016). The following section explores the historical development of Argentina's aviation industry, followed by an analysis of spatial changes over time. Section four examines the successes and challenges of LCC growth and network changes, while the final section discusses the implications of these changes in the context of changing political, economic, and health circumstances.

2. Argentina's aviation development

Since its modern development in the post-World War II era, Argentina's aviation industry has remained tightly controlled by the federal government. During the nationalization phase of the Perón presidency in the 1940s, Aerolíneas Argentinas, the national carrier, emerged as a state-owned company after the May, 1949, merger of four airlines, and began formal operations under Decree 26.099 in December 1950, operating international flights from Ezeiza (EZE) airport and domestic flights (plus Uruguay) from the Aeroparque (AEP) airport located near the city center. In 1971 Aerolíneas Argentinas became the sole national airline permitted to provide international flights from Argentina, while external carriers (British Airways, Air France, KLM, etc.) negotiated individual traffic rights bilaterally. Domestically, the 1971 law assigned Aerolíneas 50% of all domestic point-to-point flights, which were primarily, but not exclusively, operated from AEP. This law limited opportunities for new domestic airlines to compete in the Argentine aviation market, although existing carriers such as Austral (founded in 1971 and a subsidiary of Aerolíneas) and LADE (the airline of the Argentine Air Force, founded in 1944) found niche markets for their services. Dozens of other domestic airlines began operations between the 1950s and the 2000s, but subsequently went out of business. Throughout this time period, passenger cost per seat mile remained high compared to more mature aviation markets, such that the Argentine aviation market on average generated only about 0.3 trips per capita compared to over 3.0 per capita in the United States (Piglia, 2016). Neoliberalist strategies were introduced by the Menem government in 1994 to encourage aviation restructuring, most notably the transition of LAPA (Líneas Aéreas Privadas Argentinas, founded in 1977) from a regional carrier to a proto-LCC that serviced domestic and regional routes, including a flight between EZE and Atlanta. At the height of its operations in the late 1990s, LAPA controlled about 30% of the domestic market, providing stiff competition to Aerolíneas and Austral. However, the airline collapsed into bankruptcy in 2003 as the wider 2001–2002 economic crisis and its aftermath stymied further development of a competitive, low-cost aviation market.

Between 1990 and 2016, airline passenger growth in Argentina averaged about 4% annually, compared to 10% in Chile and 7% in Brazil (He, 2016). Moreover, calculations by the Aviation Price Index (2016) provided evidence that Argentines were paying three times as much per 100 km of air travel compared to Brazil, and Argentina ranked 50th out of 75 global aviation markets in overall pricing competitiveness. Between 1990 and 2008, Aerolíneas operated as a privatized company, with Iberia Airlines (Spain) taking an equity share, and ticket prices generally remained high compared to more mature markets. According to analysis by the United Nations Economic Commission for Latin America and the Caribbean (ECLAC), during the early 2000s Argentina experienced one of the region's most tightly regulated airfare markets, with minimum prices significantly higher than those of its neighbors (He, 2016). The leftist government of Cristina Kirchner

renationalized the airline in 2008, and it joined the Skyteam Alliance (Delta/Air France-KLM) in 2012, where it remains as a codeshare partner today. It is also worth noting that some contraction in the Argentine aviation market in the early 2000s (the collapse of LAPA, for example) was driven by route rationalization because of an aggressive tariff war with oversupply in the context of a national economic-political crisis (2001–2002) (Teubal, 2004). Moreover, privatization of airport operations had begun at the end of the 1990s, with the private company Aeropuertos Argentina 2000 now operating almost all of Argentina's airports with robust plans to attract more service to interior airports (Lipovich, 2008). Thus, experiences elsewhere, along with regional pricing differentials, spurred the growth of LCCs that aimed to operate within and to Argentina, as the low-cost model focused primarily on cheaper fares and no-frills service.

With the election of Mauricio Macri in 2015, a right-of-center, business-oriented president, national transportation infrastructure generally, and aviation specifically, was targeted for operational improvements and restructuring. Macri served as the Chief of Government of the Buenos Aires Autonomous City from 2007 to 2015 and had implemented many transport improvements successfully across the city (Valente, 2014), most notably a Bus Rapid Transit (BRT) system. Argentina's transport minister, Guillermo Dietrich, unveiled *La Revolución de los Aviones* (the Airplane Revolution policy) in 2016, opening up the country's aviation market to encourage new LCC and ULCC operators, thus enhancing competition, reducing airfares, improving connections between 2nd and 3rd tier cities, creating new links between interior cities and neighboring countries, and encouraging a shift in mode from automobiles and long-distance buses to airlines. Although many of these strategies had been tried sporadically since the 1980s, especially during the 1990s' neoliberalist phase of the Menem government, not until 2016 did Argentina begin to experience deeper restructuring of its entire aviation system. For example, Flybondi, Argentina's first contemporary LCC, began operations in January, 2018, from its base in the interior city of Córdoba (COR), and from the revamped El Palomar (EPA) military airfield in northwest Buenos Aires (about 25 kms from the city center and located outside the boundaries of the Federal District). *Bondi* is a local vernacular term for the public bus, so the airline name literally translates to "fly the bus." As the low-cost airline market exploded, over 14 million passengers took domestic flights in 2018, a 40% increase over domestic traffic in 2015. By late 2017, Macri's government had approved 630 new routes for 13 different airline operators, with local, regional, and international LCCs joining in the frenzy for a share of the aviation market (Laffrey, 2019). Analyzing available data on the pricing differential between LCCs and legacy carriers is not part of this study, but it is clear that LCCs aimed to reduce point-to-point fares substantially (between 50 and 80% on some routes), which forced Aerolíneas Argentinas and other legacy carriers to adjust their pricing accordingly.

3. Argentina's changing aviation network

In the context of Argentina's aviation networks, and economic geography more broadly, the Global North hereafter includes Europe, North America (Canada and the U.S.), Japan, Hong Kong, and Oceania (Australia and New Zealand), while the Global South includes Latin America, Africa, and most of Asia. Some analysts have suggested that the oil-producing countries of the Middle East, such as Qatar, the UAE, and Saudi Arabia, belong to the Global North for aviation purposes, in part because airlines like Qatar, Etihad, and Emirates have created east-west, north-south hubs in Doha, Abu Dhabi, and Dubai, etc., primarily for transfer traffic (Wald, 2016). To understand how Argentina's non-stop O-D relationships with regional and global cities have changed over time, the data set provides a snapshot of one week of scheduled flight departures at the height of its summer season (January) for 1972, 1982, 1996, and 2019. The first three sets of data were developed by the author in the mid-1990s for chapters in several books about

Table 1
Non-stop flights per week to Global North Destinations, 1972–2019.

From Argentina to	1972	1982	1996	2019
EUROPE				
Amsterdam	–	–	–	7
Barcelona	–	–	–	10
Frankfurt	–	–	3	7
London (LHR)	–	–	3	7
London (LGW)	–	–	–	7
Madrid	4	5	13	32
Paris	–	–	4	7
Rome	–	–	5	16
Zurich	–	–	–	3
SOUTH PACIFIC				
Auckland	–	–	2	6
USA/CANADA				
Atlanta	–	–	–	7
Dallas	–	–	–	7
Houston	–	–	–	7
Los Angeles	–	–	–	3
Miami	–	4	28	42
Newark	–	–	–	7
New York (JFK)	5	–	16	14
Toronto	–	–	–	3
TOTAL	9	9	74	192

Note: International flights departed from Buenos Aires (EZE) international airport. Data represent scheduled flights during a typical Southern Hemisphere summer week.

Source: OAG (1972, 1982, 1996), Flightstats (2019)

Argentine development specifically and aviation in the world-city system generally (Keeling, 1995, 1996, 1997), with flight details from published airline guides (OAG, 1972; 1982; 1996). The 2019 flight departure data came from Flightstats (2019), an online, open-source data base. There is no intent in comparing these four datasets to suggest that changes were static between the years examined for this research. On the contrary, Argentina's aviation network experienced constant volatility in O-D relationships between the 1980s and 2000s as local, regional, and global economic conditions evolved. Nonetheless, a snapshot of this almost-fifty-year period provides useful evidence of how O-D relationships have matured over time.

With few direct international destinations in the 1970s and 1980s, only nine non-stop flights per week connected Argentina to cities in the Global North: Madrid in Europe, and New York/Miami in the U.S. (Table 1). During this timeframe, West Africa enjoyed infrequent connections between Buenos Aires and Dakar (Senegal), Freetown (Sierra Leone), and Sal (Cape Verde), primarily as technical stops and not because of any significant demand for seats between the two airports. Flights from Buenos Aires also stopped at Las Palmas de Gran Canaria (Canary Islands, Spain), off the coast of Morocco, on their way to Madrid. The weekly British Caledonian flight on a Boeing 707 in 1972 between EZE and Freetown, for example, formed part of the London Gatwick to/from Buenos Aires service with traffic between EZE and Freetown (and v.v.), permitted as part of the aviation fifth-freedom rights (these permit an airline to carry revenue traffic between foreign countries as a part of services connecting the airline's home country). Within a few years, new wide-bodied aircraft such as the Boeing 747 and the DC 10 allowed British Caledonian to fly non-stop between EZE and London Gatwick.

Why are there no non-stop flights today between Argentina and Global South destinations beyond Latin America? There are two viable explanations, although connectivity between city pairs is a complex issue shaped by other factors such as political relationships, economic demand, and the growing use of code-share flights through connecting hubs. First, the technical specifications of preferred modern aircraft for international flights - the more fuel-efficient, twin-aisle, twin-engine models such as the Boeing 767, 777, and 787, and the Airbus 330, 340



Fig. 1. Global North destinations from Argentina, January 2019. Data represent scheduled flights during a typical Southern Hemisphere summer week. Source: Flightstats (2019).

(quad engine), 350, etc. – provide an effective range of around 7500 miles (> 12,000 kms), although some models have a longer range. Historically, this has put most destinations in East Africa and South and East Asia technically out of reach for non-stop flights from Argentina, requiring stops or connections at major hub cities. Flights to key business centers in these regions required transfers in U.S. hubs (Los Angeles, Dallas, Atlanta, New York, etc.) or in European/Middle Eastern hubs (London, Amsterdam, Paris, Dubai, Istanbul, etc.). Thus, the number of city-pair connections becomes quite large when considering airline alliances, hub airports, and traffic potential. In 2019, however, several airlines used fifth-freedom rights to carry traffic regionally and globally from Argentina to cities outside the traditional European region. Istanbul is served by Turkish Airlines daily from Buenos Aires via São Paulo (GRU), Ethiopian Airlines operated a daily flight from EZE via GRU to Addis Ababa, Emirates connected Buenos Aires daily to Dubai via Rio de Janeiro (GIG), and Qatar connected EZE to Doha via GRU, among others. Nonetheless, Aerolíneas Argentinas has no non-stop or even one-stop flights from Buenos Aires to destinations in Africa or Asia, despite the technical ability of modern aircraft, preferring to rely primarily on code-share relationships for through traffic connecting mostly in Global North hubs. Is this indicative of a lack of demand for traffic to/from Argentina from these regions?

Perhaps a more useful second explanation for the dearth of Global South connections beyond Latin America, then, is the lack of demand. Historically, Argentina has not enjoyed strong economic links with Africa or much of Asia, although in recent years China has quickly become an important player in Argentina's, and Latin America's, economy, but the distance between China's major hubs and Argentina requires at least one connection, with a change of plane in New York, Atlanta, Los Angeles, Amsterdam, Rome, or Auckland, etc. Indeed, there is growing evidence of an uptick in passenger traffic between Chinese cities and Argentina since 2010 (Liu and Oum, 2018). Nonetheless, in 2019 neither Aerolíneas Argentinas nor any mainland Chinese airline operated through flights (one or more intermediate stops) between Argentina and China, although 76,000 Chinese visited Argentina in 2019. Yet demand should continue to grow, based on economic relationships. In 2018, China and Vietnam were the third and fifth export destinations, respectively, for Argentine products (Brazil, the U.S., and Chile were first, second, and fourth, respectively), while

China had risen to become Argentina's 2nd most important import market out of the top five (Brazil, Germany, the U.S., and Mexico). Another one of the five BRICS countries (Brazil, Russia, India, China, and South Africa) and the leading economy in Sub-Saharan Africa, South Africa would seem to be a likely destination for traffic to/from Argentina. South African Airways (SAA) began thrice-weekly flights between Johannesburg (JNB) and Buenos Aires in 2009, based on optimistic forecasts of financial, industrial, and agricultural opportunities. By the end of March, 2013, this single flight was contributing over 5% of SAA's total annual losses and so the flight was terminated in 2014. For SAA, it made more sense to use fifth-freedom rights to fly JNB to GRU in Brazil daily (and v.v.), and codeshare with TAM airlines from São Paulo to Buenos Aires and return for connecting JNB passengers. Similarly, Malaysian Airlines operated a Boeing 747–400 aircraft between Kuala Lumpur and Buenos Aires via Cape Town, South Africa, between 1992 and 2012, but it also fell victim to poor revenue performance. Moreover, codeshare agreements through aviation alliances such as Skyteam, OneWorld, and Star Alliance now provide viable one- or two-connection alternatives to a single operator between two markets beyond Global North cities, as airlines can minimize the financial impact of low passenger loads by combining traffic at a hub, as shown in the SAA example above (see Njoya (2016) on the single aviation market in Africa). Therefore, the focus of this analysis is only on non-stop flights between city pairs in order to provide a broad overview of how Argentina's regional and global connections have changed over the past several decades.

As highlighted in Table 1, weekly flights to Global North cities experienced a growth spurt during the privatization and liberalization period of the Menem government in the 1990s. Between 1982 and 1996, nine flights per week grew to 74, with new destinations in Oceania, Europe, and North America, although Madrid, New York, and Miami maintained their dominance as preferred destinations. These snapshot data do not imply that nothing happened in O-D relationships during the years between 1982 and 1996. On the contrary, annual changes to schedules and destinations were ongoing, but evidence suggests that the 1980s, a period known as the "Lost Decade" in Latin America's economic development (Kyndland and Zarazaga, 2002), saw minimal overall growth in Argentina's aviation industry. By 2019, non-stop flight frequencies from Argentina to the Global North had

increased by 160%, with ten more cities added to the roster of O-D links compared to 1996. Fig. 1 visualizes the Global North destinations from Buenos Aires during the southern hemisphere summer season of January 2019. Some of the increase in service frequency between 1996 and 2019 could be attributed to the transportation policies and ideologies of the Macri government since 2016, and the rapidly declining value of the Argentina peso that has attracted more tourists (in 2010, four pesos cost one US\$; by May, 2020, the official rate had collapsed to 68 pesos per one US\$, although the “blue” or unofficial rate had soared to 120 pesos per one US\$). However, adding and dropping flight routes between city pairs is a constant process that reflects supply and demand regimes in regional and local economies. These data do not suggest that there were fewer or more O-D connections in any given year between 1996 and 2019; rather, these data simply compare the two years of O-D relationships from a snapshot perspective.

For example, growth in airline service to Madrid, Barcelona, and Rome, along with more flights to Miami, reflected the demand generated by the nearly 500,000 Argentines living in Spain, Italy, the U.S., and other countries. During the Argentine economic crisis of 2001–2002, there likely was higher demand for seats between Buenos Aires and Madrid or Rome as upwards of 300,000 Argentines fled to Europe for better economic opportunities (Jachimowicz, 2006). Of particular importance recently in terms of new LCC transatlantic services, a daily EZE to London (LGW) flight operated by LCC Norwegian Air UK (a subsidiary of Norwegian Air Shuttle) commenced operations in February 2018, using a Boeing 789. Air Europa, an LCC from Spain, operated a daily EZE-to-Madrid service, also using a Boeing 789. It also operated a twice-weekly seasonal service from Iguazu, a popular tourist destination in Argentina, to Madrid and v.v., with an additional leg between Iguazu and Asunción, Paraguay. Finally, Edelweiss Air, an LCC subsidiary of Swiss International, flew thrice weekly between EZE and Zurich operating an Airbus 340. There are no LCCs yet operating non-stop flights between Argentina and the U.S./Canada, although North American LCCs such as JetBlue, Spirit, and Southwest have begun to penetrate the Latin American market.

Flights to Latin American countries non-contiguous to Argentina have experienced significant growth since the 1990s (Table 2). As the only Global South destinations from Argentina with non-stop service, cities within Latin America have benefited from regional trade agreements, new transport policies, and other initiatives aimed at enhancing interaction between Latin American neighbors (Bowen, 2019). LCCs are an important part of this changing aviation geography. The number of weekly flights between Argentina and non-contiguous Latin American countries increased over eight-fold between 1996 and 2019, with five new cities added to the roster of destinations. Again, these data do not imply that increases or decreases in weekly flight volume did not occur in any year between 1996 and 2019, as they did. During this time frame, five of Argentina's interior cities gained non-stop service for the first time to important regional destinations such as Lima, Perú, and Panamá City, Panamá. In 2019, several LCCs such as Flybondi had targeted expansion from Argentina's interior cities to destinations in Chile, Peru, Bolivia, Paraguay, Uruguay, Brazil, and Colombia as part of their strategy to avoid Buenos Aires and grow capacity and service options from smaller airports.

Flights from Argentina to contiguous countries (except Brazil) historically were dominated by the Buenos Aires to Montevideo and Punta del Este routes, accounting for 75% of all non-stop flights in 1972 (Table 3). Over the decades, flights to Montevideo declined, as improved hydrofoil service across the Río de la Plata estuary and competing destinations elsewhere changed the demand relationship. The Buquebus service from Buenos Aires city center to Montevideo takes a little less than five hours and costs around US\$90 one way. With the introduction of new ferries that carry cars, many Argentines visiting Uruguay may prefer to take their personal vehicle to have additional mobility. Another factor could be the opening in 1976 of an international bridge between the two countries that reduced the driving

Table 2

Non-stop flights per week to Latin America, Non-Contiguous Destinations, 1972–2019.

From Argentina to:	1972	1982	1996	2019
MIDDLE AMERICA				
Cancún, Mexico	–	–	–	6
Cayo Coco, Cuba	–	–	–	1
Curacao	–	–	1	–
Havana, Cuba	–	–	1	–
Mexico City	–	–	–	12
Panamá City, Panamá	2	–	–	21
Panamá City (ex Córdoba)	–	–	–	14
Panamá City (ex Mendoza)	–	–	–	7
Panamá City (ex Rosario)	–	–	–	7
Panamá City (ex Salta)	–	–	–	2
Punta Cana, Dominican Republic	–	–	–	6
Punta Cana (ex Córdoba)	–	–	–	1
COLOMBIA				
Bogotá	–	–	6	12
ECUADOR				
Guayaquil	–	1	–	–
Quito	–	–	–	2
PERÚ				
Lima	5	3	10	56
Lima (ex Córdoba)	–	–	–	7
Lima (ex Mendoza)	–	–	–	11
Lima (ex Rosario)	–	–	–	7
Lima (ex Salta)	–	–	–	5
Lima (ex Tucumán)	–	–	–	5
VENEZUELA				
Caracas	2	2	4	3
TOTAL	9	6	22	185

Note: Most International flights departed from Buenos Aires (EZE) international airport. International flights from other Argentine cities are noted by destination. Data represent scheduled flights during a typical Southern Hemisphere summer week.

Source: OAG (1972, 1982, 1996), Flightstats (2019).

distance between Buenos Aires and Montevideo to 700 kms. As the data highlight, though, direct flights to Punta del Este, Uruguay, increased, with more modern aircraft introduced on the route and increasing numbers of Argentines choosing to visit this Atlantic beach resort.

To the west, Santiago, Chile, emerged as an important destination among Argentina's contiguous countries (excluding Brazil) by flight frequency, in part because of its economic stability, tourism development, infrastructural investments in ground transportation, and competitive fares offered by new LCCs. In addition, Santiago is also the home airport for the LATAM Group that has a significant number of flights operating from that city to myriad international destinations, so it is possible that much of the traffic to Santiago involves transfers to international flights. However, flights from Argentina also serve many of the same destinations, so it might be helpful in future research to determine what percentage of passengers to Santiago are indeed international transfers.

Sky Airlines, headquartered in Santiago, Chile, transitioned to the LCC model in early 2016 and, in 2019, provided 22 weekly flights to Santiago from EZE, a daily flight from Mendoza, and thrice-weekly service from Córdoba. Another Chilean LCC, Jetsmart, started service in 2017 and provided, in 2019, daily service to Santiago from EPA (the new low-cost airport in Buenos Aires currently under renovation) and four flights each week from Córdoba. Jetsmart and Sky combined provided 25% of the weekly scheduled flights between Argentina and Santiago. Jetsmart also provided thrice-weekly service from Córdoba and Mendoza to La Serena in Chile's central valley, an important agricultural and tourist region. Flybondi, Argentina's first contemporary LCC operator, provided regional service to Asunción, Paraguay, four times weekly, and to Punta del Este, Uruguay, four times weekly from EPA airport during January 2019. It also aimed to expand aggressively

Table 3
Non-stop flights per week to Latin America, Contiguous Countries (except Brazil), 1972–2019.

From Argentina to:	1972	1982	1996	2019
BOLIVIA				
La Paz	2	1	–	–
Santa Cruz	2	4	7	14
Santa Cruz (ex AEP)	–	–	–	5
Santa Cruz (ex Salta)	–	–	–	3
CHILE				
Iquique (ex Salta)	–	–	–	5
La Serena (ex Córdoba)	–	–	–	3
La Serena (ex Mendoza)	–	–	–	3
Santiago	29	36	70	71
Santiago (ex AEP)	–	–	–	35
Santiago (ex EPA)	–	–	–	7
Santiago (ex Córdoba)	–	–	–	21
Santiago (ex Mendoza)	–	–	–	29
Santiago (ex Rosario)	–	–	–	4
Santiago (ex Tucumán)	–	–	–	3
PARAGUAY				
Asunción	9	6	21	27
Asunción (ex AEP)	–	–	–	7
Asunción (ex EPA)	–	–	–	4
Asunción (ex Córdoba)	–	–	–	5
Asunción (ex Salta)	–	–	–	3
URUGUAY				
Colonia	–	–	8	–
Montevideo (ex EZE)	–	–	–	1
Montevideo (ex AEP)	148	115	87	40
Punta del Este (ex AEP)	12	51	4	55
Punta del Este (ex EPA)	–	–	–	4
Punta del Este (ex Cordoba)	–	–	–	4
Punta del Este (ex Rosario)	–	–	–	2
TOTAL	202	213	197	355

Note: International flights departed from EZE international airport, while a few departed from the AEP domestic airport. Effective 2019, Low Cost Carriers (LCC) also departed from Buenos Aires (EPA) Palomar military airport. International flights from other Argentine cities are noted by destination. Data represent scheduled flights during a typical Southern Hemisphere summer week. Source: OAG (1972, 1982, 1996), Flightstats (2019).

into 2020 and beyond, having applied for multiple new routes to contiguous and non-contiguous countries in the region. Fig. 2 visualizes the destinations within Latin America (excluding Brazil) served from Argentine airports in January 2019.

Brazil dominates the regional aviation market in terms of number of cities served and flight frequencies, and it is the most important Latin American market for Argentina (Table 4). Flights between the two countries experienced an uptick following the signing of the Treaty of Asunción in 1991 that established the Southern Cone Common Market (MERCOSUR) between Brazil, Argentina, Paraguay, and Uruguay. Revised aviation policies since 2016 have encouraged the development of new routes between interior Argentine cities and Brazil's key financial and tourism centers (Fig. 3). Seventeen cities in Brazil were connected to Buenos Aires plus four interior cities in 2019, although Rio de Janeiro and São Paulo continued to dominate Argentina-Brazil traffic with 60% of total weekly flights between the two countries. Brazil's dominant LCC operator, Gol, provided 94 weekly flights (23% of all flights to Brazil) linking Argentina to 11 Brazilian destinations. According to Argentina's civil aviation authority, Gol carried just under 100,000 passengers from Argentine airports in January 2019, or about a 10% share of the regional market (ANAC, 2019). A second Brazilian LCC, Azul, established in 2008 by the U.S. JetBlue founder, Brazilian-born David Neeleman, continued to make inroads into the LCC market with 39 weekly flights to four Brazilian cities (10% of all flights to Brazil). Azul carried 44,000 passengers from Argentine airports in January, 2019, as it entered its second year of regular services to/from Argentina. Flybondi, Argentina's primary LCC, received authority to



Fig. 2. Latin American destinations from Argentina (excluding Brazil), January 2019. Data represent scheduled flights during a typical Southern Hemisphere summer week. Source: Flightstats (2019).

commence service in October, 2019, between Buenos Aires (EPA) and Rio de Janeiro (GIG), and to Florianopolis in December 2019, with other Brazilian destinations in the planning phase. As Table 4 illustrates, flights from Buenos Aires to Brazil's Foz do Iguazu airport ended in the 1980s as the Argentine government invested in its own Cataratas del Iguazú International Airport, as the Iguazú Falls region on both sides of the Brazil-Argentina border has become a popular tourist destination. There are no direct flights from Brazil's Iguazu airport to Argentina.

4. Successes and challenges for Argentina's aviation networks

Argentine travelers have been quite vocal in their acknowledgment that the entry of LCCs into the local and regional aviation markets, following the 2016 policy restructuring, has provided a plethora of new service, price, and schedule options, compared to the pre-2016 era when Aerolíneas Argentinas dominated the national market (Niето, 2019). Argentina's "Airline Revolution" opened up new, or enhanced existing, routes between interior cities within Argentina and to new destinations across Latin America from these secondary cities, with LCCs providing about 1/3rd of this new service (ANAC, 2019). Many interior cities have experienced double- or triple-digit growth in passenger traffic since 2015, as highlighted in Table 5, which lists Argentine cities with populations over 250,000 and details passenger loadings in January 2019. These data do not suggest that LCCs (or Flybondi) alone have been responsible for the increase in passenger boardings at selected Argentine airports, only that a changing regulatory environment after 2015 appeared to have stimulated an overall growth in passengers to the benefit of all airlines.

For the country's biggest city and largest market (Buenos Aires has a metropolitan population of about 15 million), aviation network changes have not been without challenges. The sheer size of the Buenos Aires metropolitan market compared to interior cities (Table 5) has made it difficult to generate traffic between interior cities within Argentina and from interior cities to international destinations. From this perspective, little has changed over the past five decades in terms of Buenos Aires' dominance in the domestic and international aviation

Table 4
Non-stop flights per week to Brazil, 1972–2019.

From Argentina to	1972	1982	1996	2019
Belo Horizonte	–	–	–	14
Brasilia	–	–	–	11
Cabo Frio	–	–	–	2
Campinas	–	–	–	7
Curitiba	–	–	7	2
Curitiba (ex AEP)	–	–	–	5
Florianopolis	–	–	9	24
Florianopolis (ex AEP)	–	–	–	22
Florianopolis (ex Córdoba)	–	–	–	7
Florianopolis (ex Rosario)	–	–	–	3
Fortaleza	–	–	–	1
Fortaleza (ex Córdoba)	–	–	–	1
Iguazu	–	8	–	–
Joao Pessoa	–	–	–	1
Manaus	–	–	–	1
Natal	–	–	–	1
Navegantes	–	–	–	7
Porto Alegre	10	3	21	15
Porto Alegre (ex Córdoba)	–	–	–	4
Porto Alegre (ex Rosario)	–	–	–	3
Porto Seguro	–	–	–	3
Porto Seguro (ex AEP)	–	–	–	1
Porto Seguro (ex Córdoba)	–	–	–	1
Recife	–	–	–	4
Recife (ex Córdoba)	–	–	–	1
Recife (ex Rosario)	–	–	–	1
Rio de Janeiro	18	18	27	63
Rio de Janeiro (ex AEP)	–	–	–	20
Rio de Janeiro (ex Córdoba)	–	–	–	10
Rio de Janeiro (ex Mendoza)	–	–	–	1
Rio de Janeiro (ex Rosario)	–	–	–	10
Salvador	–	–	–	16
Salvador (ex Córdoba)	–	–	–	2
Salvador (ex Rosario)	–	–	–	1
São Paulo	21	23	71	84
São Paulo (ex AEP)	–	–	–	32
São Paulo (ex Córdoba)	–	–	–	7
São Paulo (ex Mendoza)	–	–	–	5
São Paulo (ex Rosario)	–	–	–	7
São Paulo (ex Tucumán)	–	–	–	4
TOTAL	49	52	135	404

Note: Flights to Brazil depart primarily from EZE international airport, while a few departed from the AEP domestic airport. Effective 2019, Low Cost Carriers (LCC) also departed from Buenos Aires (EPA) Palomar military airport. International flights from other Argentine cities are noted by destination. Data represent scheduled flights during a typical Southern Hemisphere summer week. Source: OAG (1972), 1982, 1996), Flightstats (2019).

marketplace. What has changed in a meaningful way are the additional flights from and between interior cities domestically, and from interior cities to international destinations, many offered by LCCs (JetSMART, Sky, Gol, Flybondi, etc.) or by legacy carriers expanding into Argentina (COPA, LATAM, etc.). For example, American Airlines introduced a non-stop Córdoba-Miami flight during the 2019 summer, but just a few months later it announced a May, 2020, termination of the route citing demand “headwinds”, although the COVID-19 pandemic certainly accelerated that route closure. Generally, however, interior cities enjoyed robust growth after 2015 in connections to other interior cities and to international destinations.

To provide support for LCCs, in April, 2019, the government eliminated all international flights (except for flights to Uruguay) from AEP, the closest airport to the Buenos Aires city center (2 kms). Although Aeroparque has no direct rail link to downtown Buenos Aires, it is served by several bus lines that run along the Costanera highway that parallels the Rio de la Plata and the airport terminals. However, those travelers in search of cheap LCC flights to regional destinations in Brazil, Bolivia, Chile, Colombia, Paraguay, and Perú had to trek out to EZE, some 35 kms from the city center, or to EPA, about 25 kms from downtown (Fig. 4). EZE airport has neither direct rail connections nor

reliable public bus service to the city, forcing travelers without a vehicle into taxis or other transfer services. EPA can be reached from the city's Retiro terminus on the San Martín suburban rail line, but the El Palomar station is three blocks from the airport with challenging walking conditions for those with luggage. Flying from EZE or EPA likely also requires additional time and costs for day-trippers, tourists, and businesspeople who typically are based in and around the city center. On the positive side, tourists arriving in EZE from international origins and heading to interior cities can connect directly at EZE without the minimum three-hour transfer previously required to get from EZE to AEP for domestic flights. In 2019, twelve interior cities were accessible from EZE directly, with flights provided by Aerolíneas Argentinas, Austral, and LatAm Argentina on a mostly daily basis and scheduled to connect with major international flights. From EPA, domestic flights were available on LCC JetSMART to seven interior cities, as well as to Santiago, Chile. Flybondi served 13 interior cities, along with Punta del Este, Uruguay, and Asunción, Paraguay, from EPA, during the 2019 period evaluated, with new routes in development.

Some traditional transport models focus on how demand shapes supply, as both LCC and legacy airlines have argued it is better to have flights overbooked and flying full than have empty seats (see chapter 12 in Abdelghany and Abdelghany, 2016; Arthur et al., 2002). The idea that the cost of “bumping” a small number of passengers is outweighed by the financial benefits of a full flight (overbooking) does not always account for “who” is inconvenienced – are “elite” or business flyers less likely to be “bumped” when flights are overbooked? In Argentina, this rationale (supply is driven by demand) served, to some degree, to limit domestic flights between interior cities (as well as direct international flights) by routing many flights to Buenos Aires to ensure maximum loadings and more frequent service, with Buenos Aires acting like a hub a la Atlanta or Detroit for onward travel. For example, the flight distance between Córdoba and Mendoza is 470 kms but, before deregulation, passengers who wished to travel between these two cities often had to transit via Buenos Aires (AEP), for a total travel distance of 1700 kms and additional travel time. Those direct flights that did exist were not always convenient or competitively priced.

The accelerated revamping of Argentina's aviation industry in 2016 challenged this model, with LCCs arguing that demand could be stimulated by supply. The theory pushed by LCCs was that offering better frequencies at lower prices, with direct flights between major interior cities, would stimulate latent demand (Boonekamp et al., 2018). Some loss leaders on potentially popular corridors were acceptable to drive demand upwards. Introductory or promotional fares on new routes, for example, have been priced as low as one peso to spur demand. LCCs like Flybondi aimed to entice travelers away from ground transportation with competitive pricing, frequency, and service similar to the Southwest Airlines model in the U.S. (targeting bus or automobile passengers is also happening in other regions of the world). As an example, a bus journey between Salta and Mendoza, some 1260 kms along the eastern side of the Andean mountains, required about 18 h on a mediocre highway and cost US\$120 (higher and lower prices depend on service level and time of departure). JetSMART flew between the two cities in 90 min (not counting travel time to/from airports) with prices as low as US\$35 one-way. Flybondi could fly a passenger from Córdoba to Bariloche for US\$25 and up one-way (depending on day and time) in just over two hours, compared to a bus journey of nearly 30 h (via Mendoza) to cover the 1500 kms between the two cities. In January 2019, for example, 107 flights linked Córdoba to Bariloche, transporting just over 12,000 passengers (ANAC, 2019). Based on extant data, it is clear that aviation restructuring generally, and LCCs specifically, have changed the internal and external geographies of Argentina's air transport relationships, and accessibility and mobility more generally, in important ways.

What competition to LCCs is provided by railways in Argentina today and perhaps in the near future? Prior to the 1990s, Argentina had the most extensive interurban railway network of any country in Latin



Fig. 3. Brazilian destinations from Argentina, January 2019. Data represent scheduled flights during a typical Southern Hemisphere summer week. Source: Flightstats (2019).

America. However, most interurban passenger rail services were privatized in the early 1990s as part of the neoliberal policies of the Menem government, resulting in wholesale service abandonment or significant reduction in connections to just a handful of cities. New investment in railways was announced by the Macri government in 2016, but there are no regular cross-border passenger railway services between Argentina and contiguous countries, with the exception of a short, 8-km line, disconnected from the national network, that runs between Posadas, Argentina, and Encarnación, Paraguay, as a twice-hourly commuter service. Rail services operated in 2019 by the national government in partnership with provincial authorities included routes within Buenos Aires province (to Junin, Bragado, Bahía Blanca, and Mar del Plata) and to three interior cities (Rosario, Córdoba, and Tucumán). There are also a few local urban services disconnected from any intercity lines (Salta, Mendoza, Cacuf, and Córdoba) mainly for local commuting. These interurban rail services do not compete with LCCs on frequency or journey time, but do compete on price. For example, the rail service between Buenos Aires and Córdoba, the 2nd largest city, takes 19 h outbound and 17 h inbound to cover 700 kms, and is priced as low as US\$9 one way (US\$10.5 in Pullman class). Buses along the same corridor take about 10 h and cost US\$15 and up depending on class of service and time of day. Aerolíneas flights from Aeroparque to Córdoba take 90 min and cost from US\$54 upwards, while Flybondi flights from EPA to Córdoba also take around 90 min and are priced from \$US38. From a pricing standpoint, there can be cheaper options than flying between two points domestically depending on how much time one is willing to invest in a journey. Completing a deeper analysis of the pricing options of the various modes of travel between two points domestically is beyond the scope of this study, as

point-to-point pricing depends on many variables, but certainly this should be a focus of future research.

In June, 2019, about 1.2 million passengers flew domestically in Argentina, representing a 26% increase over the same month in 2018. Flybondi reached third place in the hierarchy of Argentine airlines, achieving a domestic market share of just over 9%. It has transported nearly two million passengers since its first flight, of which about 300,000 were first-time flyers (perhaps switching from the bus or automobile?) (ANAC, 2019; Ribeiro, 2019). In July, 2019, total domestic passenger volume surpassed 1.5 million, an all-time monthly record for Argentina, representing a 61% increase in demand since Macri's election in 2015 (ANAC, 2019). International passenger numbers also have shown a healthy increase in recent years, with about 15 million international departures from Argentina in 2018, a significant difference from the 4.2 million travelers recorded in 1993 at the beginning of the neoliberalist experiment of the Menem presidency (ANAC, 2019).

5. Discussion and conclusions

This paper aimed to examine spatial changes in Argentina's airline network and to address several questions about the country's aviation geography, LCC growth, and airline connections to Global South and North destinations. By way of some closing observations, let's return to the five questions posed at the outset. In terms of O-D relationships between Argentina and the global aviation network, the data show that the traditional cities of the Global North continue to dominate, despite additions to the list of cities served and significant increases in flight frequencies. New destinations added over the past two decades highlight the importance of Brazil economically and the penetration of the

Table 5
Metropolitan areas of Argentina with populations over 250,000, and selected aviation data for January 2019.

Metropolitan Area	Population 2019	Total Passenger Boardings ^a	International Passengers Boarding	% Passenger Growth 2015–2019
Buenos Aires (Ezeiza) (Aeroparque) (El Palomar)	15,060,000	2,409,000 ^b (1,125,000) (1,198,000) (86,000)	1,246,000 (1,039,000) (193,000) (14,000)	42 (37) (-11) (100)
Córdoba	1,519,000	320,000	91,000	118
Rosario	1,429,000	73,000	45,000	179
Mendoza	1,082,000	194,000	57,000	103
Tucumán	868,000	84,000	12,000	96
Mar del Plata	633,000	61,000	0	137
Salta	625,000	109,000	12,000	51
Santa Fé	530,000	8000	0	156
San Juan	513,000	11,000	0	0
Resistencia	409,000	17,000	0	13
Santiago del Estero	406,000	10,000	0	264
Corrientes	383,000	14,000	0	180
Posadas	355,000	25,000	0	123
Jujuy	338,000	35,000	0	116
Neuquén	309,000	86,000	3000	63
Bahía Blanca	307,000	27,000	0	50
Paraná	274,000	3000	0	102
Formosa	258,000	7000	0	0
Argentina	44,780,000	4,172,000	1,470,000	50

Note: Smaller cities that are important tourist destinations include Bariloche (165,000 passengers, 195% growth), Iguazú (123,000, 62% growth), Ushuaia (113,000 (26% growth), and El Calafate (94,000, 11% growth).

Source: INDEC (2019), population estimates rounded to nearest 1000; ANAC (2019), passenger loadings and growth data.

^a Total Passengers embarked to national and international destinations in January 2019.

^b Buenos Aires airport loadings: Ezeiza 1,198,000; Aeroparque 1,125,000; El Palomar 86,000.

Argentine market by Latin American carriers like COPA (Panamá) and the LATAM group (Chile). Moreover, the expansion of U.S. destinations from two to seven represents not only new partnerships with U.S. airlines but the continued importance of hemispheric interactions. Despite the historical dominance of Buenos Aires over international flights, interior cities such as Córdoba, Mendoza, and Salta have benefited from enhanced or new connections both domestically and regionally, with 219 international flights a week in January 2019, compared to just fifteen or so in 1996 (ANAC, 2019). New and enhanced domestic point-to-point services in 2019 connected dozens of interior cities with hundreds of weekly flights, where far fewer operated before 2016. During September, 2019, over 148,000 passengers connected directly between interior airports without transiting Buenos Aires, an increase of 118% compared to September 2015. The busiest domestic segment was Córdoba-Salta that month, recording 14,000 two-way passengers, an increase of 33% compared to the same month in 2018 (ANAC, 2019). This is certainly a significant improvement in internal accessibility and mobility compared to previous decades. The changing geographical relationships between city pairs have been driven, in no small part, by the entrance of LCCs into Argentina's domestic and international aviation networks. In September, 2019, LCCs Flybondi, Norwegian Air Argentina, and JetSmart Argentina combined provided 18.2% of weekly domestic seat capacity, up from zero prior to 2018 (ANAC, 2019). Nonetheless, there are a number of LCC operational and other vulnerabilities that could have significant impacts on Argentina's future aviation networks.

Despite the recent success of LCC operations in Argentina, political-economic-health storm clouds are on the horizon that could cause severe challenges for the growth, or even the survival, of LCCs in Argentina. Since 2018's economic decline that led to a calamitous depreciation of the Argentine peso, a trend that has continued into 2020, both traditional and LCC airlines have retrenched. Fleet expansions have been curtailed, some leased aircraft returned, operation centers restructured (Flybondi consolidated its Córdoba operations center with El Palomar in Buenos Aires), and some routes reduced or canceled (Flybondi terminated its Córdoba-Corrientes route for poor performance). Most revenue for Argentina's airlines is received in pesos, but many expenses are US dollar or Euro denominated, such as aircraft leases, crew training, and debt. As the peso depreciates against the dollar, it becomes increasingly more difficult to balance revenues against expenses. Moreover, results from the October, 2019, presidential election that saw the ouster of the more rightist Macri government and the return to power in January, 2020, of the more leftist Justicialista Party (Peronists), could lead to a very fluid regulatory environment for Argentina's future aviation industry should the Macri government's strategies be altered. The potential reintroduction of airfare minimums, additional subsidies for Aerolíneas Argentinas (which required about US\$300 million in 2019, whereas LCCs received no subsidies at all), a slowdown in needed transport infrastructure investment promised by the Macri government, and a loss of investor confidence in Argentina that could drive the peso even lower, all of which have been discussed recently in the Argentine media (Gilbert and González, 2019), could spell turbulence ahead for the aviation industry. Moreover, a new challenge in the story of Argentina's aviation industry is the impact of the COVID19 pandemic that led to the shutdown of almost all aviation operations in Argentina, effective mid-March 2020. The long-term impact of this pandemic on the LCC industry in Argentina will not be known until after the resumption of airline operations.

The LCC revolution in Argentina post-2016 did experience several notable successes, mirroring LCC changes experienced in other aviation markets, with more people flying, more routes between interior cities and beyond, and more competitive pricing, at least until the COVID19 shutdown. Limitations remain on flight connections to major cities in the Global South, but alliances and codeshare programs made it easier to travel between Argentina and Global South destinations in Africa and Asia, although not without a hub connection. Additional research on

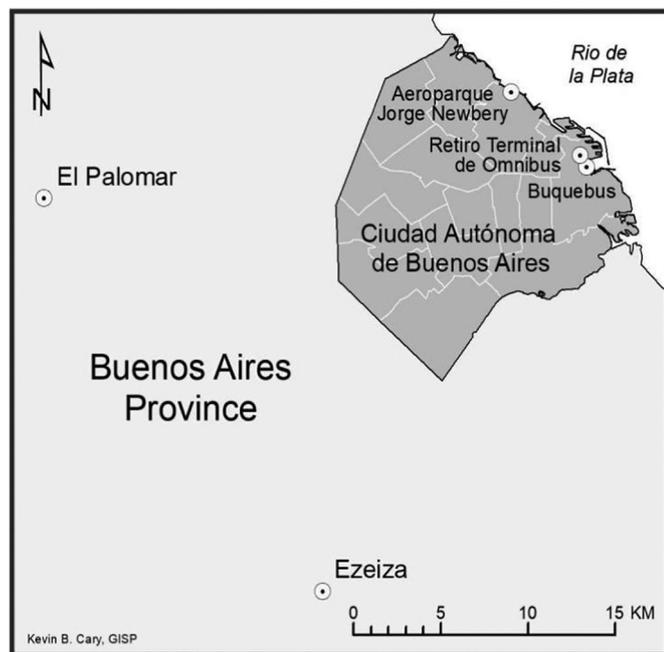


Fig. 4. Location of Buenos Aires Airports, and the central Bus and Ferry Terminal. (Source: Created by the author.)

individual city-pair flight relationships not addressed in this dataset could shed new light on how competitive interior Argentine cities have been over the decades, both in the domestic and the regional aviation system, and could determine how useful airline connectivity has been for local economies. Analysis of data on traffic and frequency by mode would also be helpful in assessing the various competitive environments in Argentina for changing levels of accessibility and mobility. The pricing regimes of LCCs versus traditional carriers would also benefit from more detailed analysis, as this was not considered in the current study due to the complexity of ticket pricing in Argentina and a lack of access to reliable data.

From a planning and regulatory policy perspective, more research is needed on how the aviation industry adapted and changed over the past five decades to Argentina's volatile economic and political conditions, perhaps with modeling that could determine the optimal aviation network needed to support the country's national and regional development and transportation goals. A key question that remains unanswered, then, is whether LCCs have fostered mobility for more people or just more mobility (hypermobility) for the privileged few? The evidence from data presented herein suggested that more "ordinary" people have started to fly, using LCC and other options, compared to passenger loadings from previous years, but more data on the socio-economic status of these new flyers are needed to answer the enhanced mobility question more thoroughly. Finally, whether or not LCCs that serve Argentina survive the 2020 turbulent political-economic-health environment depends significantly on policies yet to emanate from the recently elected Justicialista party, the economic response to the global pandemic shutdown, and the return to a relatively normal state of mobility following the country's reopening.

Credit statement

The corresponding author is solely responsible for the creation of the data sets.

Maps were created by the WKU GIS Visualization Laboratory.

Submission declaration

The work submitted has not been published previously (except in the form of an abstract and presentation at the 2019 Royal Geographical Society Conference), it is not under consideration for publication elsewhere, its publication is approved by all authors and tacitly or explicitly by the responsible authorities where the work was carried out, and that, if accepted, it will not be published elsewhere in the same form, in English or in any other language, including electronically without the written consent of the copyright-holder.

Declaration of Competing Interest

None.

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