CANADA'S AIRPORTS: THE ECONOMIC BASIS FOR A NOT-FOR-PROFIT GOVERNANCE STRUCTURE

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1. Introduction

This paper reviews government policy, governance and regulation with respect to major airports in Canada and develops a simple model to assess the economic case for Canada's unique governance model; airports operated as private, not-for-profit (NFP) organizations with no share capital. This form of airport governance is unique when compared to other jurisdictions around the world. Although many countries have engaged in some form of airport privatization during the last 30 years, this has typically involved either a partial or complete sale of publicly-owned airport assets to private, profit-seeking investors. Canada is the only country to have opted for a model in which unregulated NFP airport authorities operate airports under lease agreements with the federal government.

Of the 26 airports comprising Canada's National Airport System, the top eight airports (Toronto, Vancouver, Montreal, Calgary, Winnipeg, Ottawa, Edmonton, and Halifax) account for roughly 81% of total, 93% of transborder and 97% of international passenger traffic. The combined total assets of the top eight airports in 2015 was C$16.7 billion, with total annual revenues of C$3.1 billion, earnings (EBITDAR) of 2.1 billion and long-term debt of C$12 billion. From 2000-2015 the top eight airports reported C$13.9 billion in capital expenditures and paid C$4.5 billion in ground rent payments to the federal government. Just over half of these rent payments were assessed to Toronto airport.

The process of devolving airports from government operation and control began in 1987, with the first airport authorities created in 1992. Table 1 provides a chronological summary of events in this evolution spanning thirty years. During this time, there have been a number of enduring criticisms of Canada's airport policy; most notably that (i) Canadian airport authorities lack transparency, accountability and oversight, and (ii) that ground lease payments made by Canadian airports to the federal government are excessive and place Canadian airports at a competitive disadvantage. Such criticisms resulted in two attempts to introduce legislation that would have placed increased oversight on airport fees and charges along with the composition of airport authority boards of directors. However, both attempts failed; more as a result of timing (due to general elections) than to opposition. Continued dissatisfaction with the current airport policy culminated in 2016 with a Transportation Act review report (the 'Emmerson Report') which recommended that the Government of Canada sell its largest airports to private investors, and adopt a 'light-handed' regulatory approach currently practiced in Australia. Australian airports were sold-off as for-profit (FP) enterprises with a promise of 'light-handed' regulation (i.e. an absence of binding price regulation) and price monitoring. The Australian approach diverges from most jurisdictions that privatized airports where price-cap and rate-of-return regulation are more common. The Emmerson Report recommendations implied that the problems associated with Canadian airports are, at least in part, due to the NFP governance structure and that such problems would be solved with the creation of FP airports.

Meanwhile, by the time the Emmerson Report was being published, a debate was underway in Australia which demonstrated that all were not happy with the results of airport privatization there. In 2018, the Australian Competition and Consumer Commission (ACCC), backed by airlines, publicly voiced strong concerns that Australia's airports have acted exactly the way one might expect unregulated monopolies to act. In its 2018 price monitoring report on airports, the ACCC indicated that from 2008-2018, airport charges rose by 25% in real terms. Moreover, from 2003 - 2013, Sydney airport managed to avoid paying any corporate tax despite earing $8 billion Aus. in revenues. Lack of taxable profits were achieved by

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Table 1: Chronological summary of the evolution of airports in Canada

1987	Government releases *A Future Framework for the Management of Airports in Canada* signaling its interest in transferring airports to 'local interested parties'.
1989	Government publishes *Supplementary principles for the creation and operation of local airport authorities*
1992	The first four LAAs are established: Vancouver, Edmonton, Calgary and Montreal.
1994	The *National Airports Policy* (NAP) is introduced: establishes *Canadian Airport Authorities*
1996	Toronto Pearson, transferred to the Greater Toronto Airport Authority (GTAA).
1997-98	Ottawa, Thunder Bay, Victoria and Winnipeg airports are transferred to CAAs. Transport Canada renegotiates lease agreements with Vancouver Edmonton, Calgary, and Toronto.
2000	The five-year review of lease agreements by Transport Canada is completed. A report entitled *LAA Lease Review Consultation Report*, dated April 1999 is published by Transport Canada. The Auditor General's report critical of Transport Canada's overseeing of the airport system and in particular the transfer of airports to CAAs.
2003	Transport Canada drafts legislation on airport governance and economic policy; introduced as Bill C-27. The Bill dies on the order paper (Due to federal election in 2004). Transport Canada begins a review of National Airport System (NAS) airport rents.
2005	The NAS rent review process is completed and a new rent formula is implemented as a progressive percentage of airport general revenues. Airports with gross revenues over $250 million to pay ground rent equal to 12% of gross revenue.
2006	Legislation on airport governance and economic policy reintroduced as Bill C-20. The Bill dies on the order paper (due to federal election in 2008).
2012, 2013	Gill (2012) reports some 5 million Canadian passengers annually depart from US airports close to the Canadian border in order to avoid high-priced Canadian airports. A report to the Senate Standing committee on Transport and Communication (Dawson, 2012) recommends the end of airport ground rents and that Transport Canada transfer federally owned airports to the airport authorities that operate them.
2014	The Institute for Governance of Private and Public Organizations (2014) recommends the federal government offer provinces and municipalities the opportunity to acquire the real estate assets and equipment of Canadian airports. Canadian Transportation Act Review (CTAR) launched
2016	Report of the CTAR panel – the 'Emmerson Report' (Government of Canada, 2016) published. The Emmerson Report recommends the sale of airports to private investors along with oversight of airports via 'light-handed' regulation and price monitoring. Federal government engages Credit Suisse to provide financial advice on airport sales
2017	Federal government via the Canada Development Investment Corp. contracts with Price-Waterhouse Cooper to provide ongoing analysis pertaining to the potential or actual sale of Canadian airports to private investors.
2018	Federal government announces that it has no plans to sell Canadian airports.

retaining high debt levels while private investors were rewarded via 'stapled securities' in which shareholders in the airport also became creditors entitled to interest payments on the airport's debt.

In Canada, following two years of private consulting advice and deliberation, in 2018 the Canadian federal government announced that it had no plans to sell Canada's airports. Since that time there have been no other major changes in airport legislation or policy, leaving all previous criticisms of the Canadian airport system intact. By announcing no plans to sell airports, the Canadian government has postponed any imminent change in governance structure, but has not rejected the possibility of a future change. The goal of this paper is to create a (relatively) simple economic model with which to compare the decisions and impacts of an NFP airport with those of a FP airport in an environment where production technology, costs and demand conditions are common to each governance model. While this theoretical approach may

abstract from some realities, it has the advantage of generating a controlled comparison of governance structures that is difficult if not impossible to make empirically due to the many heterogeneous characteristics exhibited by airports and their market circumstances. The analysis may thus provide a better understanding of the role of governance in any options the Canadian government might consider in future reforms of the national airport system.

2 A dual-till model of airport operations

A defining feature of modern airport operations are the dual revenue tills of airside and landside operations. In its airside market, an airport interacts with airline customers, setting prices for airside services (runway, aircraft parking, gate services, terminal services, fueling, security etc.). In its landside market, the airport provides retail and other commercial services to passengers who pass through the airport.[i] There is demand complementarity between the airside and landside markets because a change in the number of passengers attracted to the airport changes the demand for retail businesses on the landside (Starkie, 2006; Morrison 2009). This aspect of airport operations is important in any assessment of alternative governance structures because pricing decisions on the airside impact landside demand, revenue and profits.

Consider the following model of a 'dual till' price-setting airport, in which the demand for non-aviation services is positively related to the number of airline passengers flowing through the airport, which in turn is a function of the number of air transport movements (ATMs). On the airside, let the demand for aeronautical services and facilities be represented by a simple linear inverse demand function: $p = \theta - q$ where p is the average airside price charged to airlines and q is the number of 'representative' ATMs with average passenger volume s. On the landside, we follow Kidokoro and Zhang (2017) in assuming that the airport faces a (linear) demand for homogeneous stores from commercial vendors, who lease retail space and offer products and services to those who visit the airport. Demand complementarity between airside and landside markets is captured by an inverse demand function for landside stores of the form: $r = \alpha + \beta(sq) - n$ where r is the rental price charged to the airport's retail customers, n represents the number of landside stores and β captures the strength of demand complementarity between airside and landside. We assume that on the airside, the airport incurs short-run fixed costs K and variable costs $k(q)$ with $k'(q) > 0; k''(q) \geq 0.$ In the long-run, for simplicity, we assume that the airside production function exhibits constant returns to scale with a constant long-run average cost (c). For ease of exposition, on the landside we normalize the airport's constant marginal cost of retail stores to be zero, with positive short-run fixed costs (F).

In the short-run, a FP airport with no capacity or regulatory constraints has the following objective function:

$$\max_{q,n} \Pi_{fp} = p(q)q + r(n,q)n - k(q) - K - F \cdot$$

In contrast, we assume that the objective of an NFP airport will embody preferences for wider economic benefits from airport activity in the regional economy as an increasing function of airside output. An NFP thus maximizes ATMs subject to a zero-profit constraint, given profits on the landside:

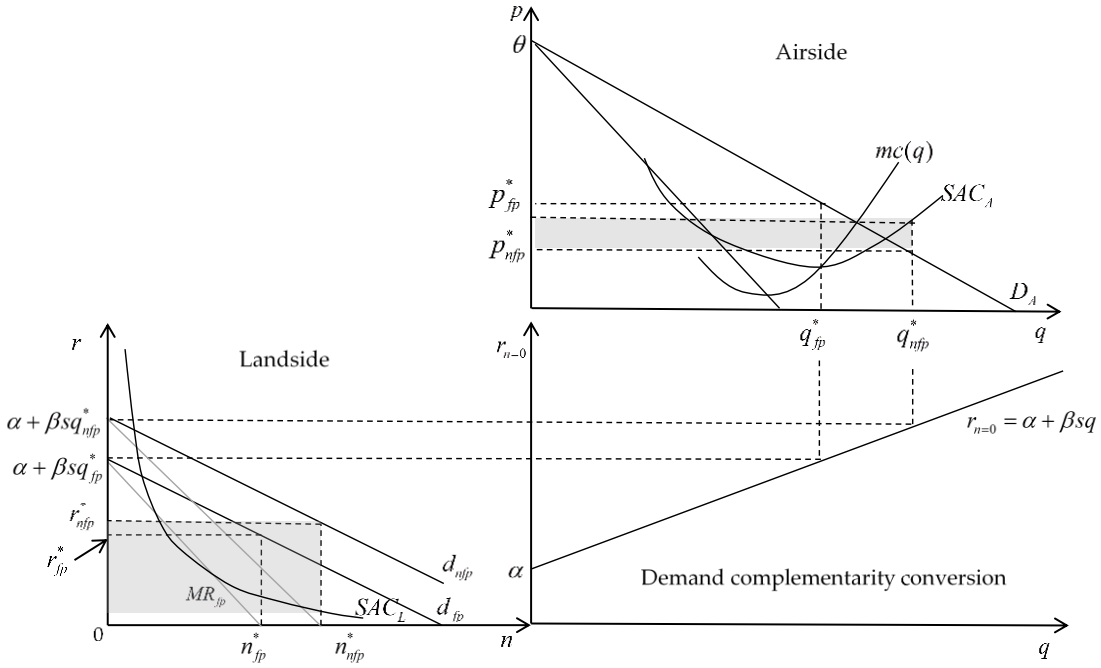
$$\max_{q,\lambda} \Pi_{nfp} = p(q)q - k(q) - K + \lambda\left(p(q)q + r^*(n,q)n^* - k(q) - K - F = 0\right)$$

$$where\ r^*(n,q)n^* = \frac{(\alpha + \beta sq)^2}{4}$$

For each type of airport, demand complementarity between the airside and landside has the effect of lowering the airside price that maximizes the airport's objective function. A lower airside price increases passenger volume which leads to an increase in demand for commercial stores and profit opportunities on the landside. In what follows we provide a graphical illustration of how each airport governance model performs under a variety of scenarios. We begin in Figure 1 with a comparison between the output and prices of a FP and an NFP airport in the short-run.

In Figure 1 below, each airport type faces the same demand for ATMs and has the same production technology and short-run costs. Complementarity between airside and landside is illustrated as a conversion process (bottom right-hand diagram) whereby airside output (q) is directly related to the vertical intercept of the demand for landside stores ($r_{n=0}$) via the conversion function: $r_{n=0} = \alpha + \beta sq$. In the case of a FP airport, profit maximization yields an airside price (p^*_{fp}) that is lower than would occur if demand complementarity was ignored (q^*_{fp} lies to the right of where marginal revenue equals marginal cost). The FP airport thus supresses the airside price to increase profits on the landside. A NFP airport also exploits demand complementarity but uses landside profits to cross-subsidize airside losses (shaded areas in Figure 1) in order to maximize ATMs. Thus, in the absence of capacity or regulatory constraints, in the short run an NFP airport that maximizes ATMs will exhibit a lower airside price and higher output compared to a FP airport along with higher land-side prices, output and profits.

Figure 1: Comparing FP and NFP airports in the short-run; no capacity or regulatory constraints.



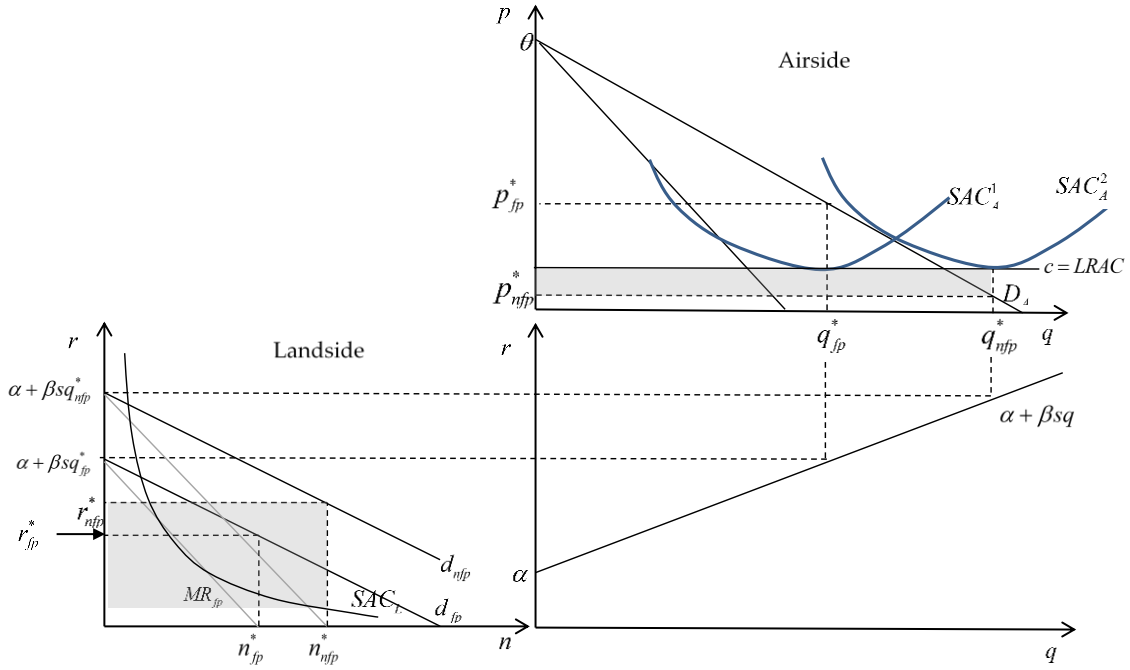
The consumer welfare effects of airports in this model are embedded in the consumer surplus generated in both airside and landside markets. In the former case, consumer surplus is enjoyed directly by airlines, while passengers benefit/suffer indirectly if airside prices impact air fares. The *extent* to which passengers benefit from lower airside prices at the airport will depend upon the existence and intensity of airline competition. However, in general we can expect a lowering of the airside price to lead to an increase of unspecified magnitude in passenger welfare.[ii] Consequently in the short-run, an NFP airport generates more airside consumer welfare than a FP airport. On the landside, commercial store owners benefit directly from lower rental rates and the extent to which this is passed on to landside customers depends on the competitive environment. Moreover, a comparison of landside consumer welfare between an FP and an NFP airport is complicated by the fact that an NFP airport will have a higher landside price (reducing consumer surplus) but more stores (which increases consumer surplus).[iii]

Figure 2 illustrates long-run decisions of FP and NFP airports by adding in a horizontal long-run average cost curve (c). The airside differences between airport governance models in the long-run is exacerbated by a lack of incentives for further expansion in capacity by a FP airport and by incentives for an NFP airport

to add capacity. In Figure 2, the position of the FP airport remains unchanged because marginal revenue (augmented by demand complementarity) is already equal to long-run marginal cost. For an NFP airport in the long-run, there is an incentive to invest in additional capacity in order to maximize ATMs such that the airside price falls below long-run marginal cost to create airside losses that are exactly offset by profits from a relatively larger number of stores on the landside.

Of course airports may face binding airside capacity constraints. Within the current model, capacity constraints may bind only on the NFP (between q^*_{fp} and q^*_{nfp}) or on both airports (to the left of q^*_{fp}). Figure 3 illustrates a capacity constraint that is binding on both airport types ($\overline{q} < q^*_{fp}$).

Figure 2: Comparing FP and NFP airports in the long-run; no capacity or regulatory constraints.



In response to the capacity constraint, an FP airport raises the airside price, however the constraint causes an NFP airport to lower prices in order to satisfy its non-profit constraint, given profits being generated on the landside. As a result, airlines and consumers benefit under an NFP governance structure relative to a FP one. One likely additional result of an airside capacity constraint is for the average size of aircraft represented by each ATM to increase resulting in an increase in average passenger volume (s) per ATM. In Figure 3, as passenger volumes rise despite the shortage of airside capacity, demand for retail stores shifts out from d_{s_0} to d_{s_1}. A FP airport takes full advantage of this by increasing landside stores and raising store rents to $r^*_{s_1}$. Note that even if landside capacity is constrained, a FP airport will raise the landside store price in order to maximize profits. However, an NFP airport might resist such actions as this would simply require even lower airside prices in order to meet the zero-profit constraint.

We now consider two scenarios that can bring the price and output decisions of each airport type closer together; (i) a binding price ceiling imposed (via regulation) on a FP airport and (ii) the imposition of an ad valorem ground rent tax on a NFP airport. Figure 4 shows the effect of a binding airside price constraint (as a result of single till price regulation) on a FP airport. Forcing a lower airside price on a FP airport results in an expansion in landside activity as higher ATMs generate additional passengers. In addition, the price ceiling may create incentives for a FP airport to invest in additional capacity.

Figure 3: FP and NFP airports under a binding capacity constraint.

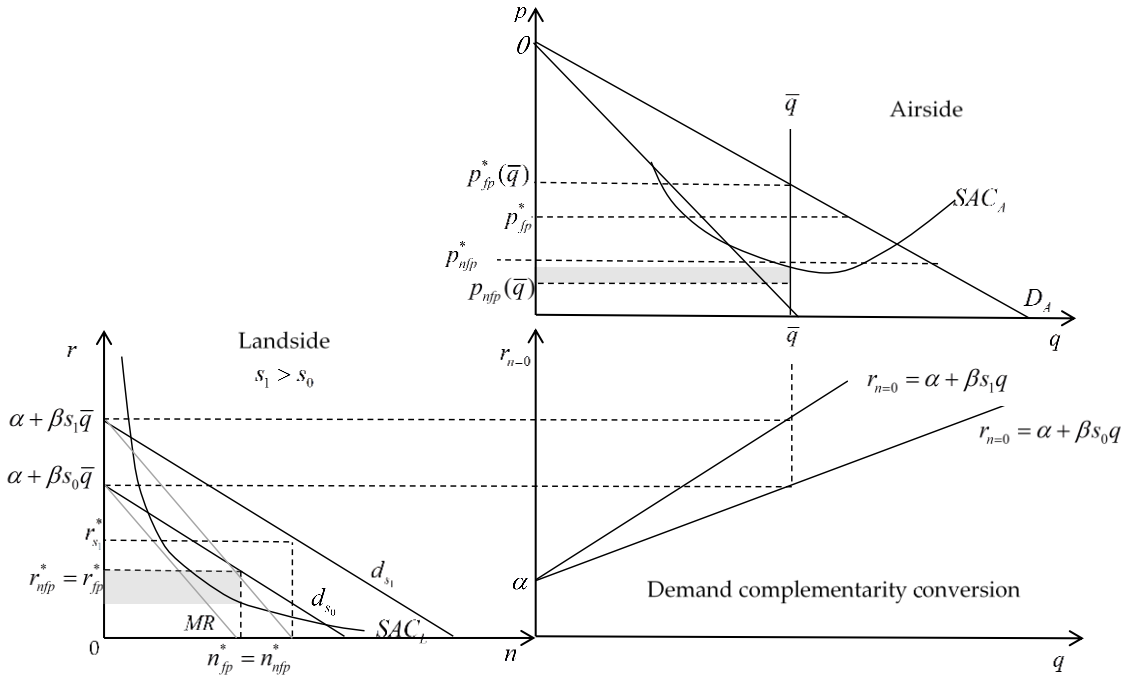
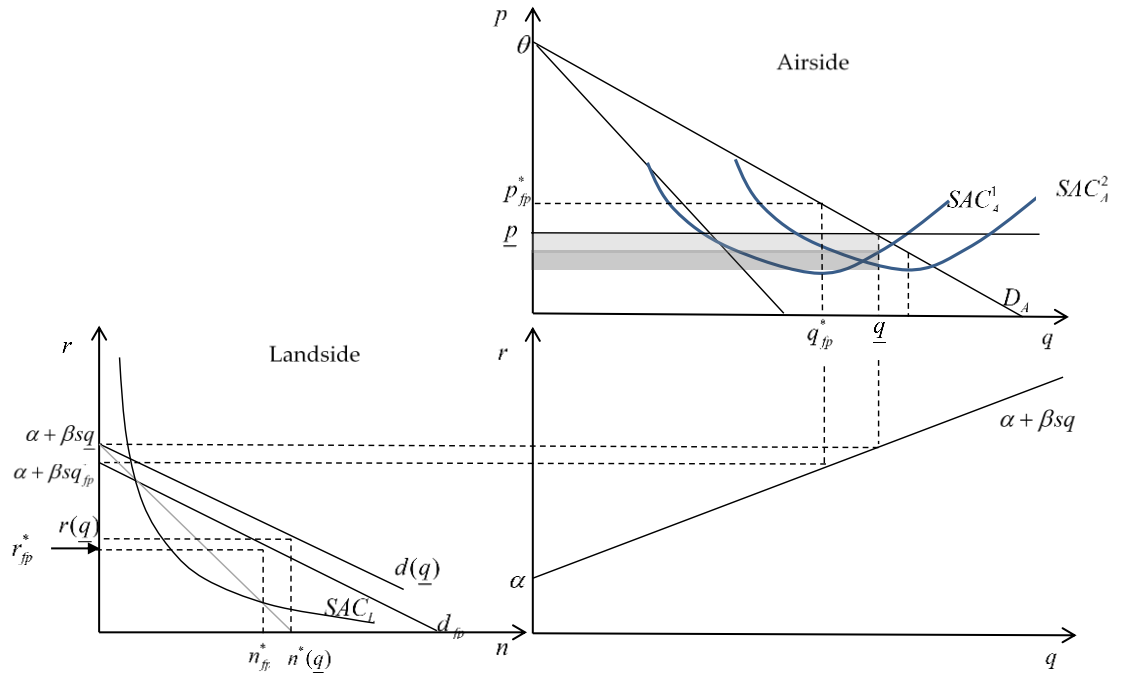


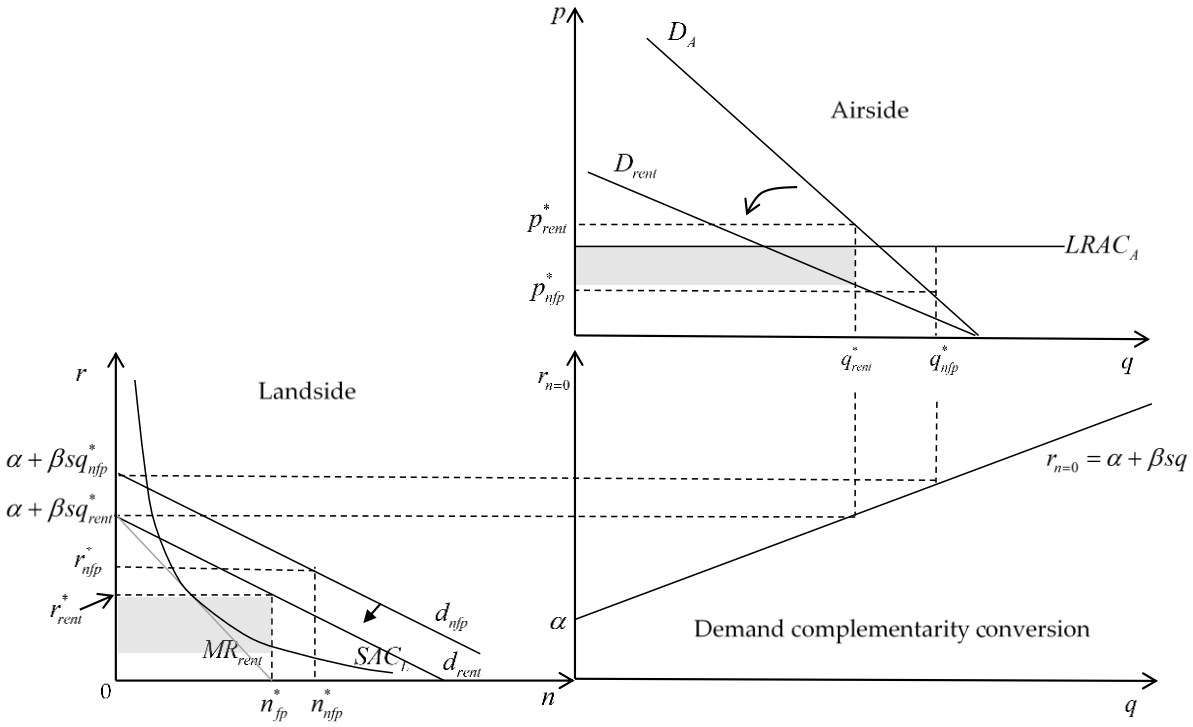
Figure 4: A FP airport under a binding airside price ceiling



Suppose in its current situation a FP has short-run average costs as depicted by SAC_A^1. If the airport is operating on the rising portion of SAC_A^1, it can increase its profits by investing in additional capacity and operating on the falling portion of SAC_A^1 as indicated by the dark shaded area in Figure 4.

In Figure 5, we show the effects of ground rent, implemented as an ad valorem tax on the revenues of an NFP airport. For ease of exposition, this is shown relative to the long-run average cost curve. Prior to the imposition of ground rent, the airport sets price p^*_{nfp} and develops n^*_{nfp} stores on the landside at price r^*_{nfp}. The effect of an ad valorem tax is to pivot in the demand curve so that D_{rent} represents the airport's after-tax average revenue curve. With less after-tax airside revenue, the airport must raise the airside price, an effect that is compounded by the associated reduction in demand on the landside (which reduces available profits with which to cross-subsidize airside activity). Consequently, ground rent raises the airside price and decreases landside activity and profits. The higher airside price has an adverse effect on the consumer welfare of airlines and passengers.

Figure 5: An NFP under an ad valorem ground rent tax



In summary the 'dual revenue till' model shows that in general, under identical demand and cost conditions, we should expect a NFP airport, set on maximizing ATMs, to generate more air traffic at lower airside prices compared to a FP airport. However, the imposition of a binding price ceiling (via regulation) on a FP airport and ground rent imposed as an ad valorem tax on a NFP airport will bring the distance between airside prices, air traffic volumes and landside activity for the two governance models closer together.

In the proceeding analysis there is no apparent economic disadvantage of the NFP governance model. On the contrary, the NFP governance model appears to provide lower airside prices, higher ATMs and the prospect of increased consumer welfare (either to airlines or passengers). In the longer term, the analysis shows NFP airports as more incentivized to add airside capacity.

One economic argument not included above that would reduce the attractiveness of the NFP governance model is the possibility of x-inefficiency and/or 'gold-plating' resulting in higher average costs than a FP airport. X-inefficiency (Liebenstein, 1979) might result in an NFP organization from a lack of well-defined objectives or from managerial slack in the absence of market (shareholder) pressure to perform and a board of directors with little or no public accountability. 'Gold-plating', (often associated with firms subject to rate-of-return regulation) is a tendency of firms with market power to overinvest in the quantity

or quality of assets when external accountability is defined in terms of cost recovery. By definition cost-recovery is embedded in the legal status of an NFP airport.[iv] In the model presented above, the presence of x-inefficiency and gold plating would shift up the cost curves for an NFP airport, resulting in a higher airside price, lower ATMs and a less activity on the landside. However, the available evidence on airport efficiency and governance structure does not support this. Oum et al (2006) and Oum et al (2008) utilize different methods to study the efficiency of a global panel of airports, including Canada's NFP airports. The results of both studies do not find NFP airports to be relatively inefficient and conclude that FP airports with majority government ownership and multi-level government-owned airports are least efficient.

While concerns about Canada's airport policy and the competitiveness, transparency and accountability of Canada's airports are unlikely to disappear, the analysis presented here does not suggest that governance structure is the root cause. A reasonable approach moving forward would be to consider legislative reforms that address these concerns while paying attention to the dual-till nature of airport operations and the wider economic benefits of air transportation that can flow from a NFP airport system.

3 References

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[i] Non-aviation commercial opportunities on airport land may also extend beyond retail services to passengers. See Morrison (2009) for example.

[ii] For example, if one assumes airlines compete in a Cournot oligopoly in which the airside price is a component of each airline's marginal cost, then a lowering of the airside price will shift out each airline's reaction function thereby lowering airfares in the Cournot equilibrium.

[iii] The larger number of stores increases consumer surplus as it is associated with an increased area under the demand curve for any given price. Additionally, more stores may increase product variety.

[iv] For example, Winston and Gines de Rus (2005) find evidence of both x-inefficiency and gold-plating at European airports that are subject to cost-based regulation.