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Distortions of airline revenues: why the network airline business model is broken

Michael W. Tretheway[a,b,*]

[a] *InterVISTAS Consulting Inc., 550-1200 West, 73rd Avenue Vancover, British Columbia, Canada V6G 6G5*
[b] *Faculty of Commerce and Business Administration, University of British Columbia, Canada*

Abstract

This paper looks at the inherent flaws that have emerged in the business models that have been pursued by the major network airlines. The business model adopted by the low-cost carriers is more robust and has gradually undermined the ability of the network carriers to practice the price discrimination needed for them to recover their full costs. The full service network carriers still have a future but they will take a smaller market share. The paper points to a number of modifications that need to be made to the full service network carriers' business model if it is going to maximise this share.

Keywords: Low-cost airlines; Network economics; Business models; Airline competition

1. Introduction

As the new millennia dawned, it became clear that the business model of the network airlines was broken: it was no longer able to drive a revenue base which could cover the traditional cost base of these air carriers including an allowance for an adequate rate of return on invested capital. This has been articulated in Hansson et al. (2002).

> The airline business model—essentially designed to take anyone from anywhere to everywhere, seamlessly—was a great innovation, but is no longer economically sustainable in its current form (Hansson et al., 2002).

Air Canada CEO Robert Milton has also echoed this sentiment:

> At the heart of the problem is the business model which full service carriers—including Air Canada—have used to generate revenues for five decades."[1]

While the problems with the ability of the network air carrier business model to cover its costs was well-know earlier, the tragic events of 11 September 2001 produced a shock to the industry which made the problem plain enough for all to see.

In the period from 1945 to then end of the 20th century, the world's airline industry built a remarkable product. A passenger almost anywhere in the world could purchase a ticket to seamlessly fly to almost any other part of the world. This remarkable feat did not require an industry structure consisting of a single global airline. Rather, it used a complex, but effective set of relationships among hundreds of individual air carriers. Individual airlines invested in internal systems, infrastructure and procedures to connect passengers within their own network, as well as to the networks of other airlines, including competitors. Industry standards and facilitation services provided by the International Civil Aviation Organisation (ICAO), the International Air Transport Association (IATA), SITA/ARINC and others, were critical and effective in providing the global standards and services (financial and technical) to make world-wide connectivity possible. Travellers enjoyed low transactions costs—a single call to one airline or travel agent would procure for them a ticket to anywhere, potentially using the services of many carriers, and allowing refundability, flexibility, and in a large number of cases, transferability. As plans changed, the traveller

*Corresponding author. InterVISTAS Consulting Inc., 550-1200 West, 73rd Avenue Vancover, British Columbia, Canada V6G 6G5.
E-mail address: mike_tretheway@intervistas.com (M.W. Tretheway).

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could change to different flights of the same or other carriers. Travellers also enjoyed relatively hassle free travel experiences—at lease relative to extreme difficulty of making connections on the passenger rail systems prevalent in the first part of the 20th century.[2]

In developing this network product, however, air carriers required costly systems and infrastructure to serve their passengers. The same infrastructure was used to serve all passengers. This included both those passengers needing the connectivity, as well as those passengers whose journeys were simple point-to-point itineraries. While never empirically examined, economists would say that there seemed to be economies of scope in providing air transportation services to the passengers with simple itineraries as well as to those passengers requiring connectivity services.[3] It was believed it would have been more expensive to build a separate set of air carriers to serve the simple itinerary passengers, than it was to provide the network product to consumers who only needed simple services.

Regardless of whether this assumption was correct or not, market conditions have changed. The demand for air transportation has been observed to grow at roughly double the rate of the growth in the general economy. This has resulted in an dramatic increase in the size of aggregate and individual aviation markets. As these markets grew, and as entry into air transportation markets was deregulated, a new breed of air carrier emerged. Southwest Airlines might be considered as the first carrier to develop a successful business model for this new type of carrier. It offered a very simple and therefore low-cost service targeted at passengers with simply itineraries. As a result, this carrier has grown and has joined the ranks of the largest air carriers in the US (and the world).

While Southwest was the first carrier with the new business model, Ryanair is perhaps the best example, as it is most extreme in reducing costs and confining its services only to passengers with the simplest of journeys. For example, Ryanair currently does not provide any network connectivity services; it even does not allow its own passengers to purchase through tickets that connect to its other flights. Passengers with simple itineraries have less need of baggage and Ryanair strictly limits the amount of baggage and carry on items. Passengers with simple itineraries, do not need complementary meal services. Managing the inventory of seats available for sale is simpler when there is no need to consider the revenue impact of connecting passengers versus originating passengers. There are no interrupted trip expenses, etc.

The simple characteristics of its passengers needs and the services Ryanair chooses to offer, have allowed it to dramatically lower costs. The lower costs have allowed it to offer lower fares. Given the elastic nature of consumer demand for airline services, this stimulates market size and the revenue base. Ryanair's costs are so low that in spite of lower ticket prices, it has a wide margin between yield and unit cost. This, in turn, has given the carrier resiliency to weather the significant recent industry downturns. It might also be added that this business model also increases general transportation safety. Air transport has a very high safety record, and to the extent that low fares encourages travellers to use air transport rather than use automobiles, overall transportation safety rates are improved.

This business model, which I refer to as the low-cost carrier (LCC) business model,[4] has proven to be financially successful. By this, I do not mean that any carrier following an LCC model will be successful. Rather, I mean that the successful LCC carriers have financially outperformed the traditional network carriers with whom they compete. I refer to the business model of the traditional network carrier as the full service network carrier (FSNC) business model. The LCC carriers have achieved the highest market capitalisation of any passenger air carriers in the US (Southwest), Canada (WestJet) and the European Union (Ryanair).[5] (The relative profitability of the US and

[2] In many countries, separate rail carriers would provide service to link outlying communities to major cities. Their networks were not connected. Passengers wishing to travel beyond the major city had to fetch luggage and make their own arrangements to get to a separate terminal of the rail carrier with the beyond service. Typically, originating carrier could not sell the needed connecting ticket. Separate transactions were required for each leg of the journey. A traveller from Omaha to Boston would require time consuming, costly and hassle filled connections in both Chicago and New York, which stands in contrast to the type of connectivity air carriers offered.

[3] The issue of economies of scope has been examined by transportation economists, e.g., Gillen et al. (1990). However, they examined different types of scope economies, such as between passenger and freight service as well as between scheduled passenger and charter services. Data did not exist to allow investigation of economies of scope between services to passengers with simple itineraries and services to passengers requiring connectivity. Interestingly, the Gillen et al. study found only limited economies of scope between scheduled and charter services, a finding which is broadly consistent with the view in this paper that network carrier provision of high connectivity services to all passengers is sub-optimal.

[4] Other terms have been used to describe this business model, such as the value-based airline. I prefer the LCC label, as it gets to the heart of the issue—the carriers provide a product to their customers at lower cost. For some customers, this provides great value (more consumer surplus) than purchasing the FSNC product. It does not provided value, however, to those consumers who need the network carriers' higher level of service. I also wish to emphasise that this business model is a low cost model, rather than a low fare model. High cost carriers can offer low fares, but these are not sustainable, as many FSNCs are discovering.

[5] Ryanair variously has the highest or second highest market capitalisation of the European air carriers.

Canadian carriers is shown in Appendix A.) As can be seen, the two LCC carriers listed have almost always achieved the highest financial returns in the industry.

The consistent superior financial performance of the LCC business model, the generally poor financial performance of the FSNC in all but a few years, and current economic conditions, all suggest that the FSNC business model is no longer an effective business model. This conclusion is held by others, including airline executives such as Robert Milton of Air Canada, and a number of industry observers in the financial and consulting sectors, as previously cited.

All this is not to say that there is no role for the FSNCs in the future airline industry. To the contrary, they will continue to provide valuable and much needed air services. For example, there is no direct air service (scheduled or charter) from where I live in Vancouver to Hamburg. Yet, I highly value attending the annual Hamburg Aviation Conference. For this trip, I need to consume the FSNC product, while for other trips, the LCC product fits my need and provides greater value relative to cost. The issue is not whether the FSNC business model will exist in the future. It will. Rather the issue is the scale of that model and the changes required to make it a more successful model for its shareholders, employees and consumers. I put forth the following propositions regarding airline business models for the future:

- The LCC model has been successful with consumers and with shareholders and will continue to grow. It is not a fad, but rather a business model with a permanent role in the marketplace.
- Perhaps the most important impact of the LCC business model on FSNCs has been the introduction of low one way fares. This has undermined the price discrimination ability of the FSNCs, and is the most important pricing development in the industry in past 25 years.
- The FSNC model will continue to exist. It is not doomed to disappear. It provides a highly valuable service to many customers.
- The FSNC model, however, will serve a declining share of the market. That share will eventually stabilise with a share of passengers carried in the range 40–50%, although with a higher revenue share.
- A consequence of the reduced market share of the FSNCs, combined with economies of scale in provision of FSNC services, means that consolidation of FSNCs is desirable and necessary.
- Consolidation of FSNCs will inevitably involve either consolidation across national frontiers (mergers between airlines in different countries) or needlessly complex business arrangements between groupings of carriers of different countries to achieve as many of the efficiencies that outright mergers would have enabled. Nations would be well served by eliminating foreign ownership restrictions of air carriers and allowing cross border airline mergers,[6] and finding other means of achieving nationalistic goals for air transport.[7]
- With or without consolidation, the FSNC business model, as currently implemented by many carriers, contains two serious business decision-making elements which must be corrected. First is correcting the overestimation of the value of network revenue contributions to individual routes (referred to as beyond revenues in this paper). The second is correcting the failure to switch from short-term to long-term pricing decisions as air carrier fleets are renewed. These two errors have led FSNCs to offering more capacity than is economically efficient, and than is financially viable for investors.

The balance of this paper will focus on the issues of the reduced market share of the FSNCs and the consequent need for consolidation, and the decision-making errors of beyond revenues and failure to move to long-term pricing.

2. The future market share of the network carriers

At one time, the FSNCs had almost the entire air transport market to themselves. In the 1950s and 1960s, while there were charter and other speciality carriers, most of the world's air transport services were provided by FSNCs. By the 1970s, this was beginning to change. Charter carriers, especially in Europe, were serving a small but increasing share of the travel market (Lawton, 2002).[8] In the US, Southwest Airlines began flying in the early 1970s. Following airline deregulation in the 1978 to 1993 period, further expansion of the LCC model

[6] There are two changes required. First national laws limit foreign ownership of air carriers will need to be changed. Second, air services agreements between nations will need to be revised so that nations will permit their bilateral partners to designate carriers which are not substantially owned and controlled by nationals of their country.

[7] Access to aircraft in times of national emergency, whether armed conflict or natural disaster, is an often cited reason for maintaining airline ownership in the hands of nationals of a country. The onus should be placed on proponents of such views to either show that these benefits exceed the enormous economic inefficiency costs of preventing FSNC consolidation, or finding other means of obtaining the necessary access to aircraft and crews. Facing the potential financial demise of many of the world's FSNCs (and already several have succumbed—Ansett, Sabena, Swissair, plus major carriers in bankruptcy in the US–United and US Airways), nations can no longer afford to maintain national ownership laws. They will either lose their FSNCs, or need to subsidise them.

[8] One can debate whether charter carriers are LCCs, but for purposes of this paper, they fit the business model of providing a subset of the market via a low cost business model.

took place in a number of countries.[9] Ryanair converted to the LCC model in 1991, WestJet began flying in Canada in 1996, and Virgin Blue began operating in Australia in 2000.

In the US, where the LCC model has the longest period of development, the LCCs in 2000:[10] operated 688 of 5570 total aircraft (12.3%),[11] provided capacity of 106 billion available seat miles (ASMs) versus 999 billion for all carriers (10.6%), earned US$12.5 billion (9.1%) of the total US$138 billion in system wide revenues. And served 24% of domestic passengers.

When examining only for the domestic airline market, the LCCs have a higher share of the market. In terms of passenger revenues, the LCCs have an 11% share, and a 14% share of ASM capacity.

It should be pointed out that the LCCs in the US have considerable numbers of aircraft on order. Southwest has a fleet of 382 aircraft with 113 on order, suggesting that it will continue to gain market share.

In Canada, WestJet in 2000 operated 22 aircraft (5.5%) versus Air Canada's 375, earned CA$ 316 million in revenue (3.1%) versus Air Canada's $ 9.2 billion, and provided capacity of 1.9 billion ASMs (2.9%), versus Air Canada's 63.4 billion. However, since 2000, WestJet has grown 50%/yr. It currently has orders and options to grow to a fleet of just over 90 aircraft. If Air Canada's fleet stayed the same, rather than shrank, this would suggest that WestJet would operate roughly 20% of fleet capacity of the two carriers. If Air Canada shrinks, WestJet's share of capacity will be higher.[12]

WestJet is not the only LCC in Canada. Prior to November 2001, Canada 3000 followed many elements of the LCC model in providing both scheduled and charter service. It was Canada's second largest carrier, operating over 30 aircraft prior to its bankruptcy in November 2001. While the carrier was profitable throughout its history, the acquisition of two smaller LCCs (Royal and CanJet), combined with the effects of the September 2001 terrorist attack and the launch of competing service by Air Canada with the Tango brand, resulted in the end of this carrier. In 2002, some of Canada 3000s capacity was restored with the expansion of Skyservice and the re-launch of CanJet and Royal (now branded as Jetsgo).

WestJet has a current fleet of 37 aircraft, with 26 aircraft on order, and additional options which will bring its total fleet to just over 90 aircraft by 2008.

Many of the FSNCs have recognised the success of the LCC business model and have launched subsidiaries or brands which attempt to adopt many of the elements of that model. British Airways launched GO. Air Canada launched Tango as a brand,[13] and has created a subsidiary carrier, Zip, in what it hopes will be the LCC model.[14] US carriers have launched (and subsequently re-launched) their own brands or subsidiaries attempting to adopt elements of the LCC model.

Lawton provides a good discussion of how the FSNCs' low fare brands and subsidiaries operate and compares them with the pure LCC model. There are significant differences between these quasi-LCC brands and subsidiaries of the FSNCs, and the pure LCC business model of Ryanair, Southwest and others. Some would argue that while the quasi-LCCs are *low fare* airlines, they are not LCCs. Nevertheless, the quasi-LCC subsidiaries/brands of the FSNCs are important in that they represent a vehicle by which capacity of the FSNCs can be and is being converted to the LCC model. Buzz, for example, was launched with the fleet of KLM UK. Thus, some of KLMs corporate capacity was converted to a business model with a number of elements of the LCC.

Air Canada has transferred a number of its aircraft to its Zip subsidiary. By the end of 2003, Zip will consist of roughly 20 aircraft which formerly had been part of the FSNC fleet. This represents roughly 16% of Air Canada's jet fleet capacity. CEO Robert Milton has indicated that he intends to have roughly 40% of Air Canada' capacity deployed in what Air Canada considers to be an LCC model.

Similarly, US carriers have deployed parts of their fleet into quasi-LCC business models. Delta Express and Shuttle by United are examples. While some of these operations were cancelled following the tragic events of September 2001, there are new launches of the quasi-LCC model or in planning. Delta has re-launched its

[9] 1978 marks the Airline Deregulation Act in the US, although significant liberalisation began two years earlier. Europe implemented deregulation in three phases (or packages), with the last in 1993. Australia deregulated its industry in 1990. In 1999, it removed foreign ownership restrictions on domestic air carriers, paving the way for Virgin Blue to begin operations.

[10] The carriers include Southwest, AirTran, JetBlue, Spirit, Frontier, American Trans Air, Sun Country, National Airlines, Midway Airlines, Vanguard, Pro Air.

[11] The base is the 53 airlines that carried more than 50,000 passengers per annum.

[12] The Globe and Mail reported in June 2003 that Air Canada's post-bankruptcy fleet plan called for a reduction in fleet capacity for a few years followed by gradual growth to return to its pre-bankruptcy levels beyond 2008.

[13] Tango was a brand of Air Canada. It was not an independent carrier with its own operating certificate. Tickets carried the Air Canada code, aircraft were owned and operated by Air Canada, and passengers could be accommodated on other Air Canada flights when a Tango flight was cancelled. Tango did not sell tickets which connected to non-Tango Air Canada flights. The Tango brand disappeared at the end of September 2003, and the term exists now only as the name of a fareclass available on almost all Air Canada flights. It is no longer a business model.

[14] It is interesting that Zip is headed by the former CEO of LCC WestJet. Zip is a subsidiary of Air Canada, with its own operating certificate. Unlike Tango, Zip does provide connections to other Air Canada flights and to interline flights of other carriers.

quasi-LCC product and United is also considering the model as part of its bankruptcy restructuring.

Market share should be measured in terms of revenues. This measure indicates the value of the service, as paid by the consumer. Nevertheless, other share measures can provide insight into how an industry is organised. The share of passengers served is a useful measure, as is the distance based measure, revenue passenger kilometres (RPKs). Capacity measures such as seats flown and ASMs also provide insight.

In the US, the market with the longest track record with the LCC business model, we currently observe that roughly 25% of passengers are served by LCC carriers. (The market share of these carriers, measured in terms of revenue, is much lower, of course.) Given the rate of expansion of these carriers,[15] and their current relative profitability, its seems reasonable to expect that their market share will grow. Further, it should be expected that the FSNCs will redeploy a portion of the their capacity to a quasi-LCC format, with potential through subsequent sales to pure LCC models. Air Canada is already on track to redeploy 16% of its jet capacity to the quasi-LCC business model.

The existing market share of the LCCs in the US, the growth of these carriers as manifested in their fleet plans and the redeployment of some of the capacity of the FSNCs to quasi-LCC operations suggests that eventually the LCC business model will serve at least 50% of the domestic market. It is not unrealistic to anticipate that the FSNC business model would serve only half of the market or possibly a bit less than this. The above suggests that the FSNCs will be reduced to somewhere in the range 40–50% of the domestic US market.[16]

Carriers using the LCC business model will serve a large portion of the market, which moves point to point on short to medium distance journeys, as well as a share of those passengers requiring simple connections. Southwest, WestJet, Virgin Blue and other LCCs provide such intra-line connection services.

Even with growth in the overall air transport market, the FSNCs will be smaller than they currently are. Coupled with certain forms of economies of scale (Gillen et al., 1990), this then suggests that the FSNCs will need to undergo consolidation in order to survive. The most efficient outcome will be for fewer FSNCs to serve the market. In large markets, such as the US, this consolidation could occur by merger of domestic FSNC carriers. We have already seen such mergers (e.g., American-TWA). Canada achieved consolidation of its FSNC when Air Canada acquired Canadian in late 1999. Australia witnessed consolidation when Ansett ceased operating.

However, there are challenges to achieving consolidation of FSNCs via consolidation of domestic carriers. First, few countries have more than one FSNC. Second, such consolidation necessarily results in a significant lessening of competition.

It would be desirable to allow consolidation of FSNCs to be achieved across borders. The recent proposed acquisition of a significant share of Air New Zealand by Qantas, should be seen in this light. Recognising that the FSNCs will likely be reduced globally to a 50% share of passengers carried in short and medium haul services (i.e., not intercontinental), allowing some to merge will (a) free up market demand for service by the more efficient LCCs or quasi-LCCs, and (b) allow the merged carriers to maintain current economies of scale (i.e., economies of traffic density—see Caves et al., 1984), rather than move backward on economies of scale relationships to higher unit costs. The realisation of economies of scale is especially important, given the reduced market share of these carriers. The customers of the LCCs will be well served at low fares.

However, a goal should be that this does not happen at the expense of those travellers who need the network product. It would be desirable that they can continue to receive the higher quality network product, but without higher fares than at present. If FSNCs have shrinking traffic bases, then overhead costs will have to be allocated to that shrinking base at ever higher unit costs, eventually resulting in higher fares.

The two goals of non-increasing unit costs of the FSNC product and competition between FSNCs to the benefit of traveller requiring this product, can only be met in all but the largest markets, by allowing cross-border consolidation. Governments must recognise the inevitability of the reduced market and traffic shares of the FSNCs. They must recognise that FSNCs can and do exit the industry via bankruptcy (e.g., Ansett, Sabena). The reality is that governments face three choices:

- Remove foreign ownership restrictions on air carriers, and allow cross-border consolidation of the FSNCs. This would maintain competition in the FSNC section of the industry and prevent a backward move on the economies of scale curve to higher unit costs; subsidise the inevitably smaller FSNCs; or face the loss of FSNCs.

[15] As manifested by the almost 1500 aircraft they have on order and option, most of which is incremental rather than replacement capacity.

[16] If one uses the 3.2% average annual growth rate of passengers carried by US ATA network air carriers (excluding Southwest) and the 15% aagr of the LCCs (including Southwest), then in five years, the LCCs will grow from a passenger carried share of 24–36% and to 51% after ten years. This does not include any capacity shifted by FSNCs to quasi-LCC formats. The large number of incremental aircraft on order and option by the LCCs and the low number of aircraft (largely for replacement) on order by the US FSNCs, suggests these simply calculations may be a reasonable indicator of future shares of passengers carried.

Today, one must question the rationale for continued foreign ownership restrictions of air carriers. Up the present, the onus has been placed on proponents of the removal of foreign ownership restrictions on air carriers to prove that national interests would not be harmed. Despite the best efforts of proponents, few governments have removed such restrictions.[17] However, in the post-September 11, 2001 world, with massive losses by many FSNCs, and in the face of obvious evidence that the LCCs are gaining market share, the time has come to reverse the onus. Of the three options listed above, clearly the latter two should not be acceptable to governments. The onus should now be placed on proponents of continued foreign ownership restrictions to either show that the benefits of such restrictions exceed the enormous economic inefficiency costs of preventing FSNC consolidation (or the prospect of the failure of the FSNCs). In the absence of such evidence, foreign ownership restrictions of air carriers should be removed.

3. Failure of the network carrier business model: loss of price discrimination ability

In the 1970s, in response to entry and growth of a number of charter air carriers, the FSNCs applied for and eventually received regulatory approval to price discriminate.[18] The carriers identified that some potential passengers were willing to travel if lower fares were available. The carriers had cost structures which were too high to be viable if all passengers were to pay low fares, but if the carriers could find a means to continue charging the traditional high fares to existing passengers while making the low fares only available to those not currently travelling, then the carrier's costs would be covered, profits increased and the market expanded.

Charging different passengers different prices constitutes price discrimination.[19] In most industries, maintaining price discrimination is difficult. However, in air transportation, transferring tickets from one passenger to another is generally not allowed by the carrier and often illegal. This satisfies one of the conditions supportive of price discrimination. In the 1970s, the industry discovered that imposing certain other restrictions would be effective in preventing most of the existing passenger base from availing themselves of low fares offered to stimulate new travellers. Among many restrictions available and used by the carriers, the most powerful pair in short and medium haul markets was the requirement that to purchase a low fare ticket, one must purchase a round trip ticket and that ticket would need to span a Saturday night. This pair of restrictions was successful in implementing price discrimination and the practice prevailed for roughly 25 years.

Carriers developed sophisticated inventory management systems to determine the optimal number of seats on any flight to offer at the low fares sold with restrictions, versus high fares sold with few or no restrictions. This allowed maximisation of the revenue for any given flight and supported the relatively high-cost structure of the FSNCs even as the size of the market expanded.

As is widely known, the LCCs have much lower cost structures than the FSNCs (Lawton, 2002). The LCCs did not require price discrimination to the same degree as the FSNCs. The seat management systems themselves were often viewed as adding significant system costs to airline operation and were to be avoided. These carriers generally offered seats for sale with no restrictions. Specifically, a traveller could avail themselves of low fares on a one way basis, and thus escape the Saturday stayover requirement. The LCCs discovered that their unrestricted fares were attracting the former customers of the FSNCs. While the traveller would have to give up the network connectivity and other value added services of the FSNC product, for many travellers, the utility of these services dimensions did not warrant paying the higher price.

At first, the one way fares of the LCCs had minimal impact on the FSNCs as they offered little capacity. In the late-1990s, however, the capacity offered by the LCCs became significant enough to seriously undermine the price discrimination ability of many FSNCs, even when their aggregate market share was only in single digits at the national level. With diminishing numbers of travellers willing to pay the high fares of the FSNCs, the latter began to respond in many cases with low one way fares of their own. However, this seriously eroded their yields and in a large number of cases has resulted in total revenues for flights well below the costs of providing the service. In North America, Europe and Australia/New Zealand, this resulted in the failure of carriers (e.g., Ansett Australia), recapitalisation (e.g., Air New Zealand) restructuring via bankruptcy protection (e.g., Air Canada, United, US Airways), or restructuring via voluntary agreements with creditors and employees (e.g., American). At this point, it seems unlikely that the FSNCs can re-impose the degree of price discrimination they once enjoyed. It remains to be seen whether the restructuring and recapitalisation of the FSNCs will

[17] Australia is a notable exception. The European Union allows intra-EU ownership of airlines, provided that their operations are confined within the EU.

[18] Background on the development of the capacity controlled low fares offered by FSNCs is provided in Oum and Tretheway (1988).

[19] It is acknowledged that there are differences in the services received by some high fare passengers. Nevertheless, the diversion of significant numbers of former high fare passengers on the FSNCs to services of the LCCs indicates that the price difference between the high and low fares of the FSNCs cannot be attributed solely to service dimensions.

provide a sustainable financial base for these carriers for an industry environment which will not support the degree of price discrimination which formerly prevailed.

4. Failure of the network carrier business model: misuse of beyond revenues

Network industries, such as airlines, have challenges in measuring the profitability of individual network segments. A FSNC examining an individual route or flight may want to recognise that providing service from City A to City B may win it a customer from A going beyond B to City C. If this is the case, it may be tempted to consider some of the incremental revenue associated with the B to C service when making the decision to operate capacity from A to B.

Two recent papers have discussed this issue (Baldanza, 2001; Frainey, 2001). Both acknowledge the complexity of the issue. Both advocate use of beyond revenues in measuring route performance. However, each paper's recommendations are based on erroneous assumptions and the evaluation methods they propose will lead carriers to deploy excess capacity.

FSNCs typically provide information to route managers which adds to the direct revenues of a flight on the A to B route the beyond revenues from the B to C and similar connecting segments. In some cases, the beyond revenues are replaced with beyond contributions, where a measure of the cost of providing service on the connecting B to C route segment is subtracted from the revenues of the B to C (and similar) segments.[20]

These information systems do the same thing for flights on the B to C route as was done for flights on the A to B route. The revenues/contribution on A to B for those passenger connecting to the B to C flight are added to the analysis of the performance of B to C. Thus the revenues are double counted.

Consider a passenger paying $250 to travel from A to C via B (Table 1). Suppose that the airline has decided that based on mileage, or some other reasonable basis, that the $250 trip revenue should be pro-rated as $100 for A to B and $150 for B to C. The FSNCs information system will report to the A to B route manager the $100 prorated direct revenue, but it will also report the $150 beyond revenue or a slightly smaller amount if beyond contribution is used. The route manager for the B to C segment will obtain information on the $150 pro-rated direct revenues of this passenger, and the $100 beyond revenue. Both route managers may be led to believe that their respective flights on the individual route segments are performing well, even if the two routes combined are failing to cover combined costs. In such a case, double counting will induce the route managers to deploy more capacity on routes than is economically justified, operate more routes than is economically justified, and to be content with low yields on a route, since there is a larger traffic base and what is not earned by price is replaced by volume.

Table 1
Beyond revenue example

	Flight A to B ($)	Flight B to C ($)	Total trip revenue ($)
Pro rated revenue	100	150	250
Add beyond revenue	150	100	
Total revenue for flight performance evaluation	250	250	

This double counting of beyond revenues is consistent the observation that network carriers claim they optimise capacity on each route yet they fail to earn adequate returns. (The optimisation presumably is profit maximisation.) Individual pieces of the network are considered to be earning an adequate return or contribution to corporate overheads. But the adequacy of the contributions are illusory, as some or all of the revenues are also being used to justify the performance of another route segment.

It is interesting to observe justification offered for the double counting inherent in use of beyond revenues. Frainey (2001) recognises the issue of double counting, yet dismisses it.

> Some analysts might be inclined to think that double counting is a critical flow in revenue analysis, but this is not the case. ...double counting is necessary to properly understand the dynamics of a linked network.

While it is true that there are dynamics of a linked network, it is not clear that double counting is the way to deal with it. To understand this, it is necessary to examine the assumptions underlying the double counting information provided to route managers.

- Beyond revenues or contributions are calculated for every passenger on a flight making a connection prior to or after the flight being evaluated.
- The inclusion of all such revenues/contributions assumes that all connecting revenue would be at risk if a flight were cancelled.

The latter, however, is unlikely to be the case for four reasons.

- If a flight were to be cancelled, and if the carrier operated other flights on the route, many if not most of the passengers would move to the other flights of

[20] Discussions with carriers reveals that some subtract only a small amount of cost from the revenues, while others subtract a significant measure of cost.

the same carrier. E.g., if Air Canada cancels the 11 am Calgary–Vancouver flight, the passenger going onward to Tokyo could take the 10 am flight.

- The carrier may have alternative means of getting the passenger to the destination in the desired time window. Many of the FSNCs operate multiple hubs and can connect the passenger in more than one way. Lufthansa can connect passenger from Berlin to a number of destinations either via its Frankfurt hub or via Munich.
- There is strong customer loyalty to FSNCs, in part due to frequent flyer rewards, and loyal passengers may still fly with the carrier even if service is less convenient.
- In some markets there are few, if any, competitive alternatives. The Air Canada passenger from Moncton to North Bay has no alternative other than Air Canada.

This use of beyond revenues at network carriers is in direct contrast to practice at the LCCs. For the most extreme cases, such as Ryanair, the carrier does not sell tickets with connections, not even for connections within its own system. Hence, there is no need for it to consider beyond revenues when it evaluates the financial performance of flights.[21]

WestJet is an LCC which does provide connections within its network. Nevertheless, the carrier expects each route segment and flight to 'stand on its own legs', and financial performance evaluation does not include any routine consideration of connection revenues.[22] The carrier does consider whether dropping service on a route would result in the loss of revenues for connecting segments. In testimony under oath to the Canadian Competition Tribunal, its CEO indicated that its internal analysis revealed that it would retain most such revenues when it cancels service. It is not surprising that WestJet's financial performance is dramatically higher than its FSNC competitor. It does not commit any double counting errors. Almost every one of its routes and flights has a positive financial performance. Its route managers are not fooled by report performance systems which report 100% of all beyond revenues on individual routes and flights.

I am not arguing that FSNCs should never consider beyond revenues in their evaluation of route performance. I am criticising the use of systems, which implicitly assume that all beyond revenues should be included in the evaluation of routes and flights.[23] Carriers should realistically address how much of beyond revenues are at risk from flight or route cancellation, and develop systems which exclude beyond revenues which are not at risk.

As an example, for a carrier with limited domestic competition, it would be appropriate to *exclude* all beyond revenues/contributions from connecting domestic route segments. For international connections, where there may be some competitive choice for consumers, it may still be inappropriate to include all beyond revenues/contributions. The carrier is likely to serve a high portion of passengers originating in its home market, and many of these will be loyal to it through its frequent flyer reward program, or be originating from a domestic point beyond the international gateways, and thus unlikely to avail themselves of foreign carrier services. If any consideration is to be given to beyond revenues/contributions on international route segments, only a fraction should be included, with the fraction representing the small portion of beyond revenues/contributions which are at risk.

Interviews carriers indicate that some, in fact, assess the riskiness of beyond revenues prior to their use. One carrier divides its services into four major groups. For two of the groups, the carrier determined that beyond revenues are little at risk and thus they are not considered in capacity and pricing decisions. For the other two segments, the beyond revenues were considered to legitimately be at risk. However, even here, the carrier is careful to attribute a significant degree of beyond cost. It determined that serving connecting passengers accounted for a significant portion of its aggregate traffic on the beyond route segments, and thus subtracts a large measure degree of costs of the beyond route services from the beyond revenues, almost fully allocated costs. Not surprisingly, this FSNC is profitable and has a high market capitalisation.

5. Failure of the network carrier business model: failure to adopt long-term pricing

Economists have long maintained, that in the long term, prices should be set at the long-term marginal costs of providing services. They will concede that in the short term, prices can be set at lower levels, to cover short-term marginal costs, even if this results in revenues

[21] It is believed that some passengers create their own connections by purchasing separate tickets for each leg of their itinerary, but this requires them to collect baggage upon arrival at the first airport then check-in for the second leg as if they were an originating passenger at the connection point. The amount of such quasi-connecting passengers is believed to be far lower than the connecting passenger percentage of the FSNCs.

[22] Clive Beddoe, CEO of WestJet, to the Competition Tribunal, 3–4 December 2002.

[23] To simplify the discussion, I have not addressed the issue of using beyond contributions rather than beyond revenues. Beyond contributions subtracts a measure of cost of providing service on the beyond flight segments from beyond revenues. While an improvement over the use of beyond revenues, an issue is whether the amount of cost subtracted is appropriate. Some carriers subtract only a trivial amount of cost from beyond revenues.

that do not cover long-term costs. However, eventually there must be a return to long-term prices.

What distinguishes the long term from the short term? It is the reduction, expansion or renewal of physical capital. The short term is that period when an air carrier cannot adjust its capital assets to more optimum levels. If an air carrier experiences a reduction in demand this week, it is unlikely to be able to reduce its fleet and other assets this week to the optimal level for serving the reduced demand levels. Thus, the carrier may rationalise reducing prices for a period of time below levels that cover fully allocated costs.[24] When the carrier is able to adjust its capital assets to appropriate levels, then prices must be restored to levels that cover long-term costs, including capital costs.

The question becomes one of when such adjustment in fleet and other airline assets can take place. The traditional view of many in the industry is that it may take years for an air carrier to adjust its fleet, as these are long-lived assets.

However, the evidence is to the contrary. Air carriers can and do make changes to their fleets on an annual or shorter period. Consider the following example. Air Canada's fleet of narrow body jets was relatively constant from 1989 to 1996 (Fig. 1). This may seem to suggest that the long term is long indeed. Even after seven years, its fleet size did not materially change. However, examination of the details of its narrow body fleet indicates during the period, a significant portion of its narrow body fleet was replaced. In almost every year, capital was being renewed via replacement, and beyond 1997, the size of the fleet was increasing. This indicates that the carrier should have been engaging in long-term pricing in virtually every year. By 2002, almost its entire narrow body fleet was replaced. In fact, in all but two of the last 12 years, it has replaced narrow bodied aircraft. 727s were completely replaced with A-320s. DC-9s were replaced with A319s. This continual renewal of the fleet indicates that the carrier is able to change the level of its fleet assets on an annual if not shorter term.[25] This in turn indicates that carrier pricing decisions should be covering fully allocated costs on an annual or shorter period. It is not necessary that the entire fleet can be replaced within a year or shorter period to require that optimal pricing policies should be long-term pricing policies. All that matters is that the fleet size can change on the margin in order to require adherence to long-term pricing.

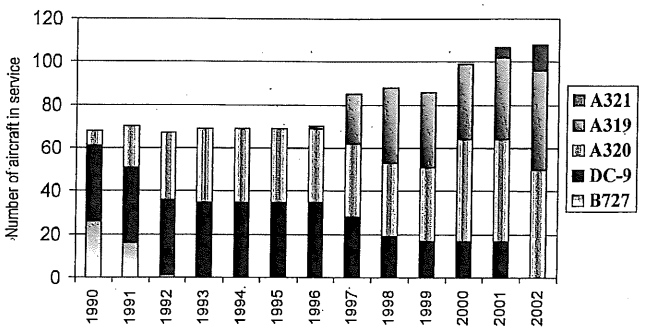

Fig. 1. Air Canada narrow body aircraft in service. Source: Air Canada annual reports.

Yet, we observe FSNCs adopting pricing strategies, which take the fleet as given. With this assumption, inherent in their decision systems, managers then maximise revenue from the fleet on a short-term pricing basis.[26] Many FSNC decision systems have no built in ability to adopt long-term pricing policies. They appear to always be stuck in short-term pricing policies.

Air carrier pricing is a complex task. Because carriers engage in price discrimination (different prices are charged to different customers on the same flight), decisions involve how many individual price categories to have, the level of individual prices, and the allocation of seat inventory available for sale to those various price categories. FSNCs make use of seat management systems to allocate seats among the categories or fareclasses.[27] Fares themselves are changed frequently, if not daily. For example, new categories (new fare classes) can be created and terminated daily.[28]

The seat management systems are short-term pricing tools. They are not intended to cover long-term costs or to cover any costs. They merely maximise revenues for a specific flight on a specific day, on the assumption that the carrier has already committed to operating the flight. Carrier invest up to hundreds of millions of dollars in these systems, and maintain large teams to manage and operate the systems. These systems are not capable of making or guiding any long-term pricing decisions. Those decisions, must be made by choosing whether or not to operate capacity.

[24] The prices must cover short term marginal costs, however. In the parlance of competition policy, prices must cover avoidable costs.

[25] In testimony to the Canadian Competition Tribunal, I have argued that in a period as short as three months, carriers can avoid capital costs, either through sale of fleet, postponing fleet acquisitions, acquiring additional capacity via leases, redeployment of capacity to alternative uses, or parking.

[26] Carrier seat management systems are essentially revenue maximisation systems. However, most carriers evaluate route profitability on a monthly or quarterly basis. Here, the carrier should be deciding whether to allocate capacity based on short term profit analysis (revenue less variable costs), or, if it is renewing or expanding its fleet, making capacity (and therefore pricing) decisions based on long term profitability.

[27] Other terms are yield management or revenue management.

[28] While the carrier may rarely create a new fare code, carriers frequently create sub-codes with short lives. For example, while the L fare code may have been present for many years, a specific fare basis code, such as L14EASTS may be put in place within a few minutes, and disappear, at will, as quickly.

FSNCs do have processes to make decisions on whether or not to operate capacity, but these are not linked back to day to day pricing decisions. The latter take as a given the level of capacity which is going to be operated. Discussions with the airline planners reveal this. Fleet decisions are made in different departments of the carrier than are the pricing decisions. While the fleet planners may make assumptions regarding the prices that will prevail in the future, these assumed prices might not be operationalised. That is, the managers responsible for day to day and even month by month or quarter by quarter decisions on airline prices may never be required to refer to the long-term prices which must be achieved to cover the long-term costs of operations, including fleet costs.

Carriers will respond to the claims in this paper by saying that their managers do examine route or flight profitability and these lead to decisions about capacity to offer. But the missing link is a *requirement* that the prices charged adhere to long run pricing requirements. As soon as the manager makes the monthly or quarterly decision, the actual pricing (and seat allocation to fareclasses) is turned over the seat management system and its managers. These are short-term pricing systems. If month after month, the routes fail to cover long-term costs, then the carrier has a systematic decision-making problem which fails to remove or redeploy sufficient capacity to achieve long-term profitability.

This is in contrast to the way LCCs generally make their pricing decisions. Testimony of Clive Beddoe, CEO of WestJet airlines to the Canadian Competition Tribunal provided great insight into at least one LCC's pricing decisions.[29] This carrier recognises the ability to redeploy aircraft to alternate routes or flights. It requires its flights to cover fully allocated costs. The number of pricing categories, price levels, and seat allocations are set to cover total costs, including capital costs.

The orientation of the LCC decisions is subtly but significantly different from that of the FSNCs. A FSNC makes decisions about capacity, then turns over pricing to a system which maximises revenues conditional on operating the flight. Every operational pricing decision is in a short-term pricing framework. Each month or quarter, capacity is re-evaluated based on short-term profit maximisation, but then turned over again to seat management systems.

An LCC, in contrast, makes decisions on capacity to offer, then establishes the pricing parameters to achieve revenue which must cover total costs. They recognise that capacity can be redeployed and thus long-term pricing policies are appropriate. For the LCC, price decisions are linked to long-term costs, whereas for the FSNC pricing decisions are based only on short-term costs or possibly divorced from costs. It can be the difference between revenue maximisation versus profit maximisation.

The seat management systems of the FSNCs have provided significant competitive advantages relative to their competitor FSNCs. Provided your competitors are also engaging in revenue maximisation rather than profit maximisation, additional investment in seat management technology provides an advantage.

However, when the LCCs appeared, and engaged in economically based pricing decisions, i.e., pricing linked to long-term costs, the LCCs proved to be profitable. The FSNCs, faced with competition from the LCCs, typically met this competition by matching fares (or undercutting in some cases),[30] and adding capacity.[31] These strategies were a consequence of short-term pricing behaviour, i.e., revenue maximisation. As time goes by, however, these FSNC pricing and capacity responses are unprofitable. They are economically inefficient.

After a very short period, the FSNCs should have recognised that their short-term pricing strategies were incorrect responses for more than a matter of a few months. The carriers should have recognised that their costs were higher, and that meeting the prices of the LCCs was a recipe for sustained long-term losses, made worse by adding capacity. The carriers should have (a) withdrawn unprofitable capacity, (b) been more aggressive about reducing costs, and/or (c) set prices which covered long-term costs, even if it meant reducing the share of the market served largely to those travellers which required the more expensive network connectivity product the FSNC was well suited to provide.

6. Conclusions

The LCC model has been successful with consumers and with shareholders and will continue to grow. It is not a fad, but rather a business model with a permanent role in the marketplace. Perhaps the most important impact of the LCC business model on FSNCs has been the introduction of low one way fares. This has

[29] The testimony was at hearing of the Commissioner of Competition vs. Air Canada. This hearing involves an application by the Commission to the Tribunal alleging the Air Canada engaged in predatory pricing against WestJet and CanJet. Mr. Beddoe's testimony was 3–4 December 2002.

[30] The LCCs also offered one way fares, undermining the degree of price discrimination which the network carriers could undertake. Here, I am focussing on the short versus long term pricing issue.

[31] It is interesting to observe FSNCs rationalising the addition of capacity in markets where they cut prices in response to LCC entry. Claims may be put forth that the additional capacity is needed to soak up (or accommodate) the increased demand at the low prices. This simply underscores the carrier's failure to recognise rational long term pricing policies. If the new prices do not cover the FSNCs costs, adding additional capacity simply makes its profit shortfall worse.

Table 2

	2001 (%)	2000 (%)	1999 (%)	1998 (%)	1997 (%)	1996 (%)	1995 (%)	1994 (%)	1993 (%)	ave (%)	max (%)	min (%)	min w/o 2001 (%)
AA	−9.5	4.8	3.8	6.5	4.8	3.8	1.3	1.8	0.2	1.9	6.5	−9.5	0.2
DL	−8.4	4.9	8.8	7.4	6.6	1.9	4.1	−1.3	−6.9	1.9	8.8	−8.4	−6.9
UA	−13.1	0.3	6.7	4.6	5.4	3.3	2.3	0.3	−0.2	1.1	6.7	−13.1	−0.2
NW	−4.4	2.8	2.9	−2.8	6.0	5.9	5.7	4.8	1.0	2.4	6.0	−4.4	−2.8
US	−24.1	−3.4	3.2	6.5	12.4	2.4	0.5	−10.9	−6.3	−2.2	12.4	−24.1	−10.9
CO	−1.2	3.7	5.5	5.2	6.1	5.8	4.5	−12.8	−17.1	0.0	6.1	−17.1	−17.1
SW	9.2	11.2	10.0	13.3	8.3	6.1	6.8	7.4	8.0	8.9	13.3	6.1	6.1
	Highest	Highest	Highest	Highest		Highest	Highest	Highest	Highest	Highest	Highest	Highest	Highest
Canadian carriers													
AC	−13.0	−0.9	3.3	−0.3	7.7	3.1	1.4	3.2	−9.1	−0.5	7.7	−13.0	−9.1
WJ	7.8	9.1	7.8	5.2	8.0	2.4	—	—	—	6.7	9.1	2.4	2.4
AA	American Airlines (FSNC)					SW	Southwest (LCC)				DL	Delta Airlines (FSNC)	
AC	Air Canada (FSNC)					UA	United Airlines (FSNC)				WJ	WestJet (LCC)	
NW	Northwest Airlines (FSNC)					US	US Airlines (FSNC)				CO	Continental Airlines (FSNC)	

Source: US data from Air Transport Association, Available on Internet Site, www.air-transport.org. Canadian data available on respective Internet sites, www.aircanada.ca; www.westjet.com.

undermined the price discrimination ability of the FSNCs, and is the most important pricing development in the industry in past 25 years.

The FSNC model will continue to exist. It is not doomed to disappear. It provides a highly valuable service to many customers. However, it will serve a declining share of the market. It will eventually stabilise with a share of passengers carried in the range 40–50%, although with a higher revenue share. A consequence of the reduced market share of the FSNCs, combined with some types of economies of scale in provision of FSNC services, means that consolidation of FSNCs is desirable and necessary.

For most nations, consolidation of FSNCs will inevitably involve either consolidation across national frontiers (mergers between airlines in different countries) or needlessly complex business arrangements between groupings of carriers of different countries to achieve as many of the efficiencies that outright mergers would have enabled. Nations would be well served by eliminating foreign ownership restrictions of air carriers and allowing cross-border airline mergers, and finding other means of achieving any nationalistic goals for air transport.

With or without consolidation, the FSNC business model, as currently implemented by many carriers, contains two serious business decision-making elements which must be corrected. First is the need to correct the overestimation of the value of network revenue contributions to individual routes (referred to as beyond revenues in this paper). This error led FSNCs to offering more capacity than is economically efficient, and than is financially viable for investors. Second is the need to correct the failure to switch from short-term to long-term pricing decisions as air carrier fleets are renewed. This error led FSNCs to offering more capacity than is economically efficient, and than is financially viable for investors.

The orientation of the LCC decisions is subtly but significantly different from that of the FSNCs. A FSNC makes decisions about capacity, then turns over pricing to a system which maximises revenues conditional on operating the flight. An LCC, in contrast, makes decisions on capacity to offer, then establishes the pricing parameters to achieve revenue which cover total costs. For the LCC, price decisions are linked to long-term costs, whereas for the FSNC pricing decisions may be divorced from costs. It is the difference between revenue maximisation versus profit maximisation.

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Appendix A

Net profit as a percentage of total operating revenues selected US Air Carriers plus Air Canada and WestJet 1993–2001. The net profit of selected US Air carriers Plus Air Canada and WestJet presented in Table 2.

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