

# Strategic Trade Theory in the Brazil-Canada WTO Dispute

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Honors Thesis

3/17/16

*Abstract:* The market for regional jets is an excellent example of imperfect competition, with two firms, Canada's Bombardier and Embraer of Brazil, competing for market share. In a market with non-cooperative rivalry, governments have an incentive to subsidize a domestic firm and thus increase its profits at the expense of a foreign firm. However, strategic trade theory tells us that subsidy competitions like the one between Canada and Brazil in the regional jet market are jointly suboptimal. Moreover, under the WTO's Agreement on Subsidies and Countervailing Measures, subsidies meant to stimulate exports are illegal. In fact, Canada and Brazil both brought charges against each other at the WTO and won. Despite the jointly suboptimal nature of subsidies and the forum for dispute resolution provided by the WTO, the dispute between the two countries dragged on for years.

The first aim of this study was to show that the use of export subsidies in the regional jet market was suboptimal. The second goal was to identify the factors that prevented an agreement to limit subsidies, based on reviewing literature on WTO disputes and studying the political and economic influence of the two firms. By using a simple calibration model my preliminary results show a combined net welfare loss for the two countries of roughly \$260 million. Furthermore, my research indicates the WTO enforcement mechanism, the economic value of the two firms, and the firms' political influence all contributed to intransigence and a delayed compromise. Although the WTO was never designed as a potent enforcer of its own rules, cases in which the economic importance of a firm translate to enduring non-compliance undercut both the legitimacy of the WTO and the free trade regime it supports.

## **Strategic Trade Theory in the Brazil-Canada WTO Dispute**

In requesting consultation with Brazil on June 19<sup>th</sup>, 1996, Canada fired the first shot in what would become a nasty trade war and a lengthy World Trade Organization dispute (WTO). At the heart of this disagreement lay an intense competition in the regional jet market. Bombardier of Canada and Embraer of Brazil, both sources of national pride and major employers, were the first aircraft manufacturers to recognize the untapped demand for regional jets (aircraft that seat between 30 and 100 passengers) and develop products to exploit said market niche. Both companies also benefitted from considerable government support, as developing, manufacturing, and financing aircraft are generally considered too risky for private capital. As demand for regional jets exploded and competition between the two firms intensified, both firms demanded more support from their respective governments on the grounds that the firm could not survive

without public funding (Hadekel, 161, 2004). At face value, the emptying of government coffers to support these companies seemed like prudent industrial policy; the firms exported the kind of technologically sophisticated, value-added goods that each government craved. Moreover, the aviation industries that government largesse fostered created thousands of high paying jobs that would keep elected officials in office. And yet, even with both sides following a generally similar logic for nurturing a civil aircraft industry, each country blamed the other of maliciously violating WTO law in order to undercut its rival and reap the rewards of market leadership. As each side filed suit at the WTO and began to dig its heels in, it became increasingly obvious that subsidization was only good for creating a convoluted and vitriolic WTO dispute. Beyond just the surface level of creating a heated WTO dispute was the rather self-evident economic logic that unfettered subsidization was detrimental to joint societal welfare. Nevertheless, the dispute between Canada and Brazil would push each government to further subsidize their firms, end up lasting almost a decade, and spill over into other issue areas.

Beyond just highlighting the diplomatic tensions this dispute generated, the aim of this paper will first be to establish the jointly suboptimal nature of Brazil and Canada's subsidy war. Correspondingly, the second goal of this paper will be to investigate why Brazil and Canada failed to resolve their costly dispute given that they had an established avenue of dispute resolution in the WTO's Dispute Settlement Understanding (DSU) at their disposal. Since our economic understanding of subsidy disputes stresses how an agreement to limit subsidies would be mutually beneficial, the overriding question of this paper becomes what domestic political considerations along with the nature of the WTO's dispute settlement process discouraged a resolution to this dispute.

To accomplish these two objectives, the first section of this paper will lay out a definition of a high-tech industry and explain why governments covet them so much. I will then outline the histories of Bombardier and Embraer in order to demonstrate how developing an aviation industry was a priority for both governments and how government support was critical to each firm's success. Following that section the general contours of the WTO dispute between Canada and Brazil will be outlined before contextualizing the subsidy dispute by examining the strategic trade policy literature. In the empirical section of this paper I will briefly describe the model used<sup>1</sup> and then present my results that support the theoretical claim that subsidies are jointly suboptimal. Using the deleterious nature of subsidies as a point of departure, I will argue that survival-maximizing governments, embedded policy goals, and WTO law itself are responsible for the duration and severity of this dispute.

### *High-tech Industries*

High-technology industries and their trade in global markets have assumed a central position in industrial competitiveness and the concerns of economists and policymakers alike. This concern is not without reason as success in high-tech industries has been shown to confer outsized benefits in “productivity, technology development, and high-wage job creation”(Tyson 1992, 2). Therefore, strength in technologically intensive sectors is essential for a nation's economic expansion and dynamism. Paramount amongst the benefits of high-technology firms is the spillovers and externalities they create for a nation's economy. The presence of a successful high-tech firm and its demand for inputs can help upstream industries flourish as well as generate

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<sup>1</sup> This static model was provided by Dr. Sheldon and is used to show the impact of a policy change on societal welfare.

invaluable research and development (R&D) that is unlikely to occur without it. What is more, many policymakers view capturing the advantages of these industries as the building blocks towards the economy of the future. The concern, then, is of path dependence, *i.e.*, that failing to nurture strategic high-tech industries today could doom a country's economy tomorrow.

High-tech industries also have a unique set of market characteristics that distinguish them further from typical sectors; namely, they are extremely capital-intensive, subject to fierce international competition, and tend to be imperfectly competitive oligopolies. Furthermore, high-technology industries rely heavily on research and development and, despite recent gains by some emerging economies, are highly concentrated in the developed world. Of these attributes, imperfect competition has the most meaningful implications for policymakers and economists. Classical understanding of international trade rests on the assumptions of perfectly competitive markets and is guided by the Ricardian notion of comparative advantage. Perfectly competitive markets are characterized by a lack of barriers to entry or exit and a large number of small firms with homogenous products. In comparison, the imperfectly competitive markets of high-technology industries are difficult to enter, occupied by a few large firms, and “economic profits are not driven to zero”(Eaton & Grossman 1986, 384). Due to these excess economic profits, or “rents”, governments have an incentive to manipulate these markets and shift profits to domestic firms. In fact, “a nation's competitive position in industries with these characteristics is less a function of its national factor endowments and more a function of strategic interactions between its firms and government”(Tyson 1992, 3). Fundamentally, the ability of governments to influence the outcomes of these

international oligopolies in favor of their domestic firms is what makes competition in these markets so fierce and contentious.

For its part, “the international market for large commercial jet aircraft is about as far as one can get from the standard trade theory paradigm of static constant returns and price-taking competition”(Baldwin & Krugman, 1988, p.45). Instead, the industry is a perfect example of a high-tech industry as it is dominated by a small number of firms, requires continual research and development, and demands highly technical production that represents a sizeable barrier to entry. The industry is also unique in that product development is quite risky and the payback period for an investment is exceedingly long. Thus, “the market risks and long-term loan repayment rates typical for aerospace... are prohibitive for private capital” (Froese, 2010, p.83). Governments, on the other hand, see opportunity where private investors balk as the spillover effects from a strong aerospace industry can be exceptionally rewarding for a domestic economy. For example,

“Chase Economics estimated in 1983 that an increase of \$1 billion in sales of civil aircraft would result in a \$6.5 billion gain in U.S. gross national product over nine years, a \$3.7 billion cut in the federal deficit, and 148,400 full-time equivalent man-years of work”

More broadly, a successful aerospace industry will provide high-wage jobs and value-added exports. The following sections will aim to underscore the point that aerospace industries are attentively nurtured and jealously guarded by governments by outlining the history of government support for both Embraer and Bombardier.

### *The Pride of Brazil*

The incipient stages of the Brazilian aerospace industry can be traced back to the “eccentric bon vivant”(van Agtmael, 2007, p.171) Santos Dumont, who was an early innovator in motorized airships. In fact, Brazilians often discredit the Wright brothers as

the first in flight and cite Santos Dumont's dirigibles as the landmark achievement. Regardless of how history should be remembered, Dumont's exploits inspired a generation of Brazilian entrepreneurs and engineers who would attempt to establish a Brazilian aircraft manufacturing industry. However, without proper financial support or sufficient technological capabilities due to a dearth of engineers, all of the ventures failed to become commercially viable (Marques, 2004, p.4). It had become apparent, however, that more than ever a Brazilian aerospace industry could and should be developed. The thrust of the argument came from the economic development theory that was in vogue at the time that emphasized cultivating "national champions to catch up with the First World"(van Agtmael, 2007, p.172). This theory was furthered buttressed by influential military thinker General Meira Mattos who "developed a geostrategic theory of Brazil's place in the world system predicated on the country's success in achieving technological and industrial autonomy" (Goldstein, 2002, p.3). Thus, Brazilian government policies created "incentives for increasing foreign direct investment, building up industrial sectors in order to be self sufficient, and creating government owned firms in strategic areas" (Marques, 2004, p.1). In 1946 the Brazilian Aeronautics Ministry, itself established in 1941, took a critical, and up to that point one of the few, steps towards forming an aeronautics industry when it established the Aeronautical Technical Center (CTA). The hope was that the CTA would be able to produce enough engineers and technicians to help jumpstart the industry. Shortly thereafter the CTA established the Aeronautic Technical Institute (ITA), modeled after the Massachusetts Institute of Technology, with the hopes of training elite engineers. In 1964 the Ministry of Aeronautics commissioned the Brazilian Research and Development Institute (IPD) to

research the feasibility of creating twin-engine turboprop airliners in Brazil, with the aim to, “design a modern and simple airplane to be produced in series in Brazil... and provide the Air Force with a versatile aircraft that fulfilled the Brazilian conditions”(de Mattos, 2006, p.27). After 4 years of development and manufacturing, the IPD-6504’s maiden voyage was a huge success. Recognizing the opportunity to commercialize the Bandeirante (the name given to the IPD-6504 when it was transferred to CTA control) the Ministry of Aeronautics founded Empresa Brasileira de Aeronautica S.A (Embraer) in 1969. The initial purpose of the company was “producing the Bandeirante on an industrial scale, based on a 80-unit launch order from the Air Force”(Frischtak, 1992, p.8-9). The first president of the company was Ozires Silva whose “objective was to combine state-owned enterprise resources... with the entrepreneurial agility of a private sector firm” (Ghemawat et. al; 2009, p.2). Although the managerial deftness of Silva and Embraer’s executive team were certainly an asset for the company, the protection afforded to Embraer by the government was key. Among other policies “Embraer was exempted from paying taxes and duties on imported raw materials, parts, components, and equipment not available locally”, the government also “permitted Brazilian corporations to invest up to 1% of the income tax they owed... in Embraer shares” (Ramamurti, 1990, p.609). Although these shares were non-voting, the tax scheme still “helped Embraer raise an estimated \$350 million in capital between 1970 and 1985” (Ghemawat et. al, 2009, p.2). This was not the only way the Brazilian government supported its nascent aerospace industry, as a steady stream of government procurement kept both production and capital flowing into the company. The government’s assistance was crucial for the company’s success as “the process of capital availability in the



sector... permit[ted] the company to finance R&D programs, transforming Embraer into a dynamic centre of industry”(Bernardes, 2003, p.6). The steps taken by the Brazilian government were in line with the development theory dogma at the time and initially proved wildly successful.

To more holistically understand the significance of the government’s support, it is useful to examine both the relationship between Embraer and the government more deeply and the system of innovation it created. Fundamentally, one of the most important steps for the company’s success was its early emphasis on innovation. The civil aircraft market is extremely dynamic and requires a robust system of innovation in order to promote the technological capabilities required to compete. The development of the capabilities that make a system effective “depend[s] on the interplay of incentives, capabilities, and institutions”(Vertesy and Szirmai, 2010,p.1). Thus, while tax schemes and trade barriers were important for Embraer to compete commercially, they were not the exclusive means of government support. Instead, the government also provided critical support in developing a potent system of innovation through fostering R&D and technology and knowledge transfers. In addition to the “learning by doing”, Embraer, by way of the Ministry of Defense, “ used licensing and co-operation agreements to bring new resources and knowledge into the firm and develop a strong core competence – system engineering for producing aircraft”(Goldstein, 2002, p.11) In summation, on top of the protective barriers, favorable tax schemes, and government procurement, Embraer received crucial assistance from the government in fostering an effective innovation system. The Ministry of Aeronautics and the Ministry of Defense heavily funded the CTA, ITA, and IPD; and it supported the company in technology transfers through aiding

in foreign partnerships. What is more, the Brazilian government strategically hung the threat of tariffs over the head of other countries and companies to push them towards favorable technology transfers for Embraer. During the 1970s, due in part to the domestic monopoly the company enjoyed<sup>2</sup> and the ample government support it received, Embraer experienced a decade of remarkable success. Embraer's success was particularly noteworthy, as it did not simply weather the storm of the global oil- shock, it boomed.

### *Bombardier Aerospace*

In line with its bitter strategic rival, and the rest of the civil aircraft manufacturing industry for that matter, the Canadian aerospace firm Bombardier has benefitted from healthy doses of government support throughout its history. In comparison with its Brazilian counterpart, however, government aid is one of the few commonalities the company's share (aside from producing world-class regional jets of course). For its part, Bombardier was a private company from its inception, was not founded for the sole purpose of creating a national champion in aerospace, and has thrived on diversification. From its humble beginnings in 1942 as a small snowmobile manufacturer in rural Quebec, Bombardier has successfully expanded to become one of the largest producers of mass transportation equipment and third largest aerospace manufacturer in the world.

From a distance, the development of Bombardier seems rather straightforward, as profits from the success in one market would fuel the development of a competitive product in the company's next venture. The actual fuel for the company's meteoric rise came from the bold risk-taking of its leaders and timely government support. Where others balked, Bombardier (and the Canadian government) saw real opportunity for

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<sup>2</sup> This monopoly was created by both the "Law of the Similar", which dictated that government agencies could not purchase foreign products if there was an Embraer model that was less than 15% more expensive, and the high tariffs on imported aircraft.

growth and during the second half of the 20<sup>th</sup> century steadily became one of the largest companies in Canada. Far from its current status as a giant multinational conglomerate and symbol of national pride for Canada, Bombardier began on a practical invention to transport people efficiently during the tough Quebec winters. After a few decades of success with commercial snowmobiles and tractors the company shifted gears again with its new invention, a recreational snowmobile called the Ski-Doo. The Ski-Doo would thrive on the boom of recreational spending during the 1960s. It would also represent the last invention of the company's ingenious founder as Armand Bombardier passed away shortly after the Ski-Doo's launch and his stepson, Laurent Beaudoin, would take the reins. With Beaudoin at the helm the company was no longer hamstrung by the cautious business approach of its founder and would burgeon under Beaudoin's daring leadership.

In Beaudoin's mind the overall similarity of the company's products exposed it to unnecessary risk. A mild winter, an increase in gas prices, or a contraction in consumer's discretionary spending would be quite detrimental to the company. The new CEO's idea was to diversify as quickly as possible. One of the first opportunities the company received was a contract for Montreal subway cars. The city was looking to expand its public transportation system, Montreal Métro, in preparation for the 1976 Olympics and approached Bombardier to make a competing bid against Canadian Vickers. It is likely that Bombardier was initially approached, and eventually won, because of "growing political nationalism in French Quebec"(Hadekel 2004, p.42). Rather than let Vickers (an English speaking British company) continue to dominate mass-transit in Quebec, officials in Montreal encouraged and later contracted Bombardier, a French speaking company, to try its hands at mass transit. Vickers cried foul as they "not only had the

lowest bid, [they] had the experience, the know-how, and the trained personnel”(Hadekel 2004, p.44). Though the Montreal Métro contract proved to be quite a windfall, the company scuffled for a number of years losing bids on other mass transit projects in Ontario and Quebec City to Hawker Siddeley and the Canadian division of General Motors respectively.

Bombardier’s luck would change quite dramatically when New York City opened up bidding for a new contract to replace their dilapidated rail cars in 1981. Competition for the contract was quite stiff with all bidders offering quality products at similar prices. The bid “was going to come down to financing: who could loan the most money to the MTA at the best terms” (Hadekel 2004, p.58). Fortunately for Bombardier, the Export Development Corporation (EDC), a federal program that lent at below market rates to foreign buyers of Canadian goods, was beginning to aggressively support Canadian companies after an impasse in OECD negotiations. In the end the EDC, and by extension the Canadian government, loaned New York, “\$536 million U.S. at the rate of 9.7%” as well as providing a \$225 million performance bond (Hadekel 60, p.2004). Although not the first time the EDC supported Bombardier, this was by far the largest aid to date and the 9.7% interest rate was well below the OECD standard of 11.25%. For Bombardier this was a major victory that, along with a few other EDC supported deals, vaulted them to the lead of the mass-transit market. While Bombardier had certainly been a savvy and aggressive company, their success was in large part due to the generous support of the EDC. As Bombardier looked to shift into another market and further diversify their risk, the EDC was more than willing to bankroll some of the company’s riskiest endeavors.

Looking to expand Bombardier's horizons, Beaudoin somewhat stumbled into the aerospace industry when he was approached about purchasing the Montreal based aerospace firm Canadair. Canadair's best years were seemingly behind it as the company had gone from a successful private firm to a languishing public enterprise that was kept afloat by hefty government support. The government's ownership of Canadair was untenable due to the enormous losses Canadair was suffering, but the Canadian government did not wish to give up on what it viewed as a critical high-tech industry. After it wrote down the company's sizeable debt, the government announced it was looking to privatize Canadair. Of the companies that bid on Canadair, Bombardier had a considerable advantage in that it was based in Quebec and was the most likely bidder to keep jobs in the province. In 1986 the Canadian government sold Canadair for \$123 million to Bombardier, a deal many criticized as a steal for Bombardier considering Canadair was worth nearly twice that (MacDonald 2001, p.136). What was most attractive about Canadair was that with its debt wiped clean by the government, the company possessed a couple of competitive products in growth segments. In particular, Canadair's Challenger business jet would be a major boon for the company during the late 1980s economic revival in the United States (the Challenger's largest market).

Despite the company's all-around success, Bombardier suffered a public image problem as many Canadians felt the company unfairly benefitted from government largesse. This common perception would continue during Bombardier's next venture, the regional jet. When the United States de-regulated the airline industry in 1978 the major carriers developed what is known as the hub and spoke model. In this system airlines choose a major city to be their headquarters (the hub) and then provide service to other

major cities (the spokes). While the hub and spoke system was most efficient for airlines, it was not well liked by consumers, “it added time, length, and inconvenience to the journey” (Hadekel 2004, p.113). If Bombardier could develop a mid-sized jet that could fly further than the turboprops that plied the shorter routes in the hub and spoke system, airlines could serve a wider range of customer’s conveniently. Developing an original plane from scratch would be extremely risky and nearly impossible without government support. Bombardier, however, did not have to reinvent the wheel like other potential regional aircraft manufactures. Instead, the company could simply stretch the successful Challenger jet to serve approximately 50 passengers. Not only would modifying an existing jet save Bombardier money, the time saved on development would afford Bombardier significant first-mover advantages. Even with the reduced costs and the temporarily uncontested market Bombardier would enjoy, “the additional investment required for the regional jet was \$350 million... this sum represented more than half of the shareholders equity”(Hadekel 2004, p.118). Bombardier thus decided to ask for \$100 million from the Defense Industry Productivity Program (DIPP), a government fund to support R&D in critical, defense related technologies. Government aid was not confined to the development process, as the EDC would step in to finance the sale of Bombardiers jets when private lenders balked at the risk. The EDC’s aid would prove critical, as Bombardier’s regional jet program did not have an auspicious start. Early sales for the Canadair Regional Jet (CRJ) stagnated during the recession of the early 1990s. The main targets for the CRJs were the regional airlines that had become strapped for cash during the economic downturn. Luckily for Bombardier the EDC was more than willing to

assume the risk for the sales of the CRJ, and Bombardier's most successful program took off as the U.S. economy rebounded strongly in the mid 1990s.

In Canada, the government did not found the aerospace industry, nor did a single firm like its Brazilian counterpart dominate it from the beginning. This is not to say, however, that the Canadian aerospace industry was not the beneficiary of any government support. Among these incentives were large R&D and export subsidies, tax breaks, and public procurement. For Bombardier, the DIPP and the EDC were the most consistent ways to obtain public support to help cover its development costs. The DIPP was started in 1959 and its subsidies "increased from C\$2 million a year to some C\$43 million in 1989 for the development of the fifty-seat Canadian regional jet by Bombardier" (Niosi 2005, p.65). Bombardier also benefitted from generous financing support for its export sales from the EDC. In fact, "between 1996 and 2003, [the EDC] financed some C\$8 billion, or 40% of Bombardier's overseas aircraft sales"(Niosi 2005, p.65). Additionally, the federal government was not the aerospace industry's only benefactor; Quebec's provincial government offered hefty support to the industry as well. The Quebec government "contributes to aerospace innovation through its tax credit for R&D system" and helped found a university/industry aerospace research center in Montreal (Niosi 2005, p.65-66).

Overall, the two companies relied heavily on aid from their respective governments and both focused on assembling aircraft while depending on a system of risk-sharing partners and small suppliers. Bombardier, however, is distinct in that its initial purpose was not to create a domestic aerospace industry. Moreover, the difference between the countries' strategies is quite clear. As a developing country Brazil attempted

to incubate a number of high-technology firms to catch up with the developed world. In contrast to the more centrally planned Brazilian economy, Canada, as a developed country, has the luxury of supporting existing firms that innovate and succeed on their own. Therefore, while Embraer's success is due to planning and consistent support, Bombardier's has succeeded in a somewhat more organic fashion.

#### *A WTO Dispute Devolves into a Trade War*

The Airline Deregulation Act of 1978 created the lucrative niche market that both Embraer and Bombardier would exploit during the 1990s. As mentioned above, the hub and spoke system, although efficient for airlines, was rather inconvenient for passengers. Customers, and therefore airlines, craved an aircraft smaller than the wide-bodied jets that dominated cross-country travel, but was still large enough for point-to-point travel and could therefore cut down on layovers. Up until that point, however, smaller airplanes were not powered by jet engine and instead were exclusively turboprop aircraft. There was something so unsettling about the noise and vibration of propeller driven airplanes that customers would forgo the time saved by the point-to-point routes that turboprops plied in favor of the time-consuming hub and spoke system routes that jet engine aircraft traveled (Goldstein, 2002, p.104). Embraer and Bombardier both recognized the opportunity of developing a mid-sized (or regional) jet and would profit immensely from stretching their successful business jets to seat approximately 50 passengers. With significant help from the EDC, Bombardier was first to the market when it introduced the CRJ-100 in 1991. However, on top of the mammoth development costs for a regional jet came the problem of financing the sale of these aircraft to airlines. As Peter Hadekel wryly points out, unlike the business jet market, the regional jet's clientele "wasn't the



champagne and Gucci shoes crowd, it was the brown-bag and white-sneaker market”(Hadekel, 2004, p.175,). Consequently, even though there was sizeable demand for regional jets, “when the regional jet revolution was introduced by Bombardier in the early 1990s, nobody was quite sure how the financing would work”(Hadekel,2004, p. 175,). Fortunately for Bombardier and Embraer, their respective governments stepped in to fill the breach. In fact, since “Bombardier and Embraer developed products that differed little in basic performance and design” (Lawton and McGuire, 2001, p.222) the competition between the CRJ-100 and the ERJ-145 came down to which government could offer the most favorable financing.

The Programa de Financiamento às Exportações (ProEX) was Brazil’s response to the hefty support Bombardier received from the TPC (Technology Partnership Canada) and EDC. Basically, “whatever the interest rate attached to the loan, the program allowed the Brazilian government to pay 3.8 percentage points”(Lawton and McGuire, 2001, p.223). Brazil would later argue at the WTO that the subsidy was meant to counteract what it termed “Brazil risk”, the steeper interest rates Brazilian companies faced in global markets due to their national origin, however, the subsidy effectively meant that Embraer could enter a bidding war with the backing of the Brazilian government.

A ProEx-backed Embraer first struck at Bombardier’s market dominance when it won an order to produce 25 ERJ’s for Continental Airlines with options to build over 100 in the future. Shortly thereafter, Embraer bagged another big order, this time with American Eagle (an American Airlines subsidiary), for 42 ERJ’s (Hadekel, 2004, p.193-194,). These two orders combined to completely erode Bombardier’s first-mover

advantage and its majority share in the regional jet market. Given the amount of money already sunk in to Bombardier's regional jet project and the strategic value placed on the aerospace industry, the Canadian government was not going to allow its aerospace darling to be outcompeted without a fight. The first tool Bombardier used to fight back was to convince the government of Quebec "to create a \$450 million pool of equity guarantees that could be used to finance future sales of [regional jets]"(Hadekel, 2004, p.197). This, of course, meant Canada was furthering the subsidy competition at the expense of its taxpayer. The second means of recourse Canada took to combat Brazil's ProEx was filing suit at the WTO.

In the summer of 1996 Canada requested consultations (DS-46) with Brazil on the grounds that ProEx violated Articles 3, 27.4, and 27.5<sup>3</sup> of the WTO agreement on Subsidies and Countervailing Measures (ASCM) (Barral, 2007, p.30). Although negotiations between the two sides were initially productive, it became increasingly obvious as the months wore on that this case would have to go before a dispute panel. It also became increasingly obvious to Brazil that if it lost the WTO case Embraer would be at a severe disadvantage without ProEx support. Consequently, Brazil filed its own suit at the WTO (DS-70) requesting consultation with Canada in March of 1997. Negotiations in both cases, unsurprisingly, became extremely unproductive as 1997 wore on and dispute panels were established for both suits on July 23<sup>rd</sup>, 1998. The Dispute Panel for DS-46 issued its report on April 14<sup>th</sup> 1999 and "found that the Brazilian measures were inconsistent with Articles 3.1(a) and 27.4 of the Subsidies Agreement"(Barral, 2007, p.30). In DS-70, the Panel found that certain Canadian measures violated Articles 3.1(a)

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<sup>3</sup> Article 3 of the ASCM declares that export subsidies are prohibited. Articles 27.4 and 27.5 deal with the exception granted to developing countries for export subsidies (27.4) and their eventual phase-out (27.5).

and 3.2 of the ASCM, “but rejected Brazil’s claim that EDC assistance to the Canadian regional aircraft industry constitute[ed] export subsidies” (Barral,2007, p.33). Brazil and Canada both appealed the Panel reports but the Appellate Body upheld each of the Panel’s findings.

With the EDC’s legality largely confirmed by the WTO, the first round of this subsidy feud was a clear victory for Bombardier. Nevertheless, Canada as a whole did not come out unscathed as the “dispute had already taken its toll on trade diplomacy, dashing Canada’s hopes of signing a free trade pact with MERCOSUR” (Hadekel, 2004, p.200-201). Brazil, on the other hand, had come out unambiguously worse for the wear from its tussle at the WTO. Not only had its claim against the EDC failed but also ProEx, the very program that vaulted Embraer into the regional jet market, had been deemed illegal. If Brazil was going to keep Embraer afloat it would have to come up with a new finance program that was as competitive as the EDC and was WTO compliant. Luckily for Brazil, WTO compliance requirements are not automatically enforced and thus, “part of the Brazilian strategy was simply to stall...so its export financing scheme could continue”(Hadekel,2004, p.205). The first step of Brazil’s stalling strategy was to appeal the Panel’s decision. As mentioned above, however, the Appellate Body upheld the Panel’s ruling on ProEx. The onus was now on Brazil to take meaningful action on modifying its export-financing scheme. Recognizing that another round of compliance proceedings might buy a bit of time, Brazil “made only cosmetic changes to the program”(Hadekel, 2004, p.205). Stalling was less successful than Brazil thought it would be, though, as a compliance panel was established less than a year later in July 2000. The compliance panel ruled that ProEx II (a name given by the WTO to distinguish

between the original ProEx and the modified version) was non-compliant and granted Canada with C\$344.2 million worth of countervailing measures. Given that the countervailing measures are damaging to both the injurer and the complainant in a WTO case<sup>4</sup>, Brazil knew that Canada was unlikely to enact its countervailing measures. Brazil therefore rolled the dice on another slightly modified iteration of ProEx (this time called ProEx III) that was deemed legal on the seemingly slimmest of margins. The WTO's compliance panel ruled "it is legally possible for Brazil to operate ProEx III in such a way that it does not result in a benefit being conferred upon producers of regional aircraft" (Froese, 2010, p.88). With ProEx III granted legal clearance by the skin of its teeth, the second round of Brazil and Canada's WTO battle certainly went to Brazil. Armed with a WTO sanctioned ProEx, Embraer continued to encroach on Bombardier's market share as it bagged huge deals with Cross Air, Continental Airlines, and American Airlines.

As the contracts for ERJs rolled in the pressure on Ottawa to fight back mounted. The Canadian government's options were seemingly limited to rolling out another subsidy program since enacting WTO sanctioned countermeasures "wasn't an attractive option because the measures would have hurt Canadian consumers and done nothing to penalize Embraer"(Hadekel, 2004, p.209). Canada therefore decided to fight fire with fire by equaling Brazil's subsidy program. Matching a subsidy program was an unprecedented move in a WTO dispute and was on dubious legal grounds since it was not sanctioned by WTO law. Though acting outside of WTO precedent, Canada felt the

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<sup>4</sup> The suspension of WTO concessions permits the complainant to rescind the extension of the most-favored-nation status to the violator by implementing tariffs up to the value of the award. However, fundamental theories of trade point out that tariffs are just as damaging to their enactor as they raise prices for consumers and create economic inefficiencies.

OECD Arrangement on export credits justified its actions. The OECD Arrangement sets minimum interest rate levels (known as commercial interest reference rates (CIRR)) and allows governments to offer rates below the CIRR only if another government oversteps the CIRR threshold first. In other words, Canada contended, “if another government export credit agency offered a rate below the CIRRs, it was allowed to match that derogation”(Krikorian, 2012, p.178). Canada’s new policy was first used when Air Wisconsin announced it was in the market for a large order of regional jets. Embraer’s financial package for Air Wisconsin was better than Bombardier’s initial offer, but when Bombardier secured Ottawa’s guarantee to match the Brazilian interest rates, Air Wisconsin pounced. Recognizing that their mega-deal with Air Wisconsin would certainly be challenged at the WTO, Bombardier insisted that Air Wisconsin sign a letter stating Bombardier’s offer was no more favorable than Embraer’s and consequently compliant with the OECD Arrangement on export credits (Hadekel, 2004, 210). Brazil immediately filed suit at the WTO (DS-222) and this time around Canada and Brazil’s WTO dispute over aircraft would remain anything but civil.

In response to Brazil filing suit, the Canadian government imposed a ban on importing Brazilian beef, citing bogus concerns over mad-cow disease (Hadekel, 2004, 212). Brazil erupted into protests, a boycott of Canadian products was called for, and Brazilian students delivered a live cow to the Canadian embassy and snidely invited the diplomats out for a barbeque (CBC News, 2001). The furor in Brazil was not unfounded since the United States and Mexico were obliged to follow their NAFTA partner’s lead and ban Brazilian beef imports as well (Jack, 2001). In Geneva, Canada’s argument that it was following OECD guidelines fell on deaf ears and the Canadian government was

ordered to modify how the EDC supported aircraft financing. After the 90-day compliance window, Canada informed the Dispute Settlement Body (DSB) that it simply would not reform EDC financing of the Air Wisconsin deal. The DSB's arbitrators awarded Brazil the right to suspend concessions and "in order to secure compliance by Canada they added a 20% adjustment" to the award's total (Shadikhodjaev, 2009, p.148). Given the doubly injurious nature of suspending concessions, in the end Brazil opted to not enact its countervailing measures either.

Roughly seven years after Canada first requested consultations, the dispute over subsidizing regional aircraft had accomplished nothing. In fact, it would appear as though the WTO cases had only made matters worse. The diplomatic tensions that spilled over from Bombardier and Embraer's competition shattered a free trade deal and initiated a petty and ruinous trade war over beef. The dispute also cost the two countries millions in legal fees and forced each side to only slightly modify their jointly suboptimal subsidy program. While the feud was finally resolved nearly a decade after its start<sup>5</sup>, the length and animosity of this case are confounding given how costly the ordeal was in both diplomatic and economic terms. The subsequent sections will try to establish how economically damaging the dispute was before turning to an examination of the political factors that prevented a more timely resolution of the dispute.

### *Strategic Trade Policy*

A useful starting point for a discussion on strategic trade policy and trade disputes is the model developed by Marc Busch in his 1999 book *Trade Warriors*. Busch's

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<sup>5</sup> The two countries finally came to an understanding by signing the 2007 OECD Aircraft Sector Understanding

approach is more political science oriented and is therefore a good introduction to the more technical models developed by Brander and Spencer(1985). In his examination of why governments intervene on the behalf of high-technology firms, Busch highlights a few explanations that have been mentioned above, for example, a concern for path dependence and national pride. Busch also introduces two new factors that he terms the consumption and internalization variables. The consumption variable depends on whether “industries upstream or downstream are in place to anchor the relevant linkage externalities”(Busch, 1999, p.16). For the internalization variable “ the intuition behind this variable is that states are likely to be reluctant to subsidize a national champion if the externalities that result help foreign firms as much as they do domestic ones”(Busch, 1999, p.16). According to Busch, not only do these variables determine if a country supports a high-tech industry, they are also essential to a state’s calculus in deciding to engage in a trade war, overall “states weigh the expected benefits from intervention against the potential costs of initiating a trade war”(Busch, 1999, p.4). Therefore, the greater the ability of a country to consume and internalize the externalities from a high-tech industry, the more likely it is to support the industry in the face of a trade war. The net result of these interventions is the kind of “Beggars-Thy-Neighbor” policy games that are jointly suboptimal. Busch models this in the following pay-off table.

	State B	No intervention	Limited intervention	Full intervention
State A				
No intervention		7,7	2, 8	1, 9
Limited intervention		8, 2	6, 6	4, 7
Full intervention		9, 1	7, 4	5, 5

With the option for no intervention, limited intervention, and full intervention, both states will opt for full intervention if they can consume and internalize and both states will be worse off. Busch concludes that in this scenario an agreement to limit subsidies would be mutually beneficial.

In the economic literature on strategic trade policy the work of Barbara Spencer and James Brander on export subsidies is seminal. Among the most cited authors in the sub discipline, their 1985 paper “Export Subsidies and International Market Share Rivalry” is particularly relevant to high-tech industries like aerospace. The basis for their paper is a strategic relationship between two firms (one foreign, one domestic) competing in an imperfectly competitive market. In a strategic relationship “the payoffs (profits) of one firm must be directly affected by the individual strategy choices of other firms, and this must be understood by the firms themselves”(Brander, 1995, p.1397). The key to their model is that the governments of the two firms also recognize this strategic relationship and perceive their companies (and therefore themselves) to be in competition for international market share. Given the imperfectly competitive market that the two firms are competing in, the two governments will see subsidies as “attractive policy tools as they improve the relative position of the domestic firm...enabling it to expand market share and earn greater profits”(Brander and Spencer, 1985, p.1). Although subsidization will have a negative terms of trade<sup>6</sup> impact on the country, the increased profit of the domestic firm will result in a net societal benefit. The relationship between the four actors in this scenario, the two firms and the two governments, can be characterized as “firms play Nash against all other players, and governments play Stackleberg against

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<sup>6</sup> Terms of trade is the ratio of the value of a country’s exports to the value of its imports. Thus, if a subsidy reduces the price of an export it is diminishing the country’s terms of trade.



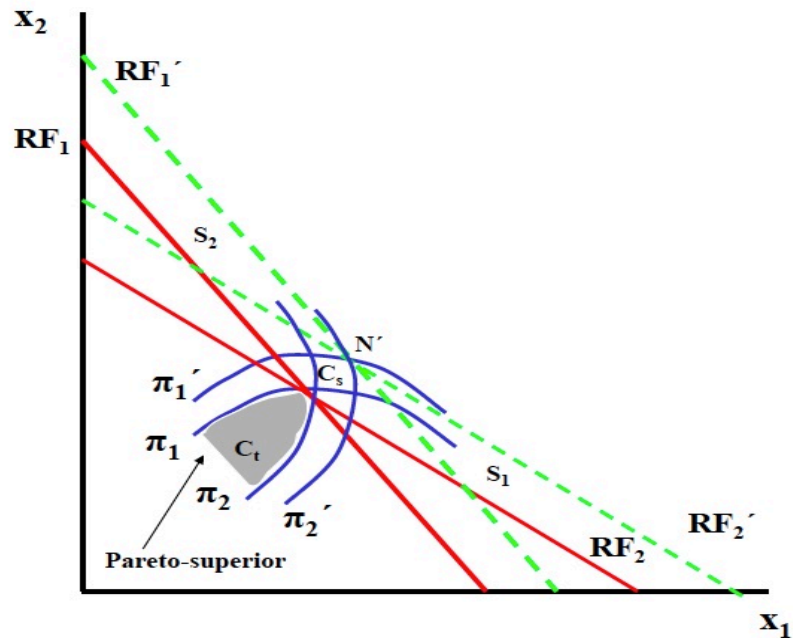
firms and Nash against other governments”(Brander and Spencer, 1985, p.84). Of course, precisely because the two governments play Nash against each other, the unilateral incentive for governments to subsidize results in a jointly suboptimal subsidy competition. To be certain, if the domestic government were to subsidize its firm while the foreign government remained idle, the marginal cost of the domestic firm would decrease and allow for an increase in production that benefits domestic welfare at the expense of foreign. As Brander and Spencer conclude

“the optimal subsidy moves the industry equilibrium to what would, in the absence of a subsidy, be the Stackelberg leader-follower position in output space with the domestic firm as leader” (Brander and Spencer, 1985, p.89).

However, since both governments have similar incentives there is no reason to think that the foreign government would not enact the same subsidy program. While consumers of the good would benefit from expanded output and consequently lower prices, “joint welfare of the producing nations would rise if the subsidy levels were reduced”(Brander and Spencer, 1995, 95). Although maintaining free trade from the beginning would have been ideal, “neither country can risk unilateral free trade because the other might then follow the Brander-Spencer policy”(Pomfret 1992, 18). The conclusions of the Brander and Spencer model can be visualized in the following graphic<sup>7</sup>.

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<sup>7</sup> Sheldon, I. *Imperfect Competition and Trade Policy*. AEDE 6200: "International Economics and Policy"



The two axes in this graphic represent the output of each firm; the higher the equilibrium is on the firm's axis, the more it produces. Since this is modeling a strategic relationship between two firms, the firms choose the quantity of their output based their rival's output. This is modeled by the two reaction functions (labeled  $RF_1$  and  $RF_2$ ), and in the absence of government intervention the reaction functions meet at the Cournot equilibrium labeled  $C_s$ . When a firm is subsidized it is able to expand its output beyond the Cournot equilibrium and therefore the two dashed lines (labeled  $RF'_1$  and  $RF'_2$ ) represent the reaction functions of the firms when they receive government subsidies. In the absence of government intervention for the foreign firm, domestic firms expand production and the equilibrium moves to either  $S_1$  or  $S_2$ , the Stackelberg leader position. In this scenario the expanded output results in an increase in domestic welfare as the increase in profit outweighs the negative terms of trade effects and the cost of the subsidy. Conversely, at the Stackelberg equilibrium the domestic firm's expanded output comes at the expense of the foreign firm's output. With a dip in output, and therefore profits, foreign welfare is

diminished. However, when both governments subsidize their firms the market moves to Nash equilibrium N. At the Nash equilibrium both firms produce more than at the Cournot equilibrium but their profits have actually decreased because of the reduction in prices brought on by the subsidies. The downward shift of the iso-profit lines (from  $\pi_1$  and  $\pi_2$  to  $\pi_1'$  and  $\pi_2'$ ) demonstrate this decrease in profit. This subsidy competition is damaging beyond just firm profits, however, as the reduction in price has worsened each country's terms of trade. In essence, the subsidies are only beneficial to world consumers as the reduction in prices allows for increased consumption and the two producing nations would benefit from an agreement to limit their subsidy programs.

Given the intense rivalries between Airbus and Boeing, and Bombardier and Embraer, the civil aircraft market is one of the best examples of a strategic relationship in an imperfectly competitive international market. As Irwin and Pavcnik conclude,

The aircraft sector provides a textbook example of an industry in which trade policy could affect the strategic interaction between a domestic and an international rival and shift profits in favor of the domestic firm as proposed in Brander and Spencer's (1985) canonical model of strategic trade policy (2003, 3).

To date, a number of studies have been conducted applying strategic trade models to the civil aircraft market. Richard Baldwin and Paul Krugman conducted one of the most important studies on the strategic rivalry between Airbus (a consortium of EU members) and Boeing (United States) and their respective governments in 1988. In their study Baldwin and Krugman create a model to simulate the entry of a subsidized firm (Airbus) to a market that was previously a monopoly. Though detrimental to the United States, the entry of Airbus was shown to increase global consumer welfare by way of decreasing unit price. Another relevant study was conducted by Douglas Irwin and Nina Pavcnik and

focuses on the impact of the 1992 U.S.- E.U. Agreement on Large Civil Aircraft. Their findings are in line with Brander and Spencer's conclusion that an agreement to limit export subsidies will be mutually beneficial as their model finds a 3.7% increase in aircraft prices after the accord was struck<sup>8</sup>. Finally, Richard Baldwin and Harry Flam's 1989 paper on the market for 30-40 seat commuter aircraft is particularly relevant to the dispute examined in this paper. The market Baldwin and Flam simulate is the antecedent of the polemical 50-seat aircraft market in the 1990s, although it features one more firm (Sweden's Saab) than the bitter Embraer and Bombardier dispute. Baldwin and Flam's conclusions are similar to that of Baldwin and Krugman's in that they find the subsidies are "quite effective in shifting profits away from the foreign and to the domestic firm" and lower world price while increasing consumer welfare (Baldwin and Flam 1989, 498). Baldwin and Flam, however, do not study the equilibrium effects of strategic trade policy in the 30-40-seat market and therefore make no conclusions about net societal welfare. The next section will examine the equilibrium impacts of Canada and Brazil's sizeable subsidy program.

### *Simulating Strategic Intervention in the Regional Jet Market*

With high cost of entry, an imperfectly competitive market, and governments willing to subsidize their domestic firm, the regional jet rivalry presents an excellent opportunity to study the equilibrium impacts of strategic government intervention. Since the rivalry between Embraer and Bombardier nearly perfectly reflects the scenarios outlined by Busch and Brander and Spencer, I expect the effect of the two government's

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<sup>8</sup> The 3.7% price increase represents a terms of trade gain for both countries that is larger than the decrease in consumer surplus.

subsidization program to be very similar to those described in both papers. To simulate the subsidy programs of Brazil and Canada I borrow a static equilibrium model from Dr. Sheldon<sup>9</sup>. In line with the strategic relationship described by Brander and Spencer, demand, and therefore output, is a function of the prices of the two products. The profit functions for the two firms are as follows

$$\begin{aligned}\pi_1 &= (p_1 - c_1)q_1 \\ \pi_2 &= (p_2 - c_2)q_2\end{aligned}$$

Where  $\pi_1$  and  $\pi_2$  are Bombardier and Embraer's profits respectively and  $p$ ,  $c$ , and  $q$  are price, cost, and quantity for their corresponding firms. The market equilibrium for the two firms is derived as

$$\begin{bmatrix} \frac{dQ_1}{dQ_2} \end{bmatrix} = \frac{1}{\Delta} \begin{bmatrix} (b_2 + \lambda_2) & -k \\ -k & (b_1 + \lambda_1) \end{bmatrix} \begin{bmatrix} -dc_1 \\ -dc_2 \end{bmatrix}$$

The middle matrix represents the responsiveness of how much the two firms supply to changes in their rival's quantity supplied, while the far right matrix is the impact of the subsidies on Bombardier and Embraer's production. Although the simulation of the regional jet market using Dr. Sheldon's model will provide a rough estimate for the impacts of subsidization, there are two flaws with this approach. First, the model used analyzes a static equilibrium even though the market for regional jets is quite volatile. Aircraft orders tend to come in bunches and from year to year total orders can fluctuate drastically. Furthermore, demand for regional jets is extremely sensitive to global macroeconomic trends. Consequently, the change in the number of orders a firm receives year to year could have just as much to do with a global recession as it does with the

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<sup>9</sup> Sheldon, Ian and McCorrison, Steve. "Climate Policy and Border Measures: The Case of the US Aluminum Industry" 2015.

government support a firm's competitor receives. The second problem with my simulation are the data. Finding reliable data for the number of orders each firm receives, the price of a jet, and the subsidy levels was extremely difficult since pricing data is considered a trade secret and governments are quite reluctant to release information about a subsidy program that has been deemed illegal. As a result, my simulation of the regional jet market would fair poorly if it were subjected to sensitivity analysis and should not be interpreted as a conclusive result. Instead, this exercise should be interpreted as a general simulation that applies widely accepted theory to an undeniably imperfectly competitive market. The quantity and pricing information comes from The Airline Monitor<sup>10</sup> (Greenslet, May 2007). Subsidy levels from the two governments were even more difficult to come by as all of these numbers were struck from publicly released WTO documents. The final subsidy number for Brazil was taken from an estimate by Bombardier CEO Bob Brown who calculated ProEx was reducing the price of ERJ-145s by about 2 million (Hadekel, 2004, 194). The subsidy levels for Bombardier were acquired from an Embraer press release that estimates "the current award against Canada is close to US\$ 4.0 million per subsidized aircraft" (Embraer Press Release, 2003). As mentioned above, for the final award the WTO tacked on an additional 20% of the EDC subsidy in an effort to make Canada comply (Shadikhodjaev, 2009, p.148). This leads to a rough estimate that each plane was subsidized by about US\$ 3.3 million. These crude calculations yield the following results.

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<sup>10</sup> A special thanks to Mr. Greenslet of The Airline Monitor and Dr. Taneja of OSU for granting me access to this data.

Variable*	Both getting subsidies	Only Bombardier subsidy	Only Embraer subsidy	No subsidies
Bombardier profits	1797.7	1857.4	1277.9	1328.4
Embraer profits	369.7	247.3	410.0	280.5
Net Canadian welfare	-160.2	-110.9	-50.4	0
Net Brazilian welfare	-105.9	-33.1	-75.9	0
Consumer surplus	1913.9	1767.8	1573.4	1425.2
Bombardier sales	190	193	160	164
Embraer sales	97	79	102	85
Bombardier price	16.4	16.5	18.2	18.4
Embraer price	13.2	14.5	13.4	14.8

\*All values in \$millions except sale quantities

Interestingly enough, when one government subsidizes to move its firm into the Stackelberg leader position the program is actually welfare decreasing. This is likely because the two countries' subsidy programs were so large that they outweighed any increase in firm profits. Moreover, when both governments choose to subsidize joint welfare decreases even more dramatically and the two governments would be better off coming to an agreement on limiting subsidies. Based on theory and the rough estimates provided in this paper, the subsidy programs run by the Brazilian and Canadian governments defied economic logic. Both governments responded to escalation with further subsidization. In the end, the expanded output and increased profit of the firms did not outweigh the tax dollars spent on the subsidization program and the terms of trade loss from lowered export prices. Beyond just economic logic, the two sides suffered appreciably in diplomatic terms as highlighted above. What becomes readily apparent, then, is that there was something beyond economic welfare in each government's calculus to subsidize their respective firms. In the basic Brander and Spencer model

societal welfare is simply the profit of the firm minus the cost of the subsidy and the objective of the government is to increase domestic welfare. But as Brander and Spencer concede “there is nothing that rules out political economy objectives, such as the use of trade policy to reward special interest groups (SIG) that provide large donations to the government”(Brander and Spencer, 2008, 2). If joint subsidization flies in the face of economic logic, then there must be underlying political objectives that compelled Canada and Brazil to continue subsidizing Bombardier and Embraer and drag their heels when it came to complying with the WTO rulings.

*Political Economy, Ideas, and WTO Compliance*

For all the ink that has been spilled bemoaning their reliance on soft law and a weak enforcement mechanism, the GATT/WTO have been remarkably effective at resolving disputes between trade combatants. In a survey of over 600 GATT/WTO disputes between 1948-1999 Marc Busch and Eric Reinhardt find that nearly 55% of disputes are settled before the panel stage, leading to the conclusion that “settlement and the withdrawal of cases are thus the norm, not the exception” (Busch and Reinhardt, 2000, p.161). Instead of a supranational enforcement authority, the WTO relies on the political or reputational costs of non-compliance. As Alexander Thompson points out in a general analysis of reputation and compliance in international law “the reputational benefits from compliance, or the costs of a damaged reputation from non-compliance, can sometimes override the short-term payoff to be gained by violation (2009, p.305). In a similar fashion to Busch’s blueprint for why governments support high-tech industries<sup>11</sup>, states theoretically weigh the benefits of non-compliance against the reputational costs of being seen as uncooperative. Nonetheless, in Busch’s formula states are concerned with

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<sup>11</sup> See quote on page 25



maximizing national welfare when they balance the benefits and costs of intervening on a firm's behalf. As advanced in the previous section, however, Brazil and Canada's subsidization policies were welfare decreasing. Moreover, the two states refused to compromise even with the WTO's negotiation forum at their disposal and declined to comply with WTO mandates despite the reputational costs of noncompliance. The utility functions of the two governments must have deviated from the traditional expectation of only seeking to maximize welfare.

Often times in the study of international relations states are considered unitary actors with a single objective function. This process, known as "black boxing" the state, reduces countries to a single set of preferences that are ordered hierarchically based on expected payoff (Busch, 1999, 15). The results from the empirical section, however, tentatively call into question the appropriateness of the unitary actor paradigm in the Brazil vs. Canada WTO dispute. Instead, during their messy WTO dispute Brazilian and Canadian officials seemed to privilege interest group preferences over national welfare considerations. Brazil and Canada's subsidy war was self-defeating and yet the two governments fought on in the name of their precious aerospace industry. Interestingly, flouting WTO mandates for the benefit of a large industry is not uncommon behavior. Analyzing the compliance decisions from nearly 100 WTO cases from 1995-2008, Tobias Hofmann and Soo Yeon Kim found strong empirical evidence supporting the claim that "delays in the implementation of WTO-recommended policies are a consequence of opportunistic governments trying to maximize their political support function by providing influential economic sectors with continued non-compliance"

(Hofmann and Kim, 2012, p.2). What, then, best models the decision-making behavior of Brazil and Canada during their WTO spat?

Since more classical understandings of international relations and economics with states as “monolithic entities” (Schropp, 2009, p.183) and elected officials as benevolent policy makers seeking to maximize national welfare seem unable to explain Brazil and Canada’s behavior in this context, I turn to more political economy oriented explanations. A useful starting point is endogenous protection theory, which “predicts that in response to increased import competition, private domestic interests will intensify their lobbying activity for protection”(Trefler, 1993, p.139). Domestic lobbies are better able to bring about their policy preferences regardless of national welfare considerations because they are organized, can effectively appeal directly to politicians, and can make sizeable campaign contributions (Grossman and Helpmann, 1995a, p.681). It is not hard to imagine this scenario with export subsidies in place of import protection. As we see in this WTO dispute, both Embraer and Bombardier were able to successfully lobby for more subsidy support in the face of increased export competition. The implication of this idea is that politicians are not welfare maximizers and are instead concerned with what Richard Baldwin terms their “politically realistic objective function (PROF)”(1997, p. 287). In the PROF model politicians have a set of policy objectives they prefer, but they compromise their preferences in favor of re-election. Since policy is set by election sensitive officials trying to maximize their political support “a country’s policy stance reflects the relative political power of its organized special interests and also the extent of the government’s concern for the plight of the average voter” (Grossman and Helpmann,

1995b, p.668). Grossman and Helpmann develop a simple linear model of a government's PROF:

$$G \equiv \sum_i C_i + aW$$

where  $C_i$  is the campaign contribution of the lobby for industry  $i$ ,  $W$  is aggregate welfare and  $a$  is a parameter that reflects the policy-maker's sensitivity to the average person's wellbeing relative to their "taste" for campaign contributions (Grossman and Helpmann, 1995b, p.670). Turning to the Embraer and Bombardier case, the relative political weight of the two firms likely helped them secure sizeable export subsidies. Given that "survival-maximizing governments take the relative political importance of these economic sectors into consideration when deciding on whether and when to comply" (Hofmann and Kim, 2012, p.6) with WTO rulings, it is equally likely that the Brazilian and Canadian governments dug their heels in due to the political influence of Bombardier and Embraer. The following subsections will analyze the political importance of Bombardier and Embraer and how it influenced government behavior.

In Peter Hadekel's history of Bombardier, *Silent Partners: Taxpayers and the Bankrolling of Bombardier*, a certain trend is quite clear; Bombardier has an outsized influence in Canadian politics. To put it bluntly "Bombardier's political clout count[s] for a lot in Ottawa"(Hadekel, 2004, 200). In general, it is unsurprising that Bombardier would have so much influence in Canadian politics given that "aerospace has been the backbone of central Canadian manufacturing, employing approximately 80,000 workers" (Froese, 2010, p.83 and that "Bombardier [is] one of the largest corporate donors to the Liberal party"(Goldstein and McGuire, 2004, p.557). What is rather impressive, however, is how easy it was for Bombardier to steer policy decisions during the WTO dispute.

Hadekel notes on multiple occasions how the CEO of Bombardier, Bob Brown, could simply pick up the phone and convince Canadian Cabinet Ministers that without more support Bombardier, and therefore the aerospace industry, would crumble. In fact, the director of financial and economic analysis at Industry Canada, which was responsible for the DIPP, noted “a strong political pressure to grant loans to aerospace”(Hadekel, 2004, p.161). What is more, the TPC, which replaced the DIPP after that program came under intense public scrutiny, “was the result of a lot of lobbying” by the aerospace industry (Hadekel, 2004, p.167). Beyond just its economic importance, though, Bombardier derives influence from regional politics. As a large company in Quebec, Bombardier has always served as a buffer between Ottawa and the separatist movement in Quebec. Investing in Bombardier has consistently been a safe bet as a strong aerospace sector bolsters the Quebec economy and therefore quells separatist tensions. In fact, during the 1995 referendum for Quebec independence, Laurent Beaudoin was one of the most active supporters of remaining a part of Canada. As Hadekel underscores, many Canadians were suspicious that this was the price Beaudoin was paying for all the export support and Canadian intransigence during the WTO spat was the government returning the favor.

While Bombardier seems to have untold influence in Canada, Embraer certainly “does not lack for political sway” (Goldstein and McGuire, 2004, p.556). Before Brazil transitioned to a democracy, military rule certainly treated Embraer kindly. As a subsidiary of Brazil’s Defense Ministry, and the darling of the air force, Embraer received a steady stream of government support. With the transition to democracy little changed as “democracy allowed organized groups to lobby for trade measures”(Barral,

2007, p.13). As a large firm, Embraer has unsurprisingly been able to put together an effective organized lobby group. Like Canada, regional interests also tend to dominate Brazilian politics as strong governors can dramatically influence presidential elections (Lee, 2007, p.17). As the prevailing industry in São Paulo region, presidential candidates who seek support from the São Paulo governor must cater to aerospace interests. An interesting note is how much of an impact the civil aircraft dispute had on Brazilian politics. In fact, Barral highlights that the case “triggered Brazilian pride in their most technologically sophisticated industry” and candidates began to argue over which party was responsible for the WTO claims (2007, p. 8&14). Moreover, the WTO dispute received “widespread attention in Brazilian internal politics, the private sector, and the media”(Schaffer, Ratton-Sanchez, and Rosenberg, 2006, p.14). Thus, as public outrage over Canada’s WTO suits and beef bans reached a fever pitch, it became politically beneficial to further support Embraer and act tough at the WTO.

In a less cynical view of foreign policy decisions, Judith Goldstein and Robert Keohane argue that ideas, just as much as SIG preferences, influence policy. For the two authors “ideas influence policy when the principled or causal beliefs they embody provide road maps”(Goldstein and Keohane, 1993, p.3). Furthermore, Goldstein and Keohane contend that policy choices have long lasting implications as they become embedded as norms. In the case of both Brazil and Canada it is not hard to see that the policy goal of a robust aerospace industry has become an entrenched idea. Because of their relatively small domestic economies, both countries rely on the success of their exporters. The problem for Brazil and Canada, however, is that their exports tend to be low-value commodities. The embedded policy goal is therefore to move beyond

commodities to value-added high technology exports. Canada, for instance, “is keen to move away from commodity dependence and to build its export competitiveness on knowledge”(Goldstein and McGuire, 2004, p.15). Therefore, supporting their aerospace industries is a priority as they represent major steps towards achieving the goal of an economy based on high-technology exports. For example, both companies are referred to as “national champions”(Froese, 2010, p.85) or “crown jewels”(Shaffer and Meléndez-Ortiz, 2010, p.77) of their country’s industrial policy. Intransigence at the WTO could also be explained by fundamental beliefs on the role of the World Trade Organization itself. It is predictable that Canada would file suit against Brazil and its ProEx program as “faced with trade dependence, Canada naturally prefer[s] a robust, international framework regulating trade”(Goldstein and McGuire, 2004, p.19). In challenging what it sees as an unfair playing field for developing countries “the Brazilian strategy has been to act as a champion of developing countries” and contests components of the ASCM that were borrowed from the OECD Arrangement (a treaty no developing country took part in crafting).

If leaders in the Brazilian and Canadian governments were only concerned with maximizing national welfare then the cost of their subsidization program and the looming threat of reputation loss likely would have compelled them to reach an agreement during the consultation phase of their WTO spat. Instead, theory allows for, and the evidence demonstrates, the fact that there are a whole host of factors that can inform policy decisions. In this instance votes were a rather salient consideration for both governments. For Canada, continued support for Bombardier delivered votes and campaign contributions for the Liberal party and mollified regional tensions. In Brazil, obstinacy at

the WTO was quite popular in the fledgling democracy and appealed to national pride. More to that point, national pride was certainly a determinant in both countries' decisions. If either government failed to defend its aerospace firm, then it risked losing a "national champion" that was a major source of national pride. Finally, the decision to bear down during the WTO dispute represents the confluence of two imbedded policy goals for each country. For Brazil and Canada the aerospace industry is critically important for the long-term goal of shifting towards high value-added exports. In other words, an expensive subsidy program and the reputation costs of non-compliance would certainly be worth it if it meant securing the future economic vitality of the country. The second entrenched policy idea revolves around how both states view the purpose of the WTO. For Canada, ensuring a robust WTO regime is essential for its export based economy, while Brazil's rallying cry has been supporting special treatment for developing countries at the WTO.

#### *Flaws in the WTO Dispute Settlement System*

Beyond just political economy considerations, the structure of the WTO's dispute settlement system itself is likely at fault for the duration of Brazil and Canada's WTO dispute. The best way to think about the WTO is as a series of bilateral contracts in which each country extends the "most favored nation" trading status to all other signatories. While there are a set of minimum standards (the TRIPS agreement is a useful example) and basic auxiliary rules (procedural rules and financial contributions) that constitute *erga omnes* entitlements, the central foundation of the WTO is the bilateral market access entitlements. In order to be an effective contract the WTO must prevent *ex post* behavior that would violate the bilateral market access entitlements, while also allowing for

flexibility in the face of “regret contingencies”. According to Mahoney a regret contingency occurs “when the future diverges from what a party expected, he may conclude that the performance he will receive under the contract is no longer more valuable than the performance he must provide.” In terms of *ex post* flexibility, the WTO is quite weak as signatories lack explicit legal means to temporarily withdraw or deviate from the WTO contract. The lack of efficient escape clauses in the WTO “effectively blurs the line between good-faith and bad-faith (opportunistic) behavior”(Schropp, 2009, p. 237). The difficulty in discerning between good faith and opportunistic behavior was likely a major source tension between Brazil and Canada during the early stages of the dispute over regional jets. For instance, although Canada and Brazil’s initial subsidization programs were in violation of the ASCM, the aim of the subsidies was certainly not to undercut each other’s firms and capture excess rents at the expense of their competitor. The subsidies were instead meant to support R&D projects that private capital simply would not touch. However, without realistic means of opting out and signaling good faith behavior, mutual suspicion was bound to arise. With heightened sensitivity towards opportunistic behavior on both sides, “the WTO contract effectively establishes violation-cum-retaliation as the de facto rule”(Schropp, 2009, p.243). A regime of violation-cum-retaliation is problematic for the WTO as retaliation is widely considered welfare depreciating. While larger states like the US and EU are generally able to absorb the cost of suspending concessions, smaller states find that the economic inefficiencies created by retaliation are unpalatable. Furthermore, states are often unable to find enough goods to tariff if they are not large trading partners with the injurer, or if their adversary only exports a few goods that are critical to the complainant’s economy. For example, Canada



faced this exact problem in enacting its award; “Canada just did not have enough products from Brazil that could be sourced from elsewhere if it used its full level of C\$ 344.2 million per annum”(Khabayan, 2010, p.279). Without the realistic ability to suspend concessions, injurers essentially get a free pass on their violation. Moreover, since “Game theory suggests that a threat is credible if players know *ex ante* that it will materialize” the lack of penalties for *ex post* violation increases the likelihood of opportunistic behavior. With the WTO contract, then, “the injuring country can renege on the trade entitlement for free”(Schropp, 2009, p.247). In general, this has a detrimental impact on the WTO dispute settlement system and increases the instances of unresolved disputes “once a ruling has been issued a dispute is much less likely to end with full or partial satisfaction of the complainant’s initial demands”(Busch and Reinhardt, 2000, p.159). More specifically, without a practical *de jure* mechanism for retaliation, the only way to strike back for Brazil and Canada during the regional jet dispute was to further subsidize. The net result of the WTO’s deficiencies, then, is that it incentivized jointly suboptimal subsidies and caused the two governments to act more belligerently than they otherwise would have.

### *Conclusion*

The decision to subsidize Bombardier and Embraer’s development of a regional jet was an unsurprising one and was in line with an established pattern of a generous government support for the country’s aerospace industry. In fact, the relationship between Bombardier and Embraer and their government is common worldwide as states are perpetually concerned with supporting the kind of high-technology firms that will be the economic engines of tomorrow. Problems arise, though, when two governments bent

on protecting their high-tech exporters throw concerns for present economic welfare by the wayside. The governments' intransigence is fueled by mistrust for their subsidizing rival, domestic special interests, and policy goals that privilege securing long-term economic gains over present and short-term ones. This is what played out in the regional jet rivalry. The combined influence of special interest groups and the inability to credibly commit to not subsidizing caused the Brazilian and Canadian governments to slide into a welfare decreasing Nash equilibrium. What further exacerbated tensions were the rather glaring deficiencies of the WTO in handling a dispute of this nature. Had the two sides been able to signal that their subsidization was not intended to be opportunistic, then the consultation phase likely would have resulted in the kind of welfare improving agreement to limit subsidies that March Busch predicts. Instead, the dispute slipped into the violation-cum-retaliation scenario that is certainly counterproductive. To be fair, the GATT/WTO system of dispute settlement is oftentimes quite successful at resolving disputes; however, in this instance reputation costs were trumped by SIG preferences and domestic policy goals and the WTO dispute settlement system only served to magnify the antagonism between the two sides.

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