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Excess Baggage:

*Measuring Air Transportation's
Fiscal Burden*

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In this issue...

The federal government should ensure that Canada's air transportation industry is taxed on a level playing field with other modes of travel, such as bus or rail, and with its international counterparts. The result would be a more internationally competitive airline sector, able to serve Canadian air travelers more efficiently and cheaply.

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The Study in Brief

Canadians and their governments tend to see the air transport sector as particularly important to the national economy: a heavy regulatory influence over the sector, as exemplified by foreign ownership limits on airlines, is one manifestation of this perception. Along with regulation, however, the sector is burdened with taxes and fees that are high, relative to other transport modes and industry sectors, and may threaten industry growth and firm survival.

This *Commentary* introduces a new and unique analysis, comparing the effective tax rates on airline costs in Canada with those in other sectors and in the United States. In Canada, the marginal effective tax rate on airline costs is 14.5 percent, compared to 10.6 percent for passenger rail, for example. Canadian airlines also face a heavier tax burden than their counterparts in the US: The effective tax rate on airline costs for domestic flights is 16.8 percent in Canada, compared to 12.0 percent in the US. For international flights, the effective tax rate is 11.2 percent in Canada, compared to 8.9 percent in the United States.

If the aviation sector is to be at its most productive in facilitating personal and commercial travel, tax policy changes are in order. This *Commentary* identifies sensible places to begin. Among them:

- reforming fuel taxes, which are problematic in their unequal application across provincial and international borders;
- balancing the government's airport security charge revenue with spending on security;
- revising the rent formula so that Canada's various airport authorities pay no more than the imputed rental value of the assets that they inherited from the government;
- reducing the air transport sector's effective tax rate relative to other sectors;
- launching a review of airline ownership restrictions, and a reconsideration of their role in the global economic environment.

The federal government should ensure that Canada's air transportation industry is taxed on a level playing field with other modes of travel, such as bus or rail, and with its international counterparts. The result would be a more internationally competitive airline sector, able to serve Canadian air travelers more efficiently and cheaply.

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Canadian air travelers had reason to be alarmed by the precedent. In July 2006, France introduced a “solidarity tax” on airline tickets to generate funds for social programs such as the fight against HIV/AIDs. Depending on the length of flight and the class of travel, this tax will cost passengers departing France up to \$52, thus raising as much as \$277 million annually. France has claimed that a further 18 countries will introduce similar taxes;¹ so far, four countries (Chile, Gabon, Ivory Coast and Mauritius) have followed France’s lead and others may do the same.

Canada has not yet agreed to the idea. This is commendable on two counts. First, there is no economic reason to burden the airline industry with a targeted tax, even if aimed at noble causes. Perhaps when air travel was largely restricted to the rich, such a luxury tax could fly. In today’s world, where low-cost carriers make the skies accessible to less well-off travelers, it would be a regressive tax, and could deter travel to developing countries, whose prosperity is increasingly dependent on global trade, commerce and tourism. Second, the fiscal burden on Canada’s air transport sector is already heavy with taxes and fees.

A comparative assessment of this tax burden, which we undertake in this paper, reveals that the current tax treatment of airlines is inequitable and inefficient. We argue that the federal government should recognize these shortfalls and revamp its air transport policy. Among the recommended reforms: fuel taxes, currently applied unevenly and inequitably across jurisdictions, should ideally be scrapped altogether, unless earmarked for either air infrastructure or environmental investment; airport security charges, which far surpass government spending on airport security, should be reduced to the point where the program breaks even; the rent formula under which airport authorities pay rent to the federal government should be revised so that they pay no more than the imputed “rental” value of their land and assets.

The goal is to ensure that this sector of the economy is taxed on a level playing field with other transportation modes domestically and other airline sectors internationally. This would be a small step toward making our airlines more competitive internationally and less vulnerable to the cyclical downturns inherent in the business. And it will be an especially crucial change if we are to seek a more liberal market for air travel with other countries, particularly the US.

The Economic Role of Canada’s Airline Industry

In 2005/06, the airline industry employed about 80,000 people in Canada and directly accounted for roughly 0.4 percent of GDP. While these numbers could be

* Ben Cherniavsky is an active equity analyst who holds no stock in Canadian airlines. The authors would like to thank: Finn Poschmann and research staff at the C.D. Howe Institute; numerous anonymous reviewers for their comments; as well as Duanjie Chen (George Weston Tax Analyst at the Institute) for her invaluable contribution to our analysis. We especially thank the many organizations that graciously shared data.

1 They are Brazil, Cambodia, Cameroon, Chile, Congo, Cyprus, Gabon, Guinea, Ivory Coast, Jordan, Luxembourg, Madagascar, Mali, Mauritius, Nicaragua, Norway, South Korea and the United Kingdom. Norway and the UK have since decided against introducing new solidarity taxes (instead deciding to contribute funds from already collected taxes).

considered small on a relative basis, it would be wrong to assume that the government need not make airline tax reform a high priority or that constructive change would benefit only a narrow sector of the economy. First, a significant amount (38 percent) of the revenue that the government collects from this industry comes from taxes that are levied on ticket sales. Relief on this front would benefit the passengers — over 63 million of them in 2005 — who take flights every year in Canada.

Second, the Canadian airline industry exerts an indirect influence over the Canadian economy. Airports, for example, employ thousands of people and generate millions of dollars of revenue for their commercial tenants. The same can be said of their impact on hotels, taxis, travel agents, and other businesses that service air travellers.

There are also positive economic and social benefits associated with the airline industry that are hard to quantify. These include the countless transactions that are facilitated by air travel to business meetings, or the intangible personal pleasures that are associated with air travel for vacation, and visiting friends and relatives.

Notwithstanding difficulties in measuring the sector's economic importance, Canadians and their governments see air transport as an activity with national significance — as exemplified by Air Canada's legacy as a Crown corporation. Policymakers have also treated airlines as too big or too important to fail — as shown by attempts to prop up Canadian Airlines. And the government continues to protect the industry through other means. For example, foreigners are limited to owning no more than 25 percent of an airline domiciled in Canada, based on the notion that control over an airline is too important an economic and strategic lever to let slip into nonresident hands. Yet air transport is nonetheless burdened with taxes and fees that are high (relative to other sectors and transport modes) and may threaten industry growth and firm survival.

Although we focus here on the need for tax policy reform, ownership regulations also require review. They arguably do the airlines more harm than good, by creating a fragmented industry that does not manage growth well or perform effectively through market downturns. With its enormous capital requirements, generally mature market, and global operations, it is difficult to imagine a business more suited for worldwide consolidation. Yet, despite the airlines' role in facilitating globalization, government policy has limited the sector's ability to fully participate in it.

While sectoral cyclicity will continue to challenge aviation, as any other sector, government policy should not contribute to its instability. Attention to aviation's tax burden and dropping existing ownership restrictions are sensible places to start. The federal government should also ensure that aviation is not hobbled by special rules and taxes not borne by other industries or modes of transportation.

Canada's Aviation Tax Burden

Last year, the federal, provincial and municipal governments collected roughly \$1 billion in revenue from the air transportation industry in Canada. This money came from taxes and fees that are levied on airports, commercial carriers or

Table 1: *Summary of Canadian Air Transportation Taxes and User Fees on Domestic Air Travel*

<u>Tax/User Fees</u>	<u>Amount</u>	<u>Rationale</u>		
<u>Input Taxes on Domestic Air Travel</u>			<u>Percent Tax</u>	<u>Equivalent US Fee</u>
Airport Rent	Calculated as a percentage of revenue generated at each airport	Compensates the government for bequeathed airport assets and land and foregone revenue	Average of 24% of airport costs	0%
Federal Fuel Tax (using 2004 market prices)	4 cents/litre	Formerly to finance air infrastructure, reduce consumption and generate revenue	9.5%	3.9%
Provincial Fuel Tax	0.7 cents/litre — 3.5 cents/litre	generate revenue, reduce consumption	Average of 5.2%	Average of 5.4%
<u>Output (Ticket) Taxes and User Fees on Domestic Air Travel</u>			<u>Percentage of Base Fare</u>	
NAV Canada	\$9, \$15 or \$20 depending on the distance flown	Remitted to NAV Canada for air navigation costs	13.0%	11.7%
Airport Improvement Fee	Up to \$15 per departure	Levied by airports to pay for future capital expansion	12.5%	5.0%
Air Travelers Security Charge	\$4.67 on domestically, \$7.94 on transborder, \$17 overseas	Levied by the federal government for security costs	4.3%	3.0%
GST	6% GST levied on the base fare and all of the above user fees and taxes.	Sales tax applied to all flights within continental North America	8.0%	0%

Sources: Air Canada, Air Transat, Transport Canada, airport authority annual reports, NAV Canada, Department of Finance, authors' calculations.

passengers at various points in the value chain. Individually, each tax serves a defined purpose, and some — such as the \$4.67 security surcharge for domestic travel — are relatively innocuous. Collectively, however, they add up to a very large number, especially when it is compared to the \$282 million of combined profit that the industry's three dominant players, Air Canada, Jazz and WestJet, reported in 2005.

The following is a list of the different avenues through which the government and other agencies collect revenue from air transportation and a brief analysis of their respective rationales. This list excludes taxes of general application — such as payroll, corporate income taxes, capital taxes, etc. — that are levied on most industries in Canada. We also focus on taxes related to passenger transportation, leaving aside, for this report, the increasingly important air cargo sector (see Table 1).

Airports and Ground Rent

Canada's largest airports are operated by autonomous airport authorities that took over the operation and financing of various airports from Transport Canada during the 1990s, creating the National Airport System. All airport authorities are non-profit, non-share corporations. They pay what is called ground rent to the federal government for the right to operate airport facilities on federally owned land. The government gave these facilities, built by Transport Canada, to airport authorities at no upfront cost, with rent payments intended to compensate Ottawa for foregone revenue, investments and land costs. Airport land values have never been precisely assessed, casting doubt on the currently appropriate rent.

In May of 2005, then-minister-of-transport Jean Lapierre announced a ground rent formula for Canadian airports to replace the prior formula based on passenger throughput. The new rent formula is calculated using gross revenue and is graduated by the level of revenue.² Most large airports now pay an incremental rate of 8, 10 or 12 percent of total revenue to the government, with Toronto Pearson, Vancouver and Montreal in the 12 percent bracket.

The formula is problematic because of the vicious circle it creates for airports. If rent is calculated as a percent of revenue, then the price of every aeronautical service an airport provides must be marked up by at least the amount of rent charged. This, in turn, increases the airport's break-even point and raises the amount of revenue that must be generated. Suppose that the operating cost of maintaining parking facilities at an airport is \$250 a day: the airport must charge parking fees that will generate daily revenues of at least that much in order to break even. However, if the airport must pay 10 percent of all its revenues in rent, then the airport's rent will equal \$25 a day, which effectively raises the operation's costs and, in turn, increases its break-even point by \$25 to \$275 a day of revenue. If the airport generated \$275 a day from parking services, its rent would increase to \$27.50 and, again, its operating costs and break-even point would rise.³

Another flaw in the current rent formula is that it fails the test of economic efficiency: there is no connection between the amount of airport rent paid and the imputed rental value (opportunity cost) of the bequeathed government assets and land. Indeed, under the current formula, the highest amount of rent is charged against the airports that have expanded the most since facility ownership was transferred to them.

At most airports, federal ground rent as a percentage of airport expenses has been in general decline over the last few years. Average rents have declined from nearly 40 percent of operating and interest expenses in 1999 to less than 25 percent in 2005. This is not to say that airport rents have been declining in absolute terms.

2 Zero percent on the first \$5 million, 1 percent on the next \$5 million, 5 percent on the next \$15 million, 8 percent on the next \$75 million, 10 percent on the next \$150 million and 12 percent on any amount over \$250 million. This new formula is being phased in gradually with full implementation to occur in 2010. Source: Transport Canada, <http://www.tc.gc.ca/mediaroom/releases/nat/2005/05-h098e.htm#bg2>

3 The formula is $x' = x / (1 - x)$ where x is the rent rate on revenues and x' is the effective rate on operating costs. A 12 percent statutory rate tax on revenue becomes a 13.6 percent tax on revenue to cover operating costs and a 10 percent rate becomes 11.1 percent.

Table 2: *Compiled Financial Data for Eight Major Canadian Airports, 1998–2005*

	2005	2004	2003	2002	2001	2000	1999	1998
	<i>C\$ millions, except as indicated</i>							
Total Operating and Interest Costs (excluding rent)	1,262	1,125	974	786	733	635	562	524
Total Rent Paid to Transport Canada	303	275	248	253	249	241	222	195
Total Aeronautical Revenue Collected	898	790	638	566	541	515	458	418
Total Airport Improvement Fee Revenue Collected	472	386	320	294	225	164	192	115
Total Other Revenue	602	561	524	502	518	491	446	420
System Wide Number of Passengers	64	60	55	54	57	60	59	57
Rent Per Passenger (Total Rent Paid/ Number of Passengers)	4.75	4.57	4.53	4.66	4.38	4.01	3.78	3.43
Rent as Percentage of Operating and Interest Costs	24%	24%	25%	32%	34%	38%	39%	37%

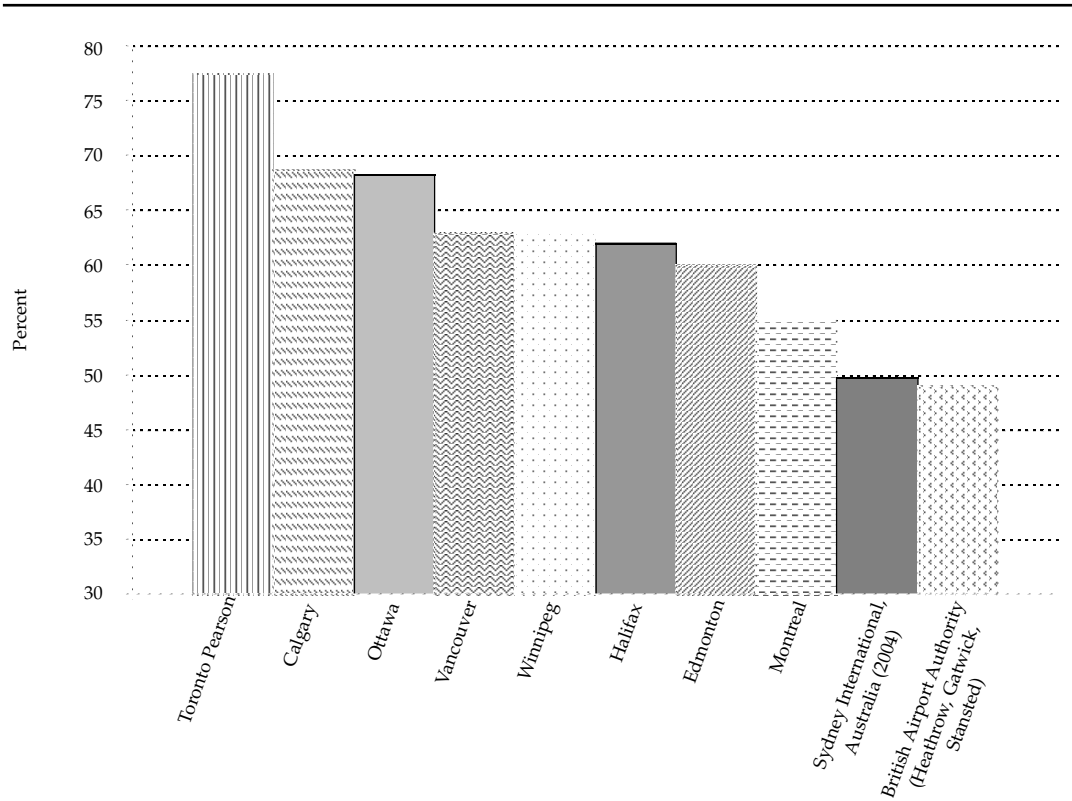
Sources: Airport financial data from airport authority annual reports, passenger data from Transport Canada.

In fact, the amount of rent paid has grown faster than passenger travel, which was the previous basis for calculating rent. Federal ground rent has declined as a share of airport costs owing to the rapid rise of airport operating and interest expenses, which grew 61 percent between 2002 and 2005 (or 141 percent from 1998 through 2005). Rent per passenger reached a new high in 2005, at \$4.75 per passenger flight (see Table 2).

As the new rent formula is a tax on revenue, it affects airports' incentives to seek additional revenue sources, because the airport must charge higher rates to cover any rent due from a new source of revenue. It is easier for Canadian airports to increase rates for airlines and passengers, because airports have some locational monopoly power over landing slots, rather than on revenues from sales of goods and services available outside of airport precincts. The rent formula thus increases an airport's incentives to use its monopoly power over airlines relative to other airport tenants. Revenue sources other than landing or improvement fees make up 36 percent of total airport revenues for the median airport in Canada (see Figure 1), whereas they are more than 50 percent at airports in Asia, Europe and the United States (Graham 2003).

Since Canada's airport authorities are not-for-profit entities, they pay no corporate income tax and instead pay ground rent to the federal government. However, unlike the rent formula, the corporate income tax permits companies to deduct interest expenses from their taxable earnings, which reduces the effective cost of borrowing. A corporation with a relatively high debt-to-asset ratio will have a lower effective tax rate, because of interest deductibility and the tax

Figure 1: *Aeronautical Fees and Airport Improvement Fees as a Percentage of Total Airport Revenues (2005)*



Source: Airport authority annual reports.

deduction for asset depreciation. Hence, a corporation wanting to expand often finds that debt financing is its lowest cost source of capital, net of taxes. The airport rent formula takes no account of asset depreciation or airport authorities' need to borrow to finance the investments that would increase passenger services, flows and revenue. The rent formula thus increases the effective after-tax cost of debt by requiring rent payments on the revenue collected to cover interest expenses.

Therefore, the most important implication of the new rent formula is arguably how it affects airports' capital spending decisions. For example, to provide the immediate funding for building and operating facilities, Toronto Pearson borrowed substantially, whereas most other Canadian airports maintained relatively light debt loads by paying for improvements with pay-as-you-go airport improvement fees. Building a capital base to finance expansion exclusively with retained earnings, however, takes many years and may thus postpone necessary investments (Tretheway 2000).

A further cost to Toronto Pearson, specifically, was that it was required to spend over \$700 million to purchase Terminal 3; the only privately built-for-profit terminal in Canada and the only facility for which an airport authority had to pay.

Toronto Pearson paid for the terminal and continues to pay rent on the revenue generated to cover the debt service charge of the original purchase. Toronto Pearson has undergone the largest, and by far most expensive, expansion and redevelopment of any airport in Canada — while facing a difficult tax environment. As other airports contemplate large expansion projects that depend on borrowed funds,⁴ rather than pay-as-you-go airport improvement fee financing, they too must anticipate a high effective financing cost. Meanwhile, ownership of improved facilities will revert to the federal government when their operational leases end. Whereas debt financing is the only source of external capital available to large Canadian airports, many European airports have been privatized as for-profit corporations, thus enabling them to finance expansion through new infusions of equity. In the US, airports are managed by government bodies and benefit from tax exemptions on municipal bond issues, allowing them to borrow at relatively low cost. In 2005, US airports also received \$3 billion in government funding from fuel and ticket taxes.

Fuel Taxes

Taxes were first introduced on aviation gasoline during the 1970s, during which time the federal government operated and financed Air Canada and all aviation infrastructure. Jet fuel taxes were initially an indirect way of having users pay the costs of airports and navigational facilities; however, during the mid-1980s federal jet fuel taxes were increased as a deficit-fighting tool.

Currently, all the provinces and the federal government levy excise taxes on aviation jet fuel ranging from 0.7 cents per litre in some provinces to 4.0 cents per litre federally, although federal and some provincial taxes do not apply on international flights. The effective rate of tax on fuel is dependent on the market price of fuel, which has nearly doubled in the last four years, resulting in a halving of the effective tax rate (see Table 3).

The wide variation in fuel taxes and differences in exemptions have a number of impacts. Firstly, provinces without fuel tax exemptions on international flights are less attractive to carriers connecting to international destinations. Secondly, airlines have an incentive to practice fuel arbitrage between provinces, known in the industry as “tankerage.” For example, a plane going from Calgary to Regina will fill up with as much fuel as possible in Calgary to reduce the amount of fuel it needs to take on in Regina, where the cost of filling up the tank is higher.⁵ Notwithstanding the fact that aircraft carrying extra fuel will, in turn, burn more fuel, because of the added weight, airlines will tank fuel if the price difference between provinces is sufficient to justify the cost of burning more fuel. The result is an economic distortion — wasted fuel, and more environmentally harmful exhaust.

4 For example, Vancouver Airport has a \$1 billion capital program to meet the increased passenger flows expected from the 2010 Winter Olympics.

5 Of course, provincial governments with higher tax rates on fuel may lose revenue to provinces with lower taxes, as planes will avoid fuelling up in high-tax provinces if they have the operational flexibility to do so.

Table 3: *Effective Fuel Tax Rate by Province on Domestic and International Fuel, 2004*

Province (Federal and Provincial Tax)	Tax Rate on Domestic Flights	Tax Rate on International Flights
	<i>percent</i>	
British Columbia	14.2	4.7
Alberta	13.0	0.0
Saskatchewan	17.8	8.3
Manitoba	17.1	7.6
Ontario	15.9	6.4
Quebec	16.6	0.0
New Brunswick	15.4	0.0
Prince Edward Island	11.1	1.7
Nova Scotia	11.6	2.1
Newfoundland	11.1	0.0
Federal Tax Only	9.5	0.0
Canada Average	14.7	4.3
US Federal Tax Only	3.9	0.0
US Federal and State Tax ^a	9.2	0.0

Note: ^a On state fuel taxes, exemptions on out of state fuel usage and caps on tax collected per carrier in certain states are not included; 9.2 percent is thus likely an overestimation of the true fuel tax burden.

Sources: Air Canada, Air Transat, Transport Canada, US Bureau of Transportation Statistics, US Air Transport Association, authors' calculations.

At present, the federal government provides very little aviation infrastructure, with most airports and all navigation services operated and funded by private authorities. Provinces provide no aviation infrastructure, and provincial fuel tax flows into general revenue. Governments have no justification, currently, for these taxes.

One potential, and increasingly popular, rationale for the jet fuel tax would be that it addresses the environmental externality of greenhouse gas emissions from airplanes, which is by many measures a worse pollutant than road or rail travel (CE Delft 2004). Although this argument has some merit, there are alternative – and potentially, more effective – tools to tackle the environmental externality of jet fuel. One idea is the introduction of an emission trading system, which will be discussed later in this report.

There are several identifiable flaws with fuel taxes that are designed to reduce emissions and improve the environment. The first is that they ignore the fact that, in the current high energy-price environment, airlines already have strong incentives to minimize fuel consumption: for most airlines, jet fuel is the largest single cost component (ATA 2006).⁶ Examples of reducing weight to marginally reduce fuel consumption include stripping paint off aircraft, removing pillows and blankets, or replacing wine bottles with paper boxes. Second, akin to the solidarity tax, they are arguably regressive. Third, the longer-term solution for airlines wishing to reduce their fuel consumption, and thus emissions, is for them to

⁶ Labour has previously been the highest cost component of passenger travel.

purchase new aircraft with more efficient engines, which fuel taxes make more difficult to finance.

US fuel taxes are important in comparing tax burdens. At a combined rate of 9.2 percent, fuel taxes in the US are levied at a lower rate on domestic fuel than in Canada. Also, US federal jet fuel taxes are apportioned to the Airport and Airways Trust Fund, which finances air traffic control, airport improvements, and other aviation related infrastructure.⁷

Airlines that service the US and Canada are able to fuel their Canada-bound planes tax-free in the US. This creates an incentive for aircraft departing from US airports with tax-free fuel on board to continue on to Canadian destinations using their low-priced fuel. Should American carriers be given the right to fly directly between two Canadian cities, they would be able to take advantage of this tax exemption in the US, while Canadian carriers operating domestically would be at a cost disadvantage. Alternatively, if the entire North American market were opened to service by US and Canadian airlines, the incentives to tank fuel between jurisdictions would be greatly exacerbated, given the current patchwork of fuel tax exemptions on transborder flights.

Ticket Charges:

Infrastructure and Security Fees, and Sales Taxes

Until 1998, the federal government collected a tax on all tickets to fund air infrastructure. This charge has been removed and private organizations, such as NAV Canada and airports, levy specific charges on tickets to pay for aviation infrastructure. Table 1 shows the rates charged as well as other fee examples based on a sampling of airfares conducted by the authors.

NAV Canada: NAV Canada operates the airspace and navigation system over Canada, effectively the “highways of the sky.” NAV Canada purchased its navigational equipment from the federal government and receives no operating subsidy. Surcharges levied on passenger tickets help airlines pay for NAV Canada operations.⁸ Air traffic control in the US also receives a sizeable subsidy from general government funds — US\$1.7 billion in 2004 — to cover the difference between operational revenues and costs of service provision (FAA 2005).⁹

Airport Improvement Fees: After corporatization, airports began levying user charges for passengers departing airports to pay for infrastructure. In comparison to the equivalent charge in the US — the passenger facility charge — the Canadian fee is a much higher share of base fares, as noted previously. Airport improvement fees are used to pay for future capital expansion, but to link current payments with future investment suggests an intergenerational inequity, if the beneficiaries

7 Similar arrangements prevailed in Canada before the privatization of air transport infrastructure.

8 In contrast, provincial governments, through revenues from road fuel taxes, largely finance road infrastructure, such as intercity highways.

9 Subsidizing air traffic control from general revenues would make little economic sense if one believed that the benefits of air traffic control were internalized by the users of the system.

of future investments do not directly pay for *them*.

Security Charges: Before September 11, 2001, airports and airlines were responsible for airport security. An airline industry safe from terrorist attacks benefits passengers and the public at large. As the September 11 events showed, the negative effects of attacks on aviation security extend beyond aircraft and passengers themselves: aviation security generates a positive externality for society as a whole. A proper public finance policy would account for this externality by providing public funding for the provision of security so that those who benefit also contribute to the cost of provision. However, the Canadian Air Transport Security Authority (CATSA) has spent less than the amount collected from travelers through the Air Travelers Security Charge (ATSC) and projects air security spending to be cumulatively less than ATSC revenues through 2007 (Department of Finance 2006). An economically efficient funding framework would closely tie fees, security spending and its beneficiaries.

In the US, travelers and airlines partially fund security costs. In 2005, security fees totalled US\$2.2 billion, collected from the security fee on each ticket and from one levied directly on airlines, whereas the Transportation Security Administration (TSA) spent US\$4.5 billion on aviation security (TSA 2005).

As subsequent attacks in Madrid, London, and Mumbai (formerly Bombay) have shown, trains and buses are no less susceptible to terrorism than airplanes. However, bus and train passengers are not levied an additional charge to help pay for the costs of their security — even though the federal government spends approximately C\$50 million per year on road and rail safety and security, in addition to the recently announced security funding for urban transit and passenger rail.¹⁰ An allocatively efficient public finance regime would equate the share of benefits society received from security with the share of total costs paid by government.

As to the passenger fee itself, charging everyone the same amount per flight is less economically shrewd than other options, given that there is a straightforward way of establishing who is willing to pay more for convenience while not compromising security. A more efficient security system would permit passengers who have cleared a security check and paid a higher fee to bypass traditional security lines each time they travel. Among the potential benefits: this would remove low-risk security threats from the screening process, freeing resources for inspecting higher risk passengers. The revenue generated from higher paying passengers could reduce (or eliminate) the amount paid by other passengers. It would also be a self-selective process, differentiating between high- and low-risk passengers, rather than selective screening of those who may or may not be higher risk. Such a system is being enacted in the US at a number of airports.¹¹

Paradoxically, the ATSC may have led to more passenger deaths than it has potentially saved by deterring terrorist attacks. The security fee encourages people

10 Transport Canada recently announced \$37 million for urban transit, with a total of \$254 million to be spent on transportation security: <http://www.tc.gc.ca/mediaroom/releases/nat/2006/06-h138e.htm>.

11 Such an example is the "Clear" program in place at Orlando International Airport, and soon to be implemented in Cincinnati, Indianapolis and San Jose. See <http://www.flyclear.com/> for details.

to substitute more highway travel for the relative safety of air travel.¹² This is particularly acute on short-haul leisure flights where passengers are most price sensitive, where road alternatives are practical and where the security charge makes up a larger share of the base fare.¹³ Although it is impossible to say whether the increased security measures have successfully deterred any terrorist attacks, it would be ironic if a charge intended to improve passenger security has caused greater societal harm.

GST/HST/QST: The GST applies to the base travel fare, insurance surcharges, airport improvement fees, as well as to the ATSC and NAVCAN surcharge. From the same sample of fares, the total GST collected represents an average of 8 percent of the base fare. Travelers in Quebec or the Atlantic Provinces face a greater cost than travelers from the rest of the country, as the other provinces do not apply PST on air travel. In contrast, state sales taxes in the US do not apply to any commercial flights as air travel is deemed interstate commerce.

Comparison with Other Sectors and Other Countries

The Marginal Effective Tax Rate Model

The long and varied list of taxes and fees complicates measuring the fiscal burden that Canada's airlines currently bear. These challenges notwithstanding, the marginal effective tax rate model is a useful tool for doing so. Its main advantage is that rather than simply measuring taxes paid as a percent of profit, the effective tax rate on marginal costs calculates what taxes an industry (or firm) incurs to produce one unit of output, in the form of tickets for passenger travel. Each input, meaning capital, labour and fuel, and facility charges in the case of airlines, has a specific marginal effective tax rate. The marginal effective tax rate reflects the increase in cost for each given input attributable to taxes on the last, or marginal, unit of transportation service produced. For example, if the cost of fuel is 50 cents/litre without taxes but is 60 cents/litre with taxes, the marginal effective tax rate on fuel is 20 percent $((60-50)/50 = 20)$.

The effective tax rate on marginal costs is a summary measure that weights the effective tax rate on each input by the share of each input¹⁴ in total costs; it is thus a function of the marginal effective tax rate on each input. For example, because

12 Although a direct comparison of highway and air travel safety is not possible, the evidence generally indicates that most types of air travel are safer than all but the safest types of highway travel (Barnett 1991).

13 The ATSC, as a share of base fares, is as high as 9 percent, based on the authors' calculations. Waters and Yu (2003) estimate that the increase in auto injuries is between 75 and 140 per year and that auto fatalities increased between 0.97 and 1.78 per year due to the initial extra cost of the ATSC using the initial \$24 round-trip security fee. As the security fee has declined (whether or not security delays and inconveniences have declined) the expected number of auto accidents attributable to diversion from air travel has declined.

14 We use a Cobb-Douglas marginal cost function (see Appendix for the equation form). The methodology follows McKenzie, Mintz and Scharf (1992) and a detailed description of the marginal effective tax model and the related methodology used in this report can be found in the Appendix.

labour in Canada tends to be taxed at a lower rate than capital or fuel, businesses that are relatively labour intensive will have a tax advantage over more capital and fuel intensive businesses — such as airlines. Using the effective tax rate on marginal costs to compare the tax burden on output between the airlines and other modes of passenger transportation — such as rail — is also relevant because both industries theoretically produce the same output (namely, moving people) with the same general inputs, albeit in different mixes. Ticket taxes are applied on the industry output (tickets), GST is incorporated into the model, and security charges are included for air transportation.¹⁵ NAV Canada and airport improvement fees are assumed to have benefits equal to the charge applied to tickets and are not included in the calculations.

The Effective Tax Rate on Marginal Costs for the Airline Industry

A sizeable discrepancy exists between the effective rates on airlines producing domestic travel versus international travel. Specifically, assuming that the input shares for domestic and international travel are the same, the effective tax rate on marginal costs for the former market is 16.8 percent while on the latter it is 11.2 percent. There are three main reasons for this difference: (i) airlines pay less fuel tax on flights headed for international destinations due to many exemptions; (ii) there is no federal or provincial sales tax applied to flights outside continental North America; and (iii) the higher base fares on international flights skews downward the proportional impact of the security surcharge (see Tables 4, 5 and 6).

Based on the split of the total number of passenger journeys in the domestic, transborder and international markets,¹⁶ we calculate a weighted average effective tax rate on marginal costs of 14.5 percent for the Canadian airline industry as a whole. In comparison, the effective tax rate on marginal costs for the oil and gas, manufacturing and retail industries are 5.9 percent, 13.1 percent and 12.4 percent respectively.¹⁷ There are three key reasons why the tax burden on the marginal cost of air travel is high. First is the taxes and fees that air travelers and airlines pay on tickets: the combined rate of the security fee and the GST is 12.4 percent of base fares on domestic travel and 11.7 percent for the industry as a whole (see Table 5). Second, the airline business is relatively capital and fuel intensive (recall that capital and fuel are taxed more heavily than labour). Finally, other capital-

15 ATSC is included in ticket tax calculations since we do not attempt to quantify the effective safety subsidy given to rail and bus passengers. Furthermore, including the ATSC on airline tickets is justified due to the federal government's surplus of revenues over costs for security and because airports were responsible for security prior to government control in 2002.

16 A more accurate measure of domestic, trans-border and international travel composition would be passenger-kilometres. However, data on the number of international and trans-border air travel passenger-kilometres are not readily available. For the comparative purposes of this paper, the tax measure of domestic air travel is most similar to other modes analyzed that are assumed to operate entirely in the confines of Canada.

17 Calculated using input shares from (McKenzie, Mansour and Brûlé 1998), capital tax rates from (Chen and Mintz 2005, 2006) and from labour tax rates calculated by the authors.

Table 4: *Marginal Effective Tax Rates and Cost Shares of Inputs by Mode*

	Cost Shares			
	Labour	Fuel	Capital	Facility Charges
	<i>percent</i>			
Intercity and Charter Bus	61.8	14.9	23.3	0.0
Passenger Rail	59.7	8.3	32.0	0.0
Passenger Air Travel	37.3	35.9	22.3	4.5
	Marginal Effective Tax Rate on Inputs			
	Labour	Fuel	Capital	Facility Charges
	<i>percent</i>			
Intercity and Charter Bus	8.7	30.3	47.7	0.0
Passenger Rail	7.1	28.7	28.6	0.0
Total Air Travel	7.4	9.4	27.4	24.0
Domestic Air Travel	7.4	14.7	27.4	24.0
International Air Travel	7.4	3.5	27.4	24.0

Sources: Authors' calculations from Transport Canada data and annual report, Airline and Airport Authority Annual Reports, Department of Finance, "Surface and Marine Transport," Statistics Canada, Catalogue 50-002, May 2005, "Rail in Canada," Statistics Canada, Catalogue 52-216, January 2006.

Table 5: *Marginal Effective Tax Rate on Outputs (Tickets)*

Rail	Bus	Total Air	Domestic Air	International Air
		<i>percent</i>		
6.0	6.0	11.7	12.4	3.9

Source: Authors' calculations from airline booking websites.

intensive sectors (such as resources) tend to have more favorable capital cost allowances, lowering the marginal effective tax rate on capital.

Intermodal Comparison

When compared to the effective tax rate on marginal costs on other modes of passenger transportation, the airlines are also at a distinct disadvantage. Specifically, the effective tax rate on marginal costs of producing passenger train travel is 10.6 percent. This captures the impact of the operating subsidy VIA Rail

Table 6: *Effective Tax Rate on Marginal Costs by Mode*

Rail	Bus (Gross of Fuel Tax Benefit)	Bus (Net of Fuel Tax Benefit)	Total Air	Domestic Air	International Air
<i>percent</i>					
10.6	21.1	16.2	14.5	16.8	11.2

Source: Authors' calculations from data in Tables 4 and 5.

receives from the federal government. However, even if that subsidy did not exist, the airlines would still have a higher effective tax rate on marginal costs. This is mainly due to two factors. First, ticket taxes on airline travel are higher than on rail travel. Second, a highly taxed input (fuel) makes up a far larger share of airline costs than it does for rail.

Notably, the effective tax rate on marginal costs on passenger bus transportation is even higher than for both air and rail travel. This reflects: (i) the higher fuel taxes on diesel fuel; (ii) the fact that bus companies pay a prorated sales tax in some provinces on the buses they purchase while aircraft purchases are exempt from sales taxes;¹⁸ and (iii) the capital cost allowances for buses are even less favorable than they are for aircraft. However, this calculation does not account for the implicit subsidy that bus travel receives by not directly paying for the infrastructure (highways) it uses. If fuel taxes paid by the bus industry are taken to be user fees that underwrite the cost of roads, then the effective net-of-benefits tax rate on diesel fuel is zero.¹⁹

On the other hand, air passengers pay directly for NAV Canada air navigation infrastructure and revenue from jet fuel taxes is not allocated to aviation infrastructure so, in our calculation, NAV Canada fees are not included in output taxes. If the road infrastructure subsidy implicitly available to the bus industry were taken into account, domestic air travel would show higher effective rates taxes on costs than rail or bus transportation.

US-Canada Comparison

Finally, there is a striking difference between the calculated effective tax rate on marginal costs on domestic air travel in Canada and domestic air travel in the United States. Specifically, the former (16.8 percent) is substantially higher than the latter (12.0 percent) for the following reasons:

¹⁸ Rail companies also pay some provincial sales taxes on rail cars and locomotives.

¹⁹ The total expenditure by all levels of government on road infrastructure in 2004 was approximately \$14 billion while total revenue from all vehicle fuel taxes and licences was also approximately \$14 billion. In 2005, total fuel tax revenues were less than the capital investment and maintenance expense on roads. Figures for revenues from vehicle licences are assumed to all be from land-based vehicles. Source: Transport Canada Annual Report.

Table 7: *Effective Tax Rate on Marginal Costs, US Air Transportation*

Domestic Air	Domestic Air (Net of Fuel Tax Benefits)	International Air
	<i>percent</i>	
12.0	10.5	8.9

Source: Authors' calculations from US Air Transport Association, US Bureau of Transportation Statistics, Canada (2005), Brazell and Mackie (2000).

- The US imposes lower fuel taxes on domestic flights;
- The US has lower ticket taxes and no sales tax on ticket purchases. In fact, their ticket and federal fuel "taxes" are effectively user fees that all go into financing the operations of air traffic control and airports. When incorporating the infrastructure paid for by fuel tax revenue, the net-of-benefits effective tax rate on marginal costs for US domestic air travel is 10.5 percent;
- The only ticket tax that is included in the calculation of the US domestic effective tax rate on marginal costs is the post-September 11 security fee, which makes up a lower percentage of the average base fare than the ATSC in Canada; and
- US airports pay no rent to the federal government, so no such tax is passed on to airlines. In fact, they are implicitly subsidized through tax-exempt municipal bonds issued by the governments that own the airports (see Table 7).

The gap between the two countries' effective tax rates on air travel narrows in the international arena. Travel abroad from the US is taxed at 8.9 percent, compared to 11.2 percent in Canada's case. Significant discrepancies, however, still exist. American travelers pay for the costs of immigration and customs services, and an international departure and arrival tax, whereas Canadian travelers only pay a slightly increased ATSC on international travel and no user charges for customs and immigration, as well as no GST. By charging international travelers less than the true cost for customs and immigration services and charging an only slightly higher ATSC for international flights, the Canadian government implicitly favours international over domestic travel.

It is beyond our scope to determine whether the effective tax rate on either domestic or international air travel in Canada is too high in an economic sense, or the respective US rates are too low, as this would require identifying true economic costs. What we can conclude, however, is that the playing field is not level and that these distortions need removing if the North American air travel market is to be fully liberated.

Two deregulations that Canadian officials have openly considered include cabotage (allowing foreign carriers to carry passengers on direct domestic routes) or a modified "sixth freedom" that would permit, for example, American operators to fly passengers from Toronto to Vancouver via an American airport

like Chicago. In the latter case, the current fiscal framework would offer an American airline with the competitive advantages of paying no fuel taxes, connecting in a lower cost American airport, and benefiting from the Canadian government's subsidization of customs and immigration costs.

Government Income (Subsidy) Per Passenger Journey

In addition to the effective tax rate on marginal costs calculation, we have measured the net government income from air transportation on a per passenger journey basis, to compare it to the passenger rail sector in Canada and with the aviation sector in other parts of the world.

Canada's aviation sector is again disadvantaged. In 2005, the combined levels of government collected a net \$4.95 per passenger journey from air travelers on industry specific charges, compared to the \$45.20 net subsidy per passenger journey on the rails.²⁰ While there may be political and/or social justifications for the government's more favourable treatment of rail over air passenger transportation, an intermodal bias of this magnitude may be hard to rationalize in purely economic terms, or in the context of tax neutrality specifically (see Table 8).

Two other disparities arise when this net income/subsidy per passenger journey analysis is extended to a comparison between Canada and other countries. The first is that in 2004 the Canadian government's net income from air transportation was higher than comparable countries such as France, Germany, and the US.²¹ The second disparity is that, with the exception of the US, rail passengers in Canada also received the largest net subsidy per journey of \$52.33 in 2004 (see Table 9).

Again, it lies beyond the scope of this paper to say what is the economically correct amount of money that the government should be collecting from (or giving to) each of these transportation modes. However, these differences comprise economic distortions that limit Canada's airlines in competing effectively in the international arena with other airlines and in domestic travel with rail. They also indicate the tax advantages that American carriers would enjoy if regulation permitted cabotage or modified sixth freedom rights. Finally, these numbers illuminate the magnitude of Canada's bias against air travel. Indeed, as far as we can determine, in no country other than the US is the gap between what the government gives to rail passengers and what it takes from (or gives to) air passengers wider than it is in Canada.

20 These figures do not include general taxes such as corporate income taxes or payroll taxes and focus on the industry specific charges for rail and air travel. Certain taxes, such as municipal payments in lieu of taxes (PILT) that airports pay have no equivalent in the rail industry. This per passenger accounting approach does not take into account the opportunity cost of government assets, such as airport land or CATSA capital equipment. However, the related cost of capital does not greatly detract from the overall conclusion because the opportunity cost of airport land is small in comparison to the overall balance (Gill 2005).

21 At the time of writing, 2005 numbers were not available for other countries.

Table 8: Revenue and Expenditures for Federal, Provincial and Local Governments by Mode of Passenger Transportation, 2004–2005

	Aviation		Via Rail	
	2005	2004	2005	2004
Government Revenue	<i>C\$ million</i>			
Fuel Excise Tax Collected by Federal Government	108.4 ^a	102.2	2.4 ^a	2.4
Fuel Excise Tax Collected by Provincial Governments	172.8 ^b	156.9 ^c	2.7 ^a	2.7
ATSC Charge collected by CATSA	383.0 ^b	409.6 ^c	0	0
Airport Rent Collected by Transport Canada	302.7	274.7	0	0
PILT to Local Governments (8 largest airports only)	87.9	79.6	0	0
Other Airport Fees	11.0	12.0	0	0
Aircraft Services Revenues	31.0	23.0	0	0
Total Government Revenue	1,096.8	1,057.9	5.1	5.1
Government Expenditures				
Operating Assistance	0	0	-169.0 ^d	-177.4 ^d
Aircraft Services	-65.0 ^b	-62.0 ^c	0	0
Airport/Rail Capital Assistance program	-30.6 ^b	-38.4 ^c	-7	-20.2
Air/Rail Safety and Policy	-173.0 ^b	-190.0 ^c	-20.6 ^b	-19.3 ^c
CATSA Operating and Capital Costs	-512.8 ^b	-351.4 ^c	0	0
Total Government Expenditures	-781.4	-641.8	-190.3	-216.9
Net Income	315.4	416.1	-185.2	-211.8
Total Passenger Journeys In Canada (million)	63.7	60.1	4.1	4.0
Net Income Per Passenger (C\$)	4.95	6.92	-45.20	-52.33

Notes: ^a Extrapolated using previous data and the rate of increase of total fuel consumption by mode from Transport Canada Fuel Data.

^b Data are for fiscal year 2004/2005.

^c Data are for fiscal year 2003/2004.

^d Includes subsidies to Via Rail only.

Source: Local airport authorities annual reports, Via Rail annual reports, Transport Canada annual reports, Transport Canada Provincial and Federal Fuel Tax Revenue Data, Rail in Canada Catalogue 52-216 and Gill (2005).

Table 9: *Net Government Revenue (Subsidy) Per Passenger Journey, 2004*

<i>Canadian dollars</i>		
<i>Canada</i>		
Passenger Rail (52.33)		Air Transportation 6.92
<i>United States</i>		
Passenger Rail (66.49)		Air Transportation (2.75)
<i>France</i>		
Passenger Rail (12.28)		Air Transportation (2.81)
<i>Germany</i>		
Passenger Rail (10.41)		Air Transportation 6.33
<i>United Kingdom</i>		
Passenger Rail (4.66)		Air Transportation 16.78

Notes: 2004 exchange rates: 1.30 Canadian dollars: 1 US dollar; 1.612 Canadian dollars: 1 euro. UK data quoted in euros in Smyth and Pearce (2005). US data are net balance of Airport and Airway Trust Fund and the net balance of the air travel component of the Transportation Security Administration 2004 budget.

Source: European data from Smyth and Pearce (2005). Canadian data from Transport Canada, Statistics Canada. US data from Amtrak annual reports; Federal Aviation Administration, Department of Homeland Security, Bureau of Transportation Statistics; a slightly different methodology is applied to 2002 data in BTS (2004); however, the conclusion of a net subsidy is the same.

Assessment and Recommendations

Based on our analysis, and in the interest of tax neutrality, simplicity, and efficiency, we urge the following measures with respect to taxation of the airline industry.

Fuel Taxes

Major reform of the jet fuel tax is needed. The federal government and the taxing provinces should harmonize their jet fuel tax rates and exemptions with other provinces and the US.²² This would reduce the incentive for airlines to “tanker” their fuel from low tax jurisdictions. An even better solution would be to eliminate fuel taxes altogether if, for environmental reasons, Canada was to move toward an emissions trading system that included airlines.²³

22 Keen and Strand (2006) argue that international coordination of fuel taxes is required. They argue that if the environmental externalities of fuel are dealt with through other means (such as through emissions trading) there is no economic justification for fuel taxes.

23 As highlighted most recently in “The Sky’s the Limit,” *The Economist*, June 10, 2006, 67-69) and as being currently implemented in the European Union, http://ec.europa.eu/environment/climat/aviation_en.htm

However, even if a trading system fails to materialize, there is a case for scrapping the fuel tax altogether unless it is earmarked specifically for either air infrastructure or environmentally friendly investments. One idea for the latter is to allow airlines to claim investment tax credits on the purchase of new, more fuel-efficient aircraft or other environmentally targeted aircraft enhancements. That said, targeted investment tax credits do have flaws, and it may be more efficient for airlines to participate in a carbon credit trading system.

Airport Security

A safe and secure aviation network is in the interest of society as a whole and, we argue, should therefore receive funding from general government revenues, much the same way that public money is provided for securing the country's ports and urban transit. Canada should also follow the US lead in implementing a security system to pre-clear registered travelers willing to pay for the convenience. This would lower the number of travelers who need to go through traditional government funded security lines, reducing wait times for other passengers and the amount spent on security. The revenue earned from travelers paying for this service, combined with some degree of government funding from general revenues, could contribute to the removal of the ATSC that everyone else pays. Removing low-risk, pre-cleared registered passengers from security lines will allow greater resources to be spent on higher risk passengers.

The overall goal should be to reduce costs for travelers not willing or able to spend the money, and to increase costs for travelers willing and able to spend for extra convenience. Indeed, even if the government stops short of subsidizing security and implementing the two-tiered system suggested above, it should at the very least reduce the ATSC to a point where the program breaks even — or it should increase spending on security such that wait times at airports are dramatically reduced.

Airport Rent

As a first step towards addressing the problems of Canada's airports, airport authorities should be able to deduct interest expenses and depreciation charges from the revenue used to calculate rent due. Without this provision, the rent formula does not recognize that different airport authorities were bequeathed facilities of different operational values at the time of corporatization and have thus needed to make varying levels of investment in their facilities.

If limitations are placed on airport fee setting, as proposed in the recent *Canada Airports Act*, airport authority credit ratings would likely be degraded, further raising the cost of borrowing for airport authorities. Allowing for interest deductibility in the rent formula would add the benefit of reducing the degree to which airports rely on airport improvement fees (and increasing their reliance on debt) as a means of funding expansions. This would facilitate lower ticket surcharges for passengers (see below). However, we recommend the government go further, and revise the rent formula so that Canada's various airport authorities

pay no more than the true imputed “rental” value of the land and assets that they inherited from the government many years ago.

Ticket Taxes and the “Solidarity” Charge

The GST should not bear on the non-benefit-related fees that governments impose. Furthermore, it would be unproductive for Canada to join the group of nations levying an additional ticket tax on travel to finance development aid; this tax is arguably regressive and cannot be justified in economic terms.

Capital Cost Allowances

Although we have identified less favourable capital cost allowances as one reason for the airline industry’s high effective tax rate relative to other transportation modes and other industries (such as resources), we stop short of recommending that these rates be lowered for aircraft. The current CCA rate for aircraft is a close match to the asset class’ economic depreciation rate. What should be considered — although we do not explore it here — is a review of CCA rates for all transport and related industries to ensure they are in line with economic depreciation rates, so that tax neutrality can be achieved.

Improving Air Transportation Competitiveness

Overall, in terms of government income (or subsidy) per passenger, Canada’s aviation sector is disadvantaged compared with its international counterparts, and with other transportation modes at home. These differences comprise economic distortions that limit Canada’s airlines in competing effectively. In reviewing Canadian tax and subsidy policy toward all sectors, the overarching goal, from the efficiency perspective, should be intermodal tax neutrality.

Too Heavy For Take-off:

Reducing Air Transportation’s Fiscal Burden

One final limitation of this report’s scope is that it precludes an estimation of how much the aforementioned recommendations will cost the government to implement. What we do know, however, is that the suggested policy changes will have a number of effects on relative effective tax rates between the airline industry and other modes of transportation, and that they will improve economic efficiency.

For example, increasing the amount that frequent flyers pay for security through a registered traveler security plan will increase the effective tax rate on travelers who have a low level of modal substitutability. Meanwhile, decreasing the charge for non-registered travelers will decrease the tax rate on travelers who are easily able to substitute other travel modes. As an exercise in estimating the impact of a registered traveler program, tripling the ATSC (as a proxy for the cost of registering for the program) would increase the effective tax rate on marginal

costs for domestic air travel to 18.2 percent, while cutting it by one-third would reduce the rate to 16.5 percent. Travelers would expose themselves to the higher effective tax rate if their economic circumstances made it advantageous to use the program. This would improve the economic efficiency of the fee structure by levying higher taxes on those whose demand for air travel was relatively inelastic.

The effective tax on Canada's airlines would also be reduced if the revenue generated from fuel taxes was reinvested in programs or infrastructure that benefited travelers or airlines. If the net-of-benefits airline fuel tax rate was zero (as with federal fuel taxes in the US and for the Canadian bus industry) then the effective tax rate on marginal costs for domestic air travel in Canada would be approximately 10.6 percent, the same as for rail industry and similar to the rate on the US airline industry.

Conclusion

The fiscal framework confronting the airline sector is harsh with respect to an industry that many observers believe to be particularly important to Canada's economy. If the aviation sector is to be at its most productive in facilitating personal and commercial travel, a revamp of taxation policy is required.

We have identified sensible places to begin. Among them: reforming fuel taxes, which are problematic in their unequal application across provincial and international borders; balancing the government's airport security-charge revenue with spending on security; revising the rent formula so that Canada's various airport authorities pay no more than the imputed rental value of the assets that they inherited from the government; and reducing the air transport sector's effective tax rate relative to other sectors. Finally, airline ownership restrictions warrant review.

The federal government should ensure that Canada's air transportation industry is taxed on a level playing field with other modes of travel, such as bus or rail, and with its international counterparts. The result would be a more internationally competitive airline sector, able to serve Canadian air travelers more efficiently and cheaply.

Appendix A: The Marginal Effective Tax Rate (METR)

We compare taxes between modes of transportation and across borders based primarily on the effective tax rates on the marginal cost of production. Marginal effective tax rates for the inputs of labour, capital and fuel are calculated for each mode; other inputs, except for landing fees at Canadian airports for air transportation, are disregarded. The marginal effective tax rate is thus the tax wedge between the net and gross of tax cost for each input. The marginal effective tax rates for each input are aggregated, and weighted by the relative share of each input, to compute a single rate that reflects the effective tax rate on the firm's marginal cost — the effective tax rate on marginal costs.

We assumed a Cobb-Douglas function for modeling marginal costs. Where T is the marginal effective tax rate on marginal cost for each mode and is a function of t_i where $i = l, f, k, af$ for labour, fuel, capital and airport fees at Canadian airports and a_i where $i = l, f, k, af$ which is the cost share of each input where $a_k + a_f + a_l + a_{af}$ (air transportation only) = 1. The equation is of the form $T = (1+t_k)^{a_k}(1+t_f)^{a_f}(1+t_l)^{a_l}(1+t_{af})^{a_{af}} - 1$. We assume that the tax-shifting factor is identical across all modes and industries and that the tax is fully shifted onto the user of inputs.^a

The tax rate on marginal costs includes taxation at multiple stages of production; for example, the effective tax rate for airports is passed on to the airlines through higher landing fees. The marginal effective tax rate at airports is calculated as the average amount of rent paid out of total operating costs, excluding rent. We assumed that the full cost of rent is passed on to later stages of service provision.

The model also accommodates operating subsidies. It reduces marginal costs by the amount that subsidies comprise of total operating expenses $(1-s)$ where s is the share of operating costs that the operational subsidy comprises. For 2005, s is estimated to be .343 for VIA Rail.^b Previous capital subsidies for VIA Rail are not included in our calculation because the program has been suspended. As a Crown corporation, VIA Rail pays all other taxes that other corporations pay: corporate income taxes, provincial capital taxes, federal and provincial fuel taxes, etc. All modes of transportation have the same general taxes applied to them, with equations only modified to account for industry specific taxes as indicated.

There are limits to the methodology. Foremost among them are certain empirical difficulties in estimating the effective tax rate and cost shares for each input. For example, fuel taxes in Canada are imposed on a per litre basis, whereas our model requires an *ad valorem* tax rate. The conversion is a function of the market price of fuel. However, in an era of volatile fuel prices, the effective rate of taxation varies based on the year of analysis. We used 2004 market prices for the various types of fuel for the calculation, because that was the most recent year where market prices and amounts consumed per province were available for all modes.

Notes: ^a Previous research has applied a similar methodology to the Canadian and American transportation industries; see McKenzie, Mintz and Scharf (1992 and 1997); or McKenzie, Mansour and Brule (1998) for a more detailed description of the model used in this paper.

^b 2005 Via Rail Annual Report.

Capital taxes raise their own empirical issues, owing to financial reports' broad definition of "capital." The aggregation of capital we used is an average of data provided by the airlines. The methodology of summing 8 percent of the book value of airline equipment plus depreciation costs and rentals follows the methodology of Oum and Yu (2001).

Also, it is sometimes unclear as to what is a true tax versus what is a user fee or benefit tax where the cost of a tax is defrayed by a service or good paid by the tax. For example, the Canada/Quebec Pension Plan relieves employers of some pension obligation to their employees. The gross of benefits tax rate on labour is given as this most closely resembles the actual cost to the firm of a unit of labour. Provincial payroll taxes are weighted by provincial revenue share for bus and air transportation and fuel consumption for rail. Personal income taxes are ignored in the labour tax calculation, owing to data limitations on income distribution by mode of transport.

The problem of differentiating between a tax and a user fee is particularly pertinent for the fees added on to air transport costs. Fees such as the NAV Canada fee or airport improvement fees can be classed as user charges, which approximate the cost of providing a service or financing a capital improvement and as such are not included in the calculations. Security charges and GST for all modes are included in the calculation of ticket taxes.

However, our model cannot take into account the nonmonetary burden placed on air travel. One example is the increased hassle from security, particularly the recent regulations on carry-on luggage and increased wait times. The hassle factor may indeed be a greater influence on travel decisions than the additional monetary cost (Rossiter and Dresner 2004). The model also excludes regulatory burdens, such as the extra cost of capital for the airline industry as a result of the limit on foreign investment and property taxes.

We calculated ticket tax rates for various domestic and international flights for travel on August 16 or 17, 2006, which were collected on July 10, and again for flights on September 28 or 29, which were collected on August 23, 2006, from Air Canada and WestJet's websites using the lowest advertised price of the two days. HST and QST are excluded from all calculations.

For the US, the only comparable tax is the post-September 11 security charge because all other charges have a definable benefit roughly equal to cost of the charge. However, in the case of international travel, we included arrival and departure taxes as well as any customs and immigration fees. For the purpose of comparison with Canada, we included these fees in the calculation rather than attempting to quantify the implicit Canadian federal subsidy for those costs.

Table A-1: *Cost Shares of Inputs for US Air Transport Industry*

	<u>Labour</u>	<u>Fuel</u>	<u>Capital</u>	<u>Landing Fees</u>
	<i>percent</i>			
US Passenger Air Travel	40.7	36.0	20.0	3.2

Source: Air Transport Association.

Table A-2: *Effective Tax Rate on Inputs and Outputs for US Air Travel*

	<u>Labour</u>	<u>Fuel</u>	<u>Fuel (Net of Benefits)</u>	<u>Capital</u>	<u>Facility Charges</u>	<u>Tickets</u>
	<i>percent</i>					
Passenger Domestic Air	8.1	9.2	5.4	26.3	0	3.0
Passenger International Air	8.1	0.0	0.0	26.3	0	9.7
Passenger Total Air	8.1	4.3	3.9	26.3	0	4.3

Note: Fuel tax rate computed using 2004 fuel prices.

Source: US Air Transport Association; US Bureau of Transportation Statistics; US Department of Labour; Department of Finance, Canada; Brazell and Mackie (2000). Ticket taxes calculated from JetBlue, US Airways and Southwest Airlines websites on July 12, 2006, for travel on August 24 using the lowest advertised price.

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