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Tighter Border Security and Its Effect on Canadian Exports

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Tighter Border Security and Its Effect on Canadian Exports
by *Michael Burt*

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Preface

In this report, The Conference Board of Canada uses statistical methods to assess the impact that tighter border security in a post-9/11 world has had on Canada's exports to the United States. Export flows are examined in a variety of ways, including aggregate exports, exports by port and exports by commodity. After accounting for economic growth in the United States and relative prices between the two countries, the study finds little evidence that tighter border security has reduced export volumes. The report is a joint project of the Conference Board's Centre for National Security, and International Trade and Investment Centre.

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EXECUTIVE SUMMARY

Tighter Border Security and Its Effect on Canadian Exports

At a Glance

- No evidence could be found that tighter border security has had a negative impact on the total volume of Canadian exports to the United States.
- When examining export data by port, we found evidence that tighter border security did reduce trade flows through the port of Fort Erie.
- After examining exports of particular commodities, we concluded that industry-specific factors such as the tech bust were more important in explaining reduced trade flows following 9/11 than tighter border security.

The 9/11 terrorist attacks have, not surprisingly, led to increased security at the Canada–U.S. border. This change has raised concerns about significant disruptions in international trade between the two countries, in the form of delays and increased compliance costs. Given the Canadian economy's high degree of dependence on trade links with the United States, any reductions in flows between the two countries could threaten the economic welfare of Canadians.

The purpose of this study was to estimate whether the increased security imposed after 9/11 has had a lasting effect on the flow of exports crossing land ports into the United States from Canada. To do so, we used statistical techniques to determine which factors influenced export volumes between 1988 and 2005. Dummy variables were used to account for any effects on trade volumes that might have occurred as a result of tighter border security following 9/11.

We estimated exports in a variety of ways to test whether tighter border security had an effect. For example, we looked at total aggregate exports, exports by port and exports by commodity. In some cases we also examined exports by commodity and port.

Tighter security measures do not appear to have impacted overall exports to the United States, but did reduce trade flows at the port of Fort Erie.

In the end, our empirical analysis did not support the contention that tighter security measures have had an impact on exports to the United States. At both the aggregate level and, with the exception of Fort Erie, the port level, we did not find evidence of a significant shift in trade volumes following 9/11. In the case of Fort Erie, below average regional performance in the U.S. Northeast and substitution away from Fort Erie in favour of other ports in Southern Ontario both contributed to reduced trade volumes. However, these factors cannot explain all of the reduction; thus, it is likely that security measures are at least partially responsible for the diminished traffic through Fort Erie.

In the case of exports by commodity, we found that tighter border security affected exports of television and telecommunications equipment only. However, the shift in trade volumes for this commodity had more to do with the tech bust and subsequent global restructuring of the industry that produces this commodity than it did with tighter border security. Similarly, when significant results did appear in the case of a few specific commodities at individual ports, it was usually commodity-specific factors, such as the softwood lumber dispute, that influenced the results.

Work similar to this study has been limited, but this report's conclusions are contrary to those of the one other major paper that has conducted a similar analysis. However, key differences in methodology likely explain this discrepancy in results. These differences include the fact that we used inflation-adjusted trade data, a longer time period in our statistical analysis, and a range of explanatory variables to estimate trade. As a result, we believe that our results are more robust.

CHAPTER 1

Introduction

Chapter Summary

- Given the high level of integration of Canada's economy with that of the United States, there has been concern that tighter border security post-9/11 has reduced Canada's economic performance.
- Several studies have tried to assess the costs of increased border security compliance for businesses, but empirical work looking at how these costs may have affected trade volumes has been limited.
- This study answers the question, "Has tighter border security reduced Canada's exports to the United States?" The short answer is "No."

The 9/11 terrorist attacks have, not surprisingly, led to new concerns about security in the United States. Heightened security regarding the movement of goods across the Canada–U.S. border has raised concerns about significant disruptions in international trade. The main worry is that more intense inspection procedures at the border have contributed to delays and higher costs. These higher costs could then discourage growth in trade between Canada and the United States. Given that exports to the United States are equivalent to about one-third of Canadian gross domestic product (GDP), any developments that could hamper trade flows between the two countries could threaten the economic welfare of Canadians.

The purpose of this study was to estimate whether the increased security imposed after 9/11 has had a lasting effect on the flow of exports crossing land ports into the United States from Canada. This study accompanies another study produced by The Conference Board of Canada, *Reaching a Tipping Point? Effects of the Post-9/11 Border Security Environment on Canada's Trade and Investment*. (See box "Reaching a Tipping Point?") That study brings together the results of this analysis with almost 60 in-depth interviews about the effects of the post-9/11 security environment on Canadian trade and company competitiveness. That study describes the nature of Canada–U.S. economic integration and offers policy and business strategy advice that flows from the comprehensive analysis.

Previous research indicated that the cost of doing business has risen because of increased border security, and Canadian businesses have borne most of the costs.

The general perception, reinforced by tales of truck lineups at the border, is that tighter border security measures have had a measurable impact on trade volumes between Canada and the United States. Previous research on this

Reaching a Tipping Point?

It is clear that the post-9/11 security environment has changed the way many companies trade across the border. Companies are bearing important new costs of cross-border trade, ranging from the direct costs of complying with new policies, to more indirect costs, such as dealing with greater uncertainty. However, this study finds little evidence that export volumes have been reduced as a result. Thus, companies that need to get their goods to market appear to be doing whatever they must to do so.

However, this new border security environment poses challenges for a country such as Canada. Investors will, all else being equal, tend to locate production in the larger U.S. market. If new border crossing costs make access to the U.S. market more difficult, this tendency will be heightened. In the short term, there may be no effect on exports, but as contracts expire, these new costs will factor into long-term decisions to source from and invest in Canada. In the highly competitive global operating environment, even small new border costs could have important negative economic consequences and could dilute some of the benefits for Canada of operating in the North American economic space.

The new border security environment also offers opportunities for Canada. Programs such as the Fast and Secure Trade (FAST) program, which separates pre-approved and trusted cargo from cargo posing unknown risks, can be powerful tools to improve both security and efficiency. Where FAST works, it works well, and some companies view it as a competitive advantage. But these programs are not fully realizing their benefits in some locations. FAST-approved drivers often elect to use regular lanes, for example. If it is implemented effectively across all border crossings, however, Canada could become the preferred place for global companies to get access to North America.

To enable secure, predictable access to the U.S. market, Canadian governments must keep new rules simple and predictable, and inform businesses of both Canadian and U.S. rules through a one-stop portal. They should also work with the U.S. to mutually recognize Canadian and U.S. border policies for FAST and, possibly, create a FAST-only border crossing. Adequate investment in border infrastructure and human resources on the Canadian side of the border is also critical. Canadian policy-makers should reassess their priorities. For example, they should consider dropping duty collection from their border responsibilities and have a clear plan for re-opening the border in the event of another 9/11.

Companies, on the other hand, should develop a plan to address another attack that affects cross-border supply chains. They might need to accept some upfront border security cost increases as the price of secure market access, but they should view that cost as an opportunity to invest in and improve their competitive position. Some company representatives interviewed for this report viewed their upfront security program costs as an opportunity to reduce waste, improve their systems and ensure their firm is viewed as a trusted security partner at the border. Still, smaller businesses might hold off on signing up for FAST until the benefits are commensurate with the costs.

These government and business changes would represent a positive start toward minimizing trade costs, increasing predictability, and maximizing the economic and security benefits of the post-9/11 border reality.

Source: The Conference Board of Canada.

question has largely been focused on assessing the cost of increased border security for businesses.[1] Earlier findings suggest that the cost of doing business has risen as a result of increased border security and that the costs for Canadian businesses have been larger than those for U.S. businesses.

Empirical work that examines whether the volume of trade has been affected has been much more limited. The most relevant study, by Steven Globerman and Paul Storer,[2] conducted a statistical analysis of the degree to which bilateral trade flows between the two countries fell short of expected levels in the period after 9/11. Their study provided estimates of trade shortfalls for both U.S. exports to Canada and U.S. imports from Canada at an aggregate level, as well as separately for the largest U.S. land ports. The key finding of this study was that exports to and imports from Canada were lower than they would have been if not for the events of 9/11. While the shortfall for U.S. exports to Canada was largely eliminated by the middle of 2005, a significant shortfall for Canadian exports to the United States has persisted beyond this period.

1 Examples of reports of this nature include A. MacPherson et al., *The Impact of U.S. Anti-Terrorism Policies*; DAMF Consultants and L-P Tardif, *The Cumulative Impact of U.S. Import Compliance Programs*; and Therrien and Tanguay, "The Impacts of 9/11 on Trade Costs."

2 Globerman and Storer, *The Impacts of 9/11 on Canada–U.S. Trade*.

However, these findings are inconsistent with the conclusions of this report. In general, we did not find that tighter security measures after 9/11 had a significant impact on the volume of trade between Canada and the United States. Because the data used in this study were published on a quarterly basis, certain short-term costs—such as the effect of an extra hour's delay at the border—might not have been captured in the results. However, it is quite clear that outside of a few isolated examples, the effects of these higher costs on the volume of trade were not significant.

For the purposes of this study, we chose to focus our efforts on Canadian exports rather than imports. We did so for a number of reasons, including the following:

- Preliminary analysis of the import data resulted in equations that were less robust and presented statistical challenges. Thus, the import equations provided less accurate and meaningful results.
- Because of the integrated nature of trade between Canada and the United States, if an effect did not show up for exports, it is unlikely that it would show up for imports.
- Since much of the increase in border security following 9/11 was on the U.S. side of the border, we expected that the largest impact would be on Canadian exports. This assumption is supported by other studies, such as the Globerman and Storer study, which found that the effect of increased security on Canadian imports diminished over time.

This report starts with a discussion of the methodology used to test for statistical evidence of a disruption in export volumes following 9/11. The equation used took three forms. The first looked at total export volumes, the second looked at export volumes by port and the third tested export volumes for specific commodities. All of these equations are described in more detail in the report.

The next section of the report discusses the data used to conduct the analysis. It describes which ports and which commodities were included, as well as why we chose them. Most of the data used in the analysis came from Statistics Canada.

The results of the statistical analysis are presented next. This section is broken into three major segments. The first looks at the results for all commodities, the second looks at the results by port and third looks at the results by commodity. A summary of the major findings is also provided for the port and commodity segments.

The report's conclusion section summarizes our results. It discusses the methodological differences between our study and the Globerman and Storer study. These disparities are likely the reason why the findings of the two reports differ, and they are the reason why we believe the results of our study are more robust. Key improvements in our methodology include:

- the use of real trade data rather than nominal trade data;
- the use of commodity- and port-specific drivers to explain trade volumes; and
- the use of a longer sample period in the estimations.

A short bibliography follows in Appendix A, and detailed results from the statistical analysis can be found in Appendix B.

CHAPTER 2

Methodology

Chapter Summary

- In order to examine how tighter border security may have affected trade, export volumes were modelled in a variety of ways.
- Equations were estimated for total exports, exports by port and exports by commodity.
- The equations were structured such that export volumes are determined by a growth driver, by relative prices between Canada and the United States, and by export volumes in the previous period.
- Dummy variables were also included to test for the effects of a shift in export volumes following 9/11.

Many different equations were estimated to determine what contributed to movements in export volumes. Each equation was structured so that real exports—that is, the dollar value of exports adjusted for inflation—were a function of four factors: a growth driver such as real GDP in the United States; a relative price term; dummy variables to account for the effects of tighter border security; and the volume of exports lagged by one period. The real export, growth driver, and relative price variables were transformed so that they were estimated in natural log form.

The export data were estimated in a variety of ways to provide as thorough an analysis as possible. We initially estimated total export volumes, then we disaggregated the data to test for the effect of tighter border security at the individual port and commodity level.

Different driver variables were considered to see which did the best job of describing changes in Canadian export volumes to the United States.

AGGREGATE ANALYSIS

The first step was to examine export volumes at the aggregate level—that is, all commodities passing through all of the ports for which we had data. The equation took the following form:

$$\text{EXPORT VOLUME}_t = B_1 * \text{DRIVERT} + B_2 * \text{RELATIVE PRICE}_t + B_3 * \text{TEMPORARY DUMMY}_t + B_4 * \text{PERMANENT DUMMY}_t + B_5 * \text{EXPORT VOLUME}_{t-1}$$

In this equation, the "betas" represented the estimated coefficients and thus measured the impact of each variable on the inflation-adjusted export volumes. Different driver variables were considered to see which did the best job of describing changes in Canadian export volumes to the United States. We expected that the driver variable would have a positive relationship with export volumes.

Dummy Variables

A dummy variable is used to denote the presence or absence of a certain characteristic over time. Dummy variables can only take the value of zero or one, denoting the lack or presence of this characteristic.

In this case, the temporary dummy variable took a value of zero, except in the third and fourth quarters of 2001. The permanent dummy took a value of zero prior to the third quarter of 2001 and a value of one thereafter.

It should be noted that the dummy variables captured a shift in the behaviour of export volumes. It is possible that this change could have been the result of factors other than tighter border security.

Source: The Conference Board of Canada.

The relative price term was designed to account for exchange-rate-adjusted changes in relative prices between Canada and the United States. All else being equal, an increase in prices in Canada relative to the United States would be expected to result in weaker export growth, so a negative relationship between the two variables should be expected. For this equation, the relative price term is defined as the export price for all goods exported from Canada in Canadian dollars, relative to the price for all finished goods in the United States multiplied by the US$/CDN$ exchange rate.

Both a temporary and a permanent dummy variable tested whether tighter security following 9/11 caused a brief or longer term trade disruption.

The two dummy variables were used to test for the effects of tighter border security on export trade flows. The temporary dummy tested for short-term effects on trade flows in the third and fourth quarters of 2001. The permanent dummy tested for a permanent shift in trade flows following 9/11, with the variable having a value of zero prior to the third quarter of 2001 and a value of one thereafter. This is an important distinction, in that we tested whether 9/11 simply represented a temporary disruption to trade or whether subsequent security measures resulted in a more permanent, long-term effect, as some analysts have argued. If, as postulated, tighter border security resulted in reduced export volumes, the relationship between the dummy variables and export volumes would be expected to be negative.

ALL COMMODITIES BY PORT

The next step was to disaggregate the analysis and examine total trade flows through each individual port. Since delays can be port specific, it is possible that tighter security measures would have affected volumes at some ports but not others. The equation used for this process was very similar to the one used for the aggregate analysis, and took the following form for each port "i":

$$\text{EXPORT VOLUME}_{i,t} = B_{i,1}*\text{DRIVER}_{i,t} + B_{i,2}*\text{RELATIVE PRICE}_t + B_{i,3}*\text{TEMPORARY DUMMY}_t + B_{i,4}*\text{PERMANENT DUMMY}_T + B_{i,5}*\text{EXPORT VOLUME}_{i,t-1}$$

By specifying the equation in this way, we gave each port its own equation, with a growth driver that was best suited to that port. The relative price variable used for each port was the same as the one used in the aggregate equation—that is, the export price for all goods exported from Canada in Canadian dollars, relative to the price for all finished goods in the United States multiplied by the US$/CDN$ exchange rate.

Since we had detailed data for 12 ports, this specification resulted in 12 equations, where the estimated coefficients varied for each port. This permitted a port-by-port analysis of the effects of tighter border security on trade volumes.

It is also important to note that as part of the individual port analysis, we also examined any outliers that presented results that differed from those of the aggregate analysis. Because factors such as regional economic performance and the substitution of one port for another can influence trade flows through individual ports, it was important to ensure that these factors did not bias the results. As a result, where possible, we controlled for these factors in an effort to ensure that the equation results were as robust as possible. For example, we tested the use of regional growth drivers instead of national ones for some ports. We also grouped ports together that might have been experiencing substitution to see what the results were for the combined ports.

INDIVIDUAL COMMODITIES

The last step in the process was to estimate export volumes for specific commodities to see whether they might have been influenced by tighter border security following 9/11. Security measures might have affected certain commodities more than others. We first looked at the total flows of each commodity type though all of the ports. The equation specification used in this step was similar to that used in the previous two steps. The equation took the following form for each commodity "i":

$$\text{EXPORT VOLUME}_{i,t} = B_{i,1}*\text{DRIVER}_{i,t} + B_{i,2}*\text{RELATIVE PRICE}_{i,t} + B_{i,3}*\text{TEMPORARY DUMMY}_{t} + B_{i,4}*\text{PERMANENT DUMMY}_{t} + B_{i,5}*\text{EXPORT VOLUME}_{i,t-1}$$

Thus, each commodity had a specific relative price variable. The relative price term was the price of that commodity in Canada, relative to the price of the commodity in the United States multiplied by the US$/CDN$ exchange rate. Also, the demand driver varied for each commodity. For example, U.S. housing starts were the major determinant of lumber exports, while U.S. vehicle production was used as the driver for motor vehicle parts exports.

Total flows for all commodities, commodity flows through individual ports, and flows for particular commodities at individual ports were analyzed to ensure the robustness of the findings.

Since trade data were available by both port and commodity, we decided to take the extra step of using panel analysis to see whether the results were different for commodity flows through individual ports. To be included in the panel, nominal trade for a particular commodity at the port in question had to account for at least 5 per cent of the total trade flows for that commodity. A primary difference between the previous equations and the panel analysis was the introduction of an estimated constant.

Panel Analysis

Panel analysis effectively stacked the data for each port, greatly increasing the sample size for the statistical analysis. As a result, the analysis produced more precise estimates.

With panel analysis, it was possible to allow the estimated coefficients to vary by port or to generate a coefficient that was the same for all ports. For this analysis, we allowed the coefficients for the dummy variables and the lagged dependent variables to vary by port, but all the other variable coefficients were held constant across all ports.

Source: The Conference Board of Canada.

Given the varying volumes of trade flows through the different ports, it was necessary to estimate a constant that varied with each port, as part of the equation. Thus, for each commodity, the panel equation took the following form, where "i" represented port-specific factors:

$$\text{EXPORT VOLUME}_{i,t} = \text{CONSTANT}_{i} + B_{1}*\text{DRIVER}_{t} + B_{2}*\text{RELATIVE PRICE}_{t} + B_{i,3}*\text{TEMPORARY DUMMY}_{t} + B_{i,4}*\text{PERMANENT DUMMY}_{t} + B_{i,5}*\text{EXPORT VOLUME}_{i,t-1}$$

As one final step, we also estimated equations for particular commodities at individual ports that were major sources of trade flows for those commodities. This step ensured that the results for a particular port were not being obscured by the estimation results for the all-ports equation or the panel analysis.

As with the all-commodities-by-port segment, we also examined any outliers that presented results that differed from those of the aggregate analysis. Because exports of individual commodities can be influenced by the performance of the companies and industries that manufacture those commodities, it was important to ensure that industry-specific factors did not bias the results. As a result, where possible, we controlled for these factors in an effort to ensure that the equation results were as robust as possible. For example, we tried to account for the effects of the softwood lumber dispute on lumber exports.

CHAPTER 3

Data

Chapter Summary

- Detailed trade data for this analysis came from Statistics Canada and included data by port for 12 of Canada's busiest ports.
- We also acquired data for 12 major commodity groupings that were shipped mainly by truck.
- Other sources of data used in the analysis included three American sources: the Bureau of Economic Analysis, the Bureau of Labor Statistics, and the U.S. Census Bureau.

To verify the degree to which 9/11 and subsequent security measures affected the flow of exports across the border, we examined export data for 12 of Canada's busiest land border crossings. The port data came from Statistics Canada and was obtained on a quarterly basis between 1988 and 2005. We analyzed the following border crossings in this study:

- Emerson, Manitoba
- Fort Erie, Ontario
- Lacolle, Quebec
- Lansdowne, Ontario
- Niagara Falls, Ontario
- North Portal, Saskatchewan
- Pacific Highway, British Columbia
- Philipsburg, Quebec
- Sarnia, Ontario
- Windsor Bridge, Ontario
- Windsor Tunnel, Ontario
- Woodstock, New Brunswick

The ports selected are among the 15 busiest in Canada in terms of the number of truck crossings, but a few were selected to provide a broad regional mix, rather than for their absolute size or ordinal rank. (See Table 1.) In total, these 12 ports accounted for 70 per cent of nominal Canadian exports to the United States in 2005. Nearly two-thirds of the remaining export activity was accounted for by oil and gas exports, which were purposely ignored in this analysis since they travel by pipeline and thus were unaffected by increased security measures.

Twelve commodity groups made up 41 per cent of total nominal trade using the 12 selected land border crossings.

In addition to looking at data on the total value of trade flowing through these ports, we examined data regarding 12 specific commodity groups. We focused on goods that were likely to be shipped across the border by truck or that represented the major products passing through the ports for which we had data. The following commodity groups were included:

- fresh, frozen, preserved, and canned fish
- inorganic chemicals
- lumber
- motor vehicle parts, including motor vehicle engines and engine parts

Exhibit 1
Border Crossings

Exports to U.S., 2005
($ billion)

Windsor Bridge/Tunnel	83.2	Pacific Highway	11.8
Sarnia	56.6	Lansdowne	9.1
Fort Erie/Niagara Falls	49.3	North Portal	6.6
Lacolle	16.8	Philipsburg	6.0
Emerson	12.7	Woodstock	2.3

Note: Circles indicate relative size of exports by port.

- newsprint paper
- office machines and equipment
- organic chemicals
- other chemical products
- other paper and paperboard
- passenger automobiles and chassis
- synthetic rubber and plastics
- television, telecommunications and related equipment

The focus on truck traffic was due to the fact that exports by this mode were more likely to be disrupted by border inspections and delays than exports moved by other modes, such as rail or pipeline. The commodities chosen for the analysis accounted for 41 per cent of total nominal trade passing through the 12 land border crossings for which we had data. Table 2 shows the relative importance of the different commodity groups to the five busiest ports.

Other major commodity groups that likely passed through these ports, but for which we did not have detailed data, include the following:

- aluminum and aluminum products
- industrial machinery
- meat products

Table 1
Truck Crossings by Port, 2005
(millions)

	Crossings	Share
Windsor Bridge	3.60	27.0
Sarnia	1.78	13.4
Fort Erie	1.26	9.4
Niagara Falls	0.96	7.2
Lacolle	0.76	5.7
Pacific Highway	0.73	5.5
Lansdowne	0.46	3.4
Emerson	0.40	3.0
Philipsburg	0.30	2.2
Rock Island, QC	0.26	2.0
Coutts, AB	0.25	1.9
Aldergrove, BC	0.20	1.5
Windsor Tunnel	0.15	1.2
Woodstock	0.14	1.1
North Portal	0.13	1.0
Total	13.33	100.0

Sources: The Conference Board of Canada, Transport Canada.

Table 2
Commodity Share of Total Exports at the Five Largest Ports, 2005
(per cent)

	Windsor Bridge	Sarnia	Fort Erie	Lacolle	Emerson
Auto Parts	17.0	9.5	5.5	1.2	3.7
Autos	31.7	15.4	19.9	0.2	0.0
Fish	0.2	0.1	0.0	0.2	0.3
Inorganic Chem.	0.2	1.3	0.5	0.8	0.5
Lumber	0.2	1.3	1.0	2.8	2.2
Newsprint	0.5	2.0	1.1	3.7	1.9
Office Machines	1.0	0.5	2.7	1.2	0.4
Organic Chem.	0.3	1.9	0.9	0.9	0.2
Other Chem.	0.8	1.3	1.1	1.3	0.4
Other Paper	0.7	1.4	1.1	2.6	1.4
Rubber & Plastics	2.3	5.0	3.7	2.5	2.8
Telecom. Equip.	1.4	0.6	2.4	2.1	0.9
Other	43.7	59.7	60.1	80.5	85.3

Sources: The Conference Board of Canada, Statistics Canada.

- other consumer goods
- other equipment and tools
- other wood products
- steel and steel products

However, we did employ statistical methods to test total exports of these commodities from Canada to the United States to see whether tighter security measures had affected them, but not at the same level of detail.

Windsor Bridge, Sarnia and Fort Erie led the way in number of truck crossings in Canada. Autos and auto parts accounted for much of the traffic that passed through these ports.

In addition to the detailed trade data, other data sets were used in this analysis. These included the export prices used to convert the nominal trade data to real trade data. We did that so the analysis could separate the effect of inflation from the volume of trade flows. These data came from Statistics Canada, which produces a separate price series for each commodity. We also used these data to create a weighted average price deflator for each port, which was used in the all-commodities-by-port analysis. The weights used in this process were each commodity's share of total real exports through each port.

To create the relative price variables used in the equations, we needed three things: domestic prices, U.S. prices and the US$/CDN$ exchange rate. The domestic price data came from Statistics Canada's Industrial Product Price Index, and we used the exchange rate published by Statistics Canada. The U.S. price data came from the Producer Price Index, published by the Bureau of Labor Statistics.

The growth drivers were the other major set of data used in this analysis. A variety of drivers were used, but major groupings included the following:

- Real consumer spending: The Bureau of Economic Analysis produces these data on a quarterly basis and reports this information in millions of chained 2000 dollars.
- Industrial production: The Federal Reserve Board reports this measure of output monthly. It is indexed so that 2002=100 for all series.
- GDP: The Bureau of Economic Analysis produces these data and reports this information in millions of chained 2000 dollars. It provides national GDP data quarterly and regional GDP data annually.
- Housing starts: The U.S. Census Bureau produces national and regional housing starts data monthly. It reports them at an annualized rate in thousands of units.
- Real business investment in communications equipment: The Bureau of Economic Analysis produces these data quarterly and reports this information in millions of chained 2000 dollars.

CHAPTER 4

Estimation Results

Chapter Summary

- We found no evidence of a significant reduction in total export volumes due to tighter border security.
- In the case of individual ports, Fort Erie and a few smaller ports that export primarily to the U.S. Northeast had lower export volumes following 9/11.
- Substitution between ports in Southern Ontario and weak economic performance in the U.S. Northeast both influenced the results.
- Television and telecommunications equipment was the only commodity group with lower export volumes following 9/11, though some commodities had lower export volumes through specific ports.
- However, we concluded that industry-specific factors, such as the tech bust and the softwood lumber dispute, were more important than tighter border security in explaining lower export volumes for specific commodities.

The detailed statistical results for the equations in the analysis can be found in Appendix B. This section focuses on the drivers used to test the different equations and on whether the dummy variables used to test for the effects of tighter border security were significant in explaining border disruptions. In some cases, equations with significant dummy variables for a particular port or commodity were investigated further. In addition to tighter security measures, other factors—such as port substitution or industry-specific factors—might have been responsible for the empirical results.

In aggregate, tighter border security at the 12 ports examined in this study did not have a damaging effect on the flow of exports.

AGGREGATE ANALYSIS RESULTS

This equation was estimated at the highest level of aggregation. The dependent variable was total real exports for all commodities shipped to the U.S. via the 12 ports included in the analysis. A number of export drivers were tested, including U.S. industrial production and U.S. real GDP. The best results occurred with the variable U.S. industrial production for manufacturers. The empirical results also revealed that the relative price term was statistically significant with the expected negative sign. This implies that as export prices in Canada

increase relative to the price of all finished goods in the United States when adjusted for exchange rates, demand for Canadian exports drops.

Of greatest interest were the results for the two dummy variables. Both the temporary and permanent dummies had the expected negative sign. However, the coefficients were not significant, with there being only a 67 per cent chance that the coefficient on the permanent dummy was not zero. This probability was even lower for the temporary dummy, at only 39 per cent. We therefore concluded that tighter border security did not have a damaging effect on the flow of exports at these 12 border crossings, at least in aggregate.

ALL COMMODITIES BY PORT RESULTS

To take the analysis a step further, we estimated equations for each of the 12 major ports for all commodities. The analysis in this section concentrates on several ports in particular: the Ambassador Bridge in Windsor; the port of Sarnia, which includes the Blue Water Bridge and the St. Clair rail tunnel; and the port of Fort Erie, which includes both the Peace Bridge and the International Railway Bridge. In 2005, these three ports accounted for a combined 72 per cent of nominal exports through the 12 ports examined in this study and 50 per cent of total Canadian exports to the United States. The market share of total exports to the United States for each port crossing is shown in Table 3.

AMBASSADOR BRIDGE

For this equation, the best driver was U.S. industrial production for total manufacturing. Given the high volume of traffic in autos and parts across this particular bridge, we also estimated the equation using motor vehicle production as the driver. However, the result was not significant. As was the case with the aggregate equation, the relative price term was significant with the expected negative sign. Both dummies were once again statistically insignificant. In fact, the permanent dummy was found to have an insignificant but positive coefficient. That suggests that tighter border security did not have an impact on export flows over the Ambassador Bridge.

SARNIA

Sarnia rail tunnel traffic was disrupted between 1990 and 1992 when a major expansion to the tunnel took place. This construction resulted in a break in the export data time series. We accounted for that break in the equation by including another dummy variable. This dummy variable has a value of one from the first quarter of 1990 through the fourth quarter of 1992, and otherwise has a value of zero.

Different explanatory variables were tried, but in the end, the best driver of activity was again U.S. industrial production for all manufacturing. Once again, both the short-term and permanent dummies were found to be insignificant. In fact, both were positive.

FORT ERIE

The Fort Erie data also had a clear break, which occurred in the first quarter of 1990. At this time there was a clear upward shift in traffic at Fort Erie, while there was a clear downward shift in traffic passing through the port of Niagara Falls. It is apparent that for some reason there was a shift in trade volumes between the two ports at this time. To correct for this break, we shortened the sample period for all of the Fort Erie-specific equations to begin in the second quarter of 1990.

Nominal exports crossing at Fort Erie were about $2.9 billion lower than they would have been in 2005 as a result of tighter border security.

The Fort Erie results were similar to the Sarnia and Ambassador Bridge estimations. Again, U.S. industrial production for all manufacturing was found to be the best driver for export volumes at this port. The short-term dummy was also negative but insignificant. However, the permanent dummy was both significant and negative. This suggests that increased border security following 9/11 did have a permanent impact on exports crossing the border at Fort Erie. Given the value of the coefficient on the permanent dummy, that means that nominal exports through the port of Fort Erie were about $2.9 billion lower than they would have otherwise been in 2005.

OTHER PORTS

The other ports were fairly minor in terms of total export traffic to the United States. Consequently, we do not present the detailed results for these ports in this section of the report, but they are available in Appendix B. Table 4 summarizes the results for the permanent dummy variables for all the other ports. We present the results for the permanent dummies, since their results have more important consequences for the economy. The permanent dummy variables are characterized as being either significant, suggesting that tighter security measures disrupted the flow of exports, or insignificant. One other category, incorrect signs, signifies that the dummy had a significant incorrect positive sign. This implied the counterintuitive result that, in the environment of tighter border security following 9/11, the volume of exports crossing these land ports was actually higher than would otherwise have been expected.

As well as Fort Erie, tighter border security may have affected exports through Lacolle, Lansdowne, and Philipsburg.

For the majority of the ports, the 9/11 permanent dummy variables were either insignificant or had a significant but incorrect sign. However, four of the ports—Fort Erie, Lacolle, Lansdowne, and Philipsburg—had permanent dummies that were significant and negative, suggesting that tighter border security did have an impact on export flows at these ports. The next section analyzes what these results might mean and what factors other than tighter border security might have influenced the significance of the dummies.

ACCOUNTING FOR SUBSTITUTION AND REGIONAL ECONOMIC PERFORMANCE

Since we found that tighter border security had no effect on export volumes as a whole, it was interesting that the results did sometimes vary by port. Possible factors influencing the results for individual ports include the following:

- Substitution between ports: Some ports had positive or even significantly positive coefficients on the dummy variables. That suggested some of the trade flows were switching between ports.

Table 3
Share of Exports Passing Through Select Ports, 2005
(per cent)

	Top 12 Ports	All Ports	All Ports Except Oil & Gas
Windsor Bridge	32.4	22.5	27.4
Sarnia	22.2	15.5	18.9
Fort Erie	17.5	12.2	14.9
Lacolle	6.6	4.6	5.6
Emerson	5.0	3.5	4.2
Pacific High.	4.7	3.2	3.9
Lansdowne	3.6	2.5	3.0
North Portal	2.6	1.8	2.2
Philipsburg	2.4	1.6	2.0
Niagara Falls	1.9	1.3	1.6
Woodstock	0.9	0.6	0.8
Windsor Tunnel	0.4	0.2	0.3

Sources: The Conference Board of Canada, Statistics Canada.

Table 4
Summary of Permanent Dummy Variable Results by Port

	Significant	Insignificant	Incorrect Sign
Emerson			•
Fort Erie	•		
Lacolle	•		
Lansdowne	•		
Niagara Falls			•
North Portal		•	
Pacific High.		•	
Philipsburg	•		
Sarnia		•	
Windsor Bridge		•	
Windsor Tunnel		•	
Woodstock			•

Source: The Conference Board of Canada.

- Regional economic performance: National variables were used as drivers for all of the equations, but if a particular port primarily serves a particular region, and that region's performance differed significantly from that of the U.S., then a falsely significant positive or negative dummy could result.

Substitution. To test for substitution, we performed some additional analysis and estimations. Substitution was likely to be most prevalent in the cluster of ports in Southern Ontario. For example, the coefficient for the Niagara Falls permanent dummy was positive, but it was negative for Fort Erie. These two ports are close substitutes, since the crossings are less than 40 kilometres apart. If wait times were long at Fort Erie, trucks could be easily diverted to Niagara Falls.

Fort Erie lost market share to other Southern Ontario ports; exports fell from 21 percent of total exports in 1990 to 12 per cent in 2005.

However, the volume of trade passing through Niagara Falls was much smaller than that at Fort Erie. Consequently, it was unlikely that Niagara Falls could handle all of the traffic that was diverted from Fort Erie. To investigate this relationship further, we did an estimation for the two ports combined for all commodities. The results still showed a significant negative coefficient for the permanent dummy.

One other possibility was that traffic from Fort Erie was being diverted farther afield than Niagara Falls. Both the Ambassador Bridge in Windsor and the port of Sarnia had insignificantly positive coefficients on their permanent dummies and it is possible that traffic was being diverted to those ports as well. To test this hypothesis, we did an estimation that included exports of all commodities through all of the ports in Southern Ontario. In this case, the permanent dummy was insignificant.

This suggested that Fort Erie was losing market share to other ports in Southern Ontario, and that was precisely what was happening. Fort Erie's share of total Canadian exports fell from 21 per cent in 1990 to only 12 per cent in 2005. (See Chart 1.) Thus, the significant permanent dummy in the Fort Erie equation may have simply captured this downward trend in Fort Erie's market share. However, it is possible that tighter security measures accelerated this trend. Exporters may have favoured one port over another if a particular port offered time savings or other advantages, such as lower fees or better access to pre-clearance programs.

Regional Economic Performance. A major reason why traffic may have been diverted away from Fort Erie toward Windsor and Sarnia was the varying economic performance of different regions within the United States. Fort Erie, along with several other smaller ports—including Lacolle, Lansdowne, and Philipsburg—also had significant negative coefficients for the permanent dummy variable. These smaller ports are all clustered in Eastern Ontario and Quebec, and the one common factor between them and Fort Erie is that they all primarily serve the U.S. Northeast.

This region has experienced below average economic performance every year since 2001, especially in the manufacturing sector. (See Chart 2.) This is important, as many of Canada's exports are used as inputs in the production process on the U.S. side of the border. It is possible that the results for the permanent dummies for these ports bordering on the U.S. Northeast could be attributable to depressed regional economic conditions and not tighter border security. Weaker economic growth in this region of the U.S. would naturally lead to lower demand for Canadian exports.

Weak economic conditions in the U.S. Northeast likely contributed to the drop in export traffic at certain ports, but the ports of Lansdowne and Philipsburg might also have experienced decreases because of security measures.

To test this hypothesis, we used manufacturing GDP in the U.S. Northeast as a driver in the equations for the ports of Fort Erie, Lacolle, Lansdowne, and Philipsburg. The results for the permanent dummy variables with this

new specification are summarized in Table 5. For the ports of Lacolle and Fort Erie, the permanent dummies were insignificant with the inclusion of the new driver. This indicates that the downturn in export traffic after 9/11 was likely not due to tighter border security but was, instead, a result of weak economic conditions in the U.S. Northeast. However, the permanent dummy for the ports of Lansdowne and Philipsburg remained significant even with the regional economic drivers, thereby implying that security measures might have been a factor in slowing down export traffic.

INDIVIDUAL COMMODITIES RESULTS

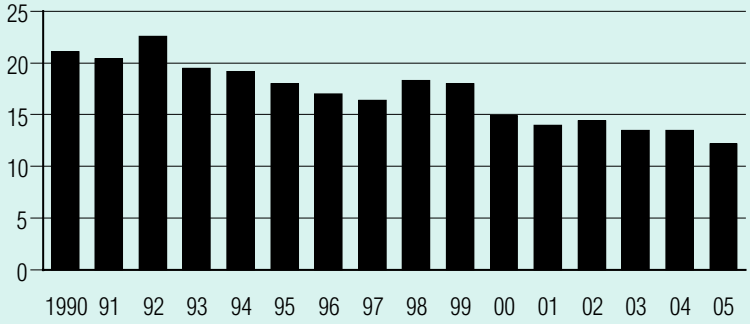
Commodity-specific influences also might have influenced the equation results. For instance, television and telecommunications equipment accounted for more than one-third of the value of goods passing through Philipsburg. The tech bust in 2001 hit this commodity especially hard, and the significant permanent dummy for this port might have reflected this development instead of tighter border security. Both developments occurred at roughly the same time.

Twelve commodities, ranging from autos at $44 billion to fish at $1.5 billion, accounted for 41 per cent of the export traffic flowing through the 12 major ports examined.

With this in mind, we also determined whether tighter border security affected any of the commodity-specific trade flows. We initially analyzed the commodity results for the all-port total. Then we did a panel analysis, including those ports that carried the bulk of a particular commodity. If the results indicated that further investigation was required, we did estimations at the individual port level.

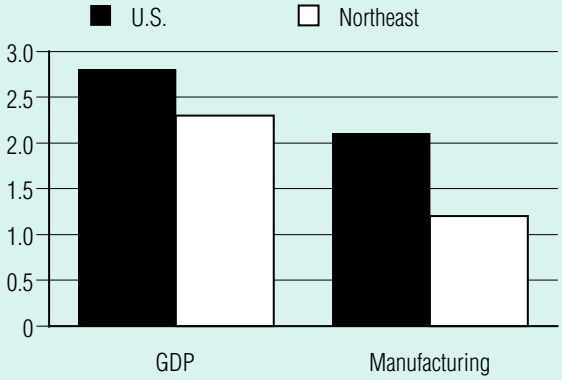
Table 6 lists the commodities in order of the size of their export flows. Combined, these 12 commodities accounted for 41 per cent of the export traffic flowing through the 12 major ports examined in this study.

Chart 1
Fort Erie's Share of Total Exports
(per cent)



Sources: The Conference Board of Canada, Statistics Canada.

Chart 2
Average Annual Growth, 2001–05,
U.S. Northeast and U.S. Total
(per cent)



Sources: The Conference Board of Canada,
Bureau of Economic Analysis.

Table 5
Summary of Permanent Dummies
Using Regional Drivers

	Significant	Close to Significant	Insignificant
Fort Erie		•	
Lacolle			•
Lansdowne	•		
Philipsburg	•		

Source: The Conference Board of Canada.

Table 6
Major Export Commodities, 2005
($ billions)

Autos	44.0
Auto Parts	23.0
Rubber and Plastics	8.8
Telecom. Equip.	5.5
Lumber	4.4
Newsprint	3.8
Other Paper	3.3
Office Machines	2.9
Organic Chem.	2.6
Other Chem.	2.4
Inorganic Chem.	1.9
Fish	1.5

Sources: The Conference Board of Canada, Statistics Canada.

PASSENGER AUTOMOBILES

We tried a variety of drivers for this commodity, including unit vehicle sales in the United States. However, since Canadian exports are highly dependent on the sales performance of the specific models built here, it was difficult to obtain valid statistical results for the exports of passenger automobiles. In the end, real U.S. consumer spending on autos and parts was the best driver for exports of passenger automobiles. The relative price variable was dropped because it was positive and insignificant. That was not surprising, as it is not easy for auto companies to quickly shift production of specific model types between plants based on their different operating costs. Both of the security dummies were negative but insignificant.

Three ports—the Ambassador Bridge, Sarnia, and Fort Erie—dominated exports of passenger automobiles and chassis. We estimated individual equations for each of these ports instead of doing a panel analysis. The dummies were insignificant for the port of Sarnia and the Ambassador Bridge. However, the permanent dummy was significant and negative for Fort Erie. As with the equation for all commodities passing through the port of Fort Erie, this may have been the result of substitution away from that port or of poor regional performance in the U.S. Northeast.

To test this hypothesis, we first re-estimated the equation using a regional driver. That reduced the size and significance of the permanent dummy variable but did not make it insignificant. However, when an equation was estimated for the combined trade volume through Sarnia, Windsor, and Fort Erie, the permanent dummy was insignificant in this case. That result was consistent with the fact that Fort Erie had been gradually losing market share for auto exports over the last decade, and that the ports of Sarnia and the Ambassador Bridge had weak positive coefficients for their permanent dummies. In essence, Fort Erie was losing market share for this commodity to the ports of Sarnia and the Ambassador Bridge, and the permanent security dummy captured some of this trend.

The data suggest that for passenger autos and auto parts, Sarnia and Windsor's Ambassador Bridge were taking traffic away from the port of Fort Erie.

MOTOR VEHICLE PARTS

We tried several variables as drivers for this commodity, and industrial production of U.S. motor vehicles turned out to be the best. The relative price variable was significantly negative, unlike the results for the passenger vehicle equation, where the relative price term was not only insignificant but also had the incorrect sign. That made intuitive sense, since the parts sector has a much lower degree of concentration than is the case among auto manufacturers, and auto producers can change parts suppliers with comparative ease. As a result, relative prices between the United States and Canada are more likely to be a significant determinant of auto parts export volumes than of passenger vehicle export volumes. Neither of the dummies was significantly negative for this commodity. In fact, the permanent dummy was significantly positive.

Three ports—the Ambassador Bridge, Sarnia and Fort Erie—dominated exports of motor vehicle parts. As a result, individual equations were estimated for each of these ports. The Ambassador Bridge had an insignificantly positive permanent dummy, while Sarnia had a significantly positive permanent dummy. Once again, the permanent dummy for Fort Erie was significantly negative.

Because data for industrial production of motor vehicles for U.S. regions are not readily available, we were unable to test a regional driver in this case. However, the positive signs on the permanent dummies in Sarnia and at the Ambassador Bridge suggested that substitution was taking place. Indeed, an equation that combined the export volumes for all three ports resulted in a permanent dummy that was negative but insignificant.

Changes in the telecommunications equipment industry are more likely to have caused the downward shifts in export volumes than tighter border security measures.

SYNTHETIC RUBBER AND PLASTICS

After trying a variety of potential drivers, we determined that real U.S. GDP was the best driver for this commodity. Both border security dummies were insignificant. We also attempted a panel analysis that incorporated five ports: Sarnia, Windsor Bridge, Fort Erie, North Portal and Lacolle. The results did not change with the panel analysis; neither of the dummies was found to be negative and significant for any of the ports.

We conducted one final check for this commodity. Sarnia was the most important port for exports of synthetic rubber and plastic products, accounting for 32 per cent of nominal exports. An individual equation was tested for this port and both dummies were insignificant.

TELEVISION AND TELECOMMUNICATIONS EQUIPMENT

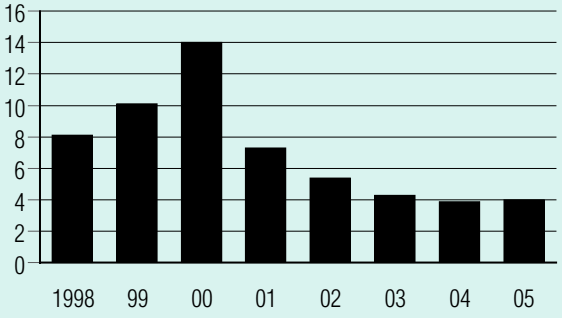
Business investment in telecommunications equipment in the United States was the best driver for this commodity. The relative price variable was insignificant but positive, so it was dropped from the equation. This commodity had significant negative coefficients for both the temporary and permanent dummies. In fact, the permanent dummy implied that exports of television and telecommunications equipment were $1.3 billion less than they would otherwise have been in 2005. That figure is equivalent to 24 per cent of television and telecommunications equipment exports in 2005.

The high-tech meltdown in 2001 might have clouded the results for this equation, as the meltdown's timing partially coincided with the implementation of tighter security measures at the border following 9/11. To test this hypothesis, we included a tech dummy in the equation, which had a value of one in each quarter of 2001. While the inclusion of this variable did reduce the temporary dummy to insignificance, the permanent dummy remained significant.

That signified that there was a break in exports of this commodity following 9/11, but that may not have been due to tighter security measures at the border. One possible reason for this result may have been the increasing globalization of the telecommunications equipment industry. Even Canadian companies that produce telecommunications equipment, such as Nortel and Celestica, have added new capacity overseas rather than opening new plants in Canada since the early 2000s. Canada accounted for 14 per cent of U.S. imports of telecommunications equipment in 2000; today, the comparable share is only 4 per cent. (See Chart 3.) During that period, Canada lost market share to a variety of countries, including China, Mexico, and Malaysia.

To determine whether there were any port-specific effects for this commodity, we performed a panel analysis. Exports of telecommunications equipment went through many ports, with five ports accounting for most of the activity. The panel analysis, which included a dummy variable for the high-tech collapse, revealed that three ports—Lacolle, Philipsburg, and Sarnia—had significant negative coefficients for the permanent dummy variable.

Chart 3
Canada's Share of U.S. Telecom Equipment Imports
(per cent)



Sources: The Conference Board of Canada,
U.S. Department of Commerce.

The results for this dummy variable did not change when individual estimates for these ports were conducted. As with the equation for all ports, it was more likely that changes in the telecommunications equipment industry, rather than tighter border security, caused the shifts in export volumes over the past few years.

LUMBER

Housing starts in the United States proved to be the best driver for lumber exports. To improve the equation results we also included Canadian housing starts, to account for the fact that strong domestic demand in Canada for homes could leave less lumber available for export to the United States. This variable was significant with the expected negative sign, indicating that rising housing starts in Canada had a negative impact on exports of lumber to the United States. For the total lumber exports equation, both the temporary and permanent security dummy variables were insignificant, though the permanent dummy was actually positive.

Among the six major ports that handled most lumber exports, only for Fort Erie could it be shown that tighter border security affected export volumes.

To examine lumber exports at the individual port level, we did a panel analysis using the six major ports that handled most of the exports for this commodity. Fort Erie had a significant negative coefficient for the permanent dummy, while Lacolle's coefficient was nearly significant. These ports were examined in greater detail to verify the degree to which the softwood lumber dispute might have affected the coefficients for the dummy variables. This dispute might have negatively affected lumber exports in the period after 9/11, since it flared up again in 2002.

To test this hypothesis, we used the ratio of domestic prices to export prices to account for the implementation of tariffs. This ratio rose significantly once the tariffs went into place, as exporters were forced to absorb the cost of the tariffs, lowering the effective price they received for exports. (See Chart 4.) This disproportionately affected higher cost producers, generally located in Ontario and Quebec, and led to production cuts, which naturally led to slower growth in exports to the United States. Lower cost producers in Western Canada reacted differently; they actually increased production to lower their average cost per board foot. That may explain why the Pacific Highway port had a positive but insignificant coefficient for the permanent dummy in the panel analysis.

However, the effects were small, with the volume of exports only $64 million or 1.5 per cent less than they would otherwise have been in 2005.

The inclusion of this variable in the lumber equations reduced the permanent dummy to insignificance in the case of Lacolle but not Fort Erie. In addition, we tried to use regional housing starts in the U.S. Northeast in the Fort Erie equation, rather than national housing starts, to see if that explained why Fort Erie was an outlier. Although this approach improved the equation results, the coefficient on the permanent dummy was still significant and negative. Thus, only in the case of Fort Erie can an argument be made that tighter border security following 9/11 affected the volume of lumber exports. However, the effects were small, with the value of exports only $64 million or 1.5 per cent less than they would have otherwise been in 2005.

Chart 4
Ratio of Domestic to Export Prices
(first quarter of 2002=1)

Sources: The Conference Board of Canada, Statistics Canada.

NEWSPRINT

We tested a number of drivers to explain newsprint exports, including industrial production at newspaper publishers in the United States. The best option turned out to be real U.S. GDP. For this equation, the relative price term was insignificant—not a surprising result, given that the benchmark price for newsprint in North America is quoted in U.S. dollars, even though most production takes place in Canada. Essentially, there was no discernible difference between Canadian and U.S. prices, once transportation costs were accounted for. For the total commodity equation, both the temporary and permanent security dummies were insignificant.

Newsprint exports were spread across quite a few ports, and we did a panel analysis to look at results for eight individual ports. Of these ports, Lansdowne was the only one with a significant negative coefficient on the permanent dummy variable. To examine this result further, we then estimated an equation for the port of Lansdowne on its own. Using both national and regional drivers for the U.S. Northeast, the Lansdowne equation continued to have a significant negative coefficient on the permanent dummy.

The newsprint industry has been shrinking in recent years, and it is possible that newsprint plants in Ontario that use this port have been disproportionately affected by plant closures. This assumption is supported by the fact that Lansdowne's share of newsprint exports has shrunk appreciably over the past five years, declining from a peak of 8.2 per cent in 2001 to only 4.4 per cent of nominal exports in 2005. Thus, the decline in newsprint exports at Lansdowne might actually be the result of local mill closures or substitution to other ports in Ontario, rather than tighter security at the border.

OTHER COMMODITIES

The other commodities for which we had detailed data included other paper and paperboard products, office machines and equipment, organic chemicals, inorganic chemicals, other chemical products and fish products. For each of these commodities, we followed the same steps of finding the best driver, estimating an equation for the total commodity through all ports, performing a panel analysis and—when warranted by the results from the panel analysis—estimating equations for individual ports. The detailed results for these equations can be found in Appendix B.

For every single commodity, the temporary and permanent dummies were either insignificant or, in the case of fish products, significant but of the wrong sign. For inorganic chemicals, the permanent dummy was negative and close to significant for the all-ports equation. When estimating equations for exports of inorganic chemicals from individual ports, we found the permanent dummy to be significant and negative for Fort Erie. Using a regional driver in the equation did not change this result. Thus, tighter border security might have had a negative impact on exports of inorganic chemicals through the port of Fort Erie.

For the seven remaining commodities studied, no evidence was found to support the conclusion that tighter security after 9/11 affected their trade flows.

Since the commodities for which we had detailed data covered only 29 per cent of the total nominal exports to the U.S., we also looked at total exports for several other commodity categories to ensure that tighter border security did not affect their trade flows. Note that these estimations were completed using total exports to the U.S., unlike the previous estimations, which used data for the 12 ports only.

These additional commodities included meat products, other wood products, steel and steel products, aluminum and aluminum products, industrial machinery, other equipment and tools, and other consumer goods. With these additions, our data set included equations that accounted for 50 per cent of nominal exports from Canada to the United States.

We used a variety of drivers for these equations, but not a single commodity exhibited a significantly negative coefficient on the permanent dummy. Thus, there was no evidence to support the conclusion that tighter security following 9/11 affected trade flows for any of these additional commodities.

SUMMARY OF RESULTS

Television and telecommunications equipment was the only commodity group that had a significant negative coefficient on the permanent dummy. (See Table 7.) This result may be at least partially attributable to industry-specific factors, such as the meltdown in the high-tech sector that took place around the time of the terrorist attacks. Canada's loss of market share in the U.S. to lower cost countries after the high-tech meltdown was another factor that likely influenced the results and that had nothing to do with increased security measures.

The inorganic chemicals group was the only other commodity to come close to having a significant negative coefficient on the permanent security dummy. In this case, real exports of inorganic chemicals fell by 15 per cent in 2003, with the decline truly beginning in the fourth quarter of 2002. This decline was largely attributable to a drop in exports of uranium resulting from the closure of Cluff Lake mine and a flood at the McArthur River mine in 2003, which led to considerable reductions in production in the second half of 2002 and into 2003. To all appearances, the permanent dummy captured this effect and provided a false signal regarding the impact of border security measures.

In a few instances individual ports, notably Fort Erie, had significant negative coefficients on the permanent dummy for certain commodities. Generally, this result could be attributed to a loss of market share for an individual port as the traffic was redirected to other ports in the vicinity. Other explanations for the significant permanent dummy results for certain commodities at different ports include depressed conditions in the U.S. Northeast, which resulted in a decline in demand for Canadian commodities.

Table 7
Summary of Permanent Dummy Variable Results by Commodity

	Significant	Close to Significant	Insignificant	Incorrect Sign
Autos			•	
Auto Parts				•
Rubber & Plastics			•	
Telecom. Equip.	•			
Lumber			•	
Newsprint			•	
Other Paper			•	
Office Machines				
Organic Chem.			•	
Other Chem.			•	
Inorganic Chem.		•		
Fish				•

Source: The Conference Board of Canada.

CHAPTER 5

Conclusion

Chapter Summary

- Broadly speaking, our analysis found little evidence of lower trade volumes as a result of tighter border security.
- This finding differs from that of the only other study to attempt this type of analysis.
- Our results differ from those of the previous study due to differences in methodology, and we believe those differences make our findings more robust.

Our empirical analysis did not support the contention that tighter security measures following 9/11 had an impact on exports to the United States. At both the aggregate level and, with the exception of Fort Erie, the port level, both the temporary and permanent dummy variables inserted into the equations to capture the impact of tighter border security turned out to be insignificant. While there is no doubt that tighter security measures at the border have increased costs for businesses, firms have adapted to the situation in order to keep goods flowing across the border in the post-9/11 world.

There was one notable exception to our general results. The results for Fort Erie revealed a significant negative coefficient on the permanent dummy for the total commodities equation, as well as for the individual lumber, inorganic chemicals, passenger automobiles and chassis, and motor vehicle parts commodities equations. There was some evidence that poorer relative economic performance in the U.S. Northeast compared to other regions in the U.S. might have contributed to the empirical results.

However, it is apparent that some of Fort Erie's traffic has been diverted to the port of Niagara Falls or other ports in Southern Ontario, and that varying regional performance cannot explain all of this diversion. Thus, it is likely that security measures were at least partially responsible for the diminished traffic through Fort Erie. Thus, although security measures have not affected the total volume of trade, it appears that factors such as the availability of varying services or wait times have caused substitution between ports. This has certainly increased costs for businesses since they have been forced to choose a sub-optimal crossing for their products.

Although businesses face more stringent border security, firms have adapted to the situation to keep goods flowing across the border in the post-9/11 world.

The television and telecommunications equipment commodity group was the only one to have a significant permanent dummy across all of the 12 ports examined in this study. However, the shift in this industry that the permanent dummy captured had more to do with the

tech bust and subsequent global restructuring of the industry that produces this commodity than it did with tighter border security. Similarly, when a significant permanent dummy did appear in the case of a few specific commodities at individual ports, it was usually commodity-specific factors—such as the softwood lumber dispute—that influenced the results.

Estimated equations for specific commodities made for more robust relationships than in Globerman and Storer's study.

Our results differ from the research done by Globerman and Storer. They found that security measures after 9/11 led to a shortfall in exports from Canada to the United States. They also found that this shortfall was more of a problem at some border crossings than others. Their research is comparable to ours in that both studies used estimation techniques. However, there are some differences between the methodologies of the two studies that could account for the discrepancy in results.

First, the Globerman and Storer study used current dollar export data, whereas our analysis used constant dollars or real export data. The use of current dollars can distort the empirical results, because the impact of inflation has not been removed from the data. Secondly, our analysis covers a longer time frame. Our data go back to 1988, whereas the data in the Globerman and Storer study go back to 1996. The use of a longer sample period makes it possible for the equations to account for broader trends. For example, our sample period covers the period both before and after the implementation of the North American Free Trade Agreement.

Our analysis was also more disaggregated, in that we estimated equations for specific commodities. Most importantly, this approach allowed us to use commodity-specific drivers rather than broad GDP. That is an important distinction, in that better drivers made for more robust equations, reducing the chance that the security dummies would falsely capture a commodity- or port-specific trend that had nothing to do with tighter border security.

This is why when altering our equations to account for regional demand or industry-specific factors, such as the softwood lumber dispute, the coefficients on the dummy variables generally became insignificant. In essence, the security dummies were significant because the equations were not specified correctly initially. That allowed the security dummies to falsely capture the effects of a variable that should have been included in the equation but wasn't initially.

Other differences between our study and the Globerman and Storer study include our use of a relative price variable rather than just the exchange rate, and the way we implemented the security dummies. How we structured the dummies implicitly assumed that tighter security measures led to a one-time shift in trade volumes, but the Globerman and Storer study used a dummy for each period after 9/11 to test whether the effects varied over time. This method allowed a wide variety of non-security-specific factors to influence the results.

There is little evidence to show that tighter border security measures implemented after 9/11 affected overall trade volumes to any great extent.

It is because of these methodological differences that The Conference Board of Canada's study arrived at different results. These are important differences that suggest that our results are more robust. Given the large number of equations and specifications tested, and the very small number that showed significant negative impacts on trade —especially once port- and commodity-specific factors were accounted for—there is little evidence that tighter security measures materially affected trade volumes.

APPENDIX A

Bibliography

DAMF Consultants Inc., and L-P Tardif and Associates Inc. *The Cumulative Impact of U.S. Import Compliance Programs at the Canada/U.S. Land Border on the Canadian Trucking Industry*. Ottawa: Transport Canada, 2005.

Globerman, Steven, and Paul Storer. *The Impacts of 9/11 on Canada–U.S. Trade*. Border Policy Research Institute Research Report #1. Bellingham, Washington: Western Washington University, 2006.

MacPherson, A., J.E. McConnell, A. Vance and V. Vanchan. *The Impact of U.S. Anti-Terrorism Policies on Canada–U.S. Cross-Border Commerce: An Exploratory Study From Western New York and Southern Ontario*. Buffalo: Canada–United States Trade Center, University at Buffalo, State University of New York, 2006. Paper provided courtesy of the authors.

Therrien, Marie-Christine, and Georges Tanguay. "The Impacts of 9/11 on Trade Costs: A Survey." *Canadian-American Public Policy* 64 (December 2005). Paper provided courtesy of the authors.

APPENDIX B

Detailed Statistical Results

The detailed statistical results in this appendix begin at the aggregate, all-port, all-commodity level. Then the different port and commodity equations are analyzed. We also include the equations that considered alternative explanations for the significant signs on some of the dummy variables.

The signs on the coefficients are important when analyzing the results. The sign on the U.S. driver of Canadian exports in the equations should be positive, so that an increase in the driver results in an increase in exports from Canada. Alternatively, the sign on the relative price term should be negative, implying that as the Canadian price increases relative to the exchange-rate-adjusted U.S. price, demand for Canadian exports declines. The sign on both the temporary and permanent dummy variables must be negative if tighter border security after 9/11 had a negative effect on exports from Canada.

For all of the variables, the t-statistic must be larger than 1.65 or less than –1.65 for that variable to be considered significant with a 10 per cent confidence interval.

ALL COMMODITIES

Table 1
All Commodities, All Ports

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	0.191	1.78
Relative Price Term	-0.141	-2.32
Temporary Security Dummy	-0.016	-0.51
Permanent Security Dummy	-0.012	-0.98
Lagged Dependent	0.870	14.11
Adjusted R-Squared	**0.993**	
Durbin-Watson Statistic	**1.492**	

Source: The Conference Board of Canada.

Table 2
All Commodities, Windsor Bridge

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	0.290	2.33
Relative Price Term	-0.295	-3.12
Temporary Security Dummy	-0.026	-0.41
Permanent Security Dummy	0.012	0.50
Lagged Dependent	0.742	9.08
Adjusted R-Squared	**0.961**	
Durbin-Watson Statistic	**1.560**	

Source: The Conference Board of Canada.

Table 3
All Commodities, Sarnia

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	1.683	8.08
Relative Price Term	-0.368	-2.96
Temporary Security Dummy	0.133	1.13
Permanent Security Dummy	0.028	0.63
Lagged Dependent	0.105	1.75
Sarnia Dummy	-1.302	-15.32
Adjusted R-Squared	**0.983**	
Durbin-Watson Statistic	**1.256**	

Source: The Conference Board of Canada.

Table 4
All Commodities, Fort Erie

Variable	Coefficient	T-Statistic
Results With National Driver		
U.S. Manufacturing Industrial Production	0.387	3.31
Relative Price Term	-0.582	-4.44
Temporary Security Dummy	-0.018	-0.34
Permanent Security Dummy	-0.063	-2.61
Lagged Dependent	0.553	5.32
Adjusted R-Squared	**0.933**	
Durbin-Watson Statistic	**1.823**	
Results With Regional Driver		
Constant	-3.967	-1.94
Northeast U.S. Manufacturing GDP	0.356	1.85
Relative Price Term	-0.489	-2.54
Temporary Security Dummy	-0.024	-0.38
Permanent Security Dummy	-0.043	-1.60
Lagged Dependent	0.720	8.17
Adjusted R-Squared	**0.924**	
Durbin-Watson Statistic	**1.942**	

Source: The Conference Board of Canada.

Table 5
All Commodities, Emerson

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	0.893	5.13
Temporary Security Dummy	-0.047	-0.59
Permanent Security Dummy	0.041	1.69
Lagged Dependent	0.548	6.21
Adjusted R-Squared	**0.968**	
Durbin-Watson Statistic	**1.790**	

Source: The Conference Board of Canada.

Table 6
All Commodities, Lacolle

Variable	Coefficient	T-Statistic
Results With National Driver		
U.S. Manufacturing Industrial Production	0.456	3.00
Relative Price Term	-0.143	-2.03
Temporary Security Dummy	0.041	0.60
Permanent Security Dummy	-0.070	-2.40
Lagged Dependent	0.710	8.03
Adjusted R-Squared	**0.957**	
Durbin-Watson Statistic	**1.942**	
Results With Regional Driver		
Constant	-4.197	-1.42
Northeast U.S. Manufacturing GDP	0.307	1.29
Relative Price Term	-0.356	-1.67
Temporary Security Dummy	-0.022	-0.30
Permanent Security Dummy	-0.040	-1.27
Lagged Dependent	0.848	10.65
Adjusted R-Squared	**0.952**	
Durbin-Watson Statistic	**2.052**	

Source: The Conference Board of Canada.

Table 7
All Commodities, Lansdowne

Variable	Coefficient	T-Statistic
Results With National Driver		
U.S. Manufacturing Industrial Production	0.562	3.38
Relative Price Term	-0.102	-1.61
Temporary Security Dummy	0.079	1.09
Permanent Security Dummy	-0.057	-2.11
Lagged Dependent	0.658	7.09
Adjusted R-Squared	**0.960**	
Durbin-Watson Statistic	**1.963**	
Results With Regional Driver		
Constant	-10.596	-2.85
Northeast U.S. Manufacturing GDP	0.779	2.72
Relative Price Term	-0.718	-2.78
Temporary Security Dummy	-0.022	-0.29
Permanent Security Dummy	-0.057	-1.92
Lagged Dependent	0.687	6.99
Adjusted R-Squared	**0.958**	
Durbin-Watson Statistic	**1.875**	

Source: The Conference Board of Canada.

Table 8
All Commodities, Niagara Falls

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	1.211	6.07
Relative Price Term	-0.129	-0.84
Temporary Security Dummy	-0.354	-1.96
Permanent Security Dummy	0.120	1.76
Lagged Dependent	0.203	2.74
Adjusted R-Squared	**0.743**	
Durbin-Watson Statistic	**0.917**	

Source: The Conference Board of Canada.

Table 9
All Commodities, North Portal

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	0.500	3.22
Temporary Security Dummy	0.006	0.06
Permanent Security Dummy	-0.020	-0.73
Lagged Dependent	0.732	8.68
Adjusted R-Squared	**0.959**	
Durbin-Watson Statistic	**2.533**	

Source: The Conference Board of Canada.

Table 10
All Commodities, Pacific Highway

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	0.275	1.62
Relative Price Term	-0.002	-0.05
Temporary Security Dummy	-0.015	-0.24
Permanent Security Dummy	-0.018	-0.79
Lagged Dependent	0.864	11.51
Adjusted R-Squared	**0.981**	
Durbin-Watson Statistic	**1.270**	

Source: The Conference Board of Canada.

Table 11
All Commodities, Philipsburg

Variable	Coefficient	T-Statistic
Results With National Driver		
U.S. Manufacturing Industrial Production	0.168	1.72
Relative Price Term	-0.314	-4.28
Temporary Security Dummy	-0.287	-4.18
Permanent Security Dummy	-0.073	-2.10
Lagged Dependent	0.728	11.50
Adjusted R-Squared	**0.881**	
Durbin-Watson Statistic	**1.986**	
Results With Regional Driver		
Northeast U.S. Manufacturing GDP	0.162	5.51
Temporary Security Dummy	-0.247	-3.80
Permanent Security Dummy	-0.042	-2.07
Lagged Dependent	0.771	18.31
Adjusted R-Squared	**0.892**	
Durbin-Watson Statistic	**2.198**	

Source: The Conference Board of Canada.

Table 12
All Commodities, Windsor Tunnel

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	0.365	3.36
Temporary Security Dummy	-0.128	-0.34
Permanent Security Dummy	-0.029	-0.26
Lagged Dependent	0.732	9.32
Adjusted R-Squared	**0.399**	
Durbin-Watson Statistic	**2.382**	

Source: The Conference Board of Canada.

Table 13
All Commodities, Woodstock

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	0.366	3.15
Relative Price Term	-0.133	-1.97
Temporary Security Dummy	0.109	1.68
Permanent Security Dummy	0.056	1.67
Lagged Dependent	0.683	7.56
Adjusted R-Squared	**0.964**	
Durbin-Watson Statistic	**2.013**	

Source: The Conference Board of Canada.

Table 14
All Commodities, Southern Ontario Ports

Variable	Coefficient	T-Statistic
U.S. Manufacturing Industrial Production	0.180	1.52
Relative Price Term	-0.170	-2.81
Temporary Security Dummy	0.006	0.14
Permanent Security Dummy	-0.011	-0.73
Lagged Dependent	0.858	13.31
Adjusted R-Squared	**0.987**	
Durbin-Watson Statistic	**1.889**	

Source: The Conference Board of Canada.

INDIVIDUAL COMMODITIES

Table 15
Passenger Automobiles

Variable	Coefficient	T-Statistic
Real U.S. Consumer Spending on Autos & Parts	0.188	2.49
Temporary Security Dummy	-0.009	-0.09
Permanent Security Dummy	-0.008	-0.29
Lagged Dependent	0.817	10.96
Adjusted R-Squared	**0.908**	
Durbin-Watson Statistic	**2.212**	

Source: The Conference Board of Canada.

Table 16
Passenger Automobiles, Windsor Bridge

Variable	Coefficient	T-Statistic
Real U.S. Consumer Spending on Autos & Parts	0.122	1.67
Relative Price Term	-0.166	-0.51
Temporary Security Dummy	0.006	0.04
Permanent Security Dummy	0.052	0.96
Lagged Dependent	0.842	12.28
Adjusted R-Squared	**0.873**	
Durbin-Watson Statistic	**1.934**	

Source: The Conference Board of Canada.

Table 17
Passenger Automobiles, Sarnia

Variable	Coefficient	T-Statistic
Real U.S. Consumer Spending on Autos & Parts	0.172	2.99
Temporary Security Dummy	0.111	0.15
Permanent Security Dummy	0.239	1.01
Lagged Dependent	0.725	8.21
Adjusted R-Squared	**0.640**	
Durbin-Watson Statistic	**1.642**	

Source: The Conference Board of Canada.

Table 18
Passenger Automobiles, Fort Erie

Variable	Coefficient	T-Statistic
Real U.S. Consumer Spending on Autos & Parts	0.478	9.26
Temporary Security Dummy	-0.022	-0.15
Permanent Security Dummy	-0.247	-5.11
Lagged Dependent	0.426	6.79
Adjusted R-Squared	**0.656**	
Durbin-Watson Statistic	**1.535**	

Source: The Conference Board of Canada.

Table 19
Motor Vehicle Parts

Variable	Coefficient	T-Statistic
U.S. Vehicle Industrial Production	0.488	7.31
Relative Price Term	-0.372	-3.26
Temporary Security Dummy	-0.008	-0.18
Permanent Security Dummy	0.049	2.95
Lagged Dependent	0.546	9.04
Adjusted R-Squared	**0.979**	
Durbin-Watson Statistic	**1.288**	

Source: The Conference Board of Canada.

Table 20
Motor Vehicle Parts, Windsor Bridge

Variable	Coefficient	T-Statistic
U.S. Vehicle Industrial Production	0.410	5.67
Relative Price Term	-0.046	-0.33
Temporary Security Dummy	0.016	0.27
Permanent Security Dummy	0.020	1.03
Lagged Dependent	0.605	9.07
Adjusted R-Squared	**0.954**	
Durbin-Watson Statistic	**1.640**	

Source: The Conference Board of Canada.

Table 21
Motor Vehicle Parts, Sarnia

Variable	Coefficient	T-Statistic
U.S. Vehicle Industrial Production	0.704	8.46
Relative Price Term	-0.344	-0.54
Temporary Security Dummy	-0.054	-0.25
Permanent Security Dummy	0.289	3.12
Lagged Dependent	0.081	1.25
Adjusted R-Squared	**0.575**	
Durbin-Watson Statistic	**2.246**	

Source: The Conference Board of Canada.

Table 22
Motor Vehicle Parts, Fort Erie

Variable	Coefficient	T-Statistic
U.S. Vehicle Industrial Production	0.473	6.13
Temporary Security Dummy	0.145	1.36
Permanent Security Dummy	-0.206	-4.75
Lagged Dependent	0.364	3.51
Adjusted R-Squared	**0.644**	
Durbin-Watson Statistic	**1.959**	

Source: The Conference Board of Canada.

Table 23
Synthetic Rubber and Plastics

Variable	Coefficient	T-Statistic
All Ports Results		
U.S. Real GDP	0.014	1.59
Relative Price Term	-0.037	-0.14
Temporary Security Dummy	0.003	0.04
Permanent Security Dummy	-0.015	-0.63
Lagged Dependent	0.965	23.89
Adjusted R-Squared	**0.984**	
Durbin-Watson Statistic	**1.835**	
Panel Results		
U.S. Real GDP	0.576	2.37
Relative Price Term	-0.060	-0.19
Fort Erie Constant	-4.865	-2.39
Lacolle Constant	-5.083	-2.48
North Portal Constant	-5.237	-2.53
Sarnia Constant	-4.974	-2.44
Windsor Bridge Constant	-4.879	-2.40
Fort Erie Temporary Security Dummy	0.040	0.20
Lacolle Temporary Security Dummy	0.022	0.11
North Portal Temporary Security Dummy	-0.093	-0.45
Sarnia Temporary Security Dummy	0.025	0.12
Windsor Bridge Temporary Security Dummy	0.093	0.46
Fort Erie Permanent Security Dummy	-0.100	-1.36
Lacolle Permanent Security Dummy	-0.103	-1.43
North Portal Permanent Security Dummy	0.204	1.98
Sarnia Permanent Security Dummy	-0.092	-1.27
Windsor Bridge Permanent Security Dummy	-0.053	-0.69
Fort Erie Lagged Dependent	0.831	17.01
Lacolle Lagged Dependent	0.829	13.16
North Portal Lagged Dependent	0.796	15.46
Sarnia Lagged Dependent	0.894	29.43
Windsor Bridge Lagged Dependent	0.826	14.53
Adjusted R-Squared	**0.968**	
Durbin-Watson Statistic	**1.761**	

Source: The Conference Board of Canada.

Table 24
Television and Telecommunications Equipment

Variable	Coefficient	T-Statistic
All Ports Results		
Constant	-2.410	-3.30
Real Investment in Telecommunications Equipment	0.381	3.78
Temporary Security Dummy	-0.266	-2.63
Permanent Security Dummy	-0.214	-3.39
Lagged Dependent	0.564	5.47
Adjusted R-Squared	**0.919**	
Durbin-Watson Statistic	**1.597**	
All Ports Results Including Tech Crash Dummy		
Constant	-2.469	-4.08
Real Investment in Telecommunications Equipment	0.351	4.19
Temporary Security Dummy	0.111	1.01
Permanent Security Dummy	-0.212	-4.07
Lagged Dependent	0.665	7.61
Tech Crash Dummy	-0.332	-5.29
Adjusted R-Squared	**0.945**	
Durbin-Watson Statistic	**2.072**	
Panel Results		
Real Investment in Telecommunications Equipment	0.240	3.57
Relative Price Term	-0.115	-0.42
Tech Crash Dummy	-0.435	-5.92
Fort Erie Constant	-2.040	-3.08
Lacolle Constant	-2.279	-3.52
Philipsburg Constant	-1.355	-1.97
Sarnia Constant	-2.557	-3.82
Windsor Bridge Constant	-2.539	-3.86
Fort Erie Temporary Security Dummy	0.496	2.06
Lacolle Temporary Security Dummy	0.249	1.03
Philipsburg Temporary Security Dummy	-0.031	-0.13
Sarnia Temporary Security Dummy	0.458	1.90
Windsor Bridge Temporary Security Dummy	0.595	2.46
Fort Erie Permanent Security Dummy	-0.046	-0.53
Lacolle Permanent Security Dummy	-0.252	-3.15
Philipsburg Permanent Security Dummy	-0.262	-2.63
Sarnia Permanent Security Dummy	-0.140	-1.85
Windsor Bridge Permanent Security Dummy	0.005	0.06
Fort Erie Lagged Dependent	0.709	6.36

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Table 24 ***(cont'd)***
Television and Telecommunications Equipment

Variable	Coefficient	T-Statistic
Lacolle Lagged Dependent	0.800	17.19
Philipsburg Lagged Dependent	0.602	4.17
Sarnia Lagged Dependent	0.914	36.97
Windsor Bridge Lagged Dependent	0.893	16.71
Adjusted R-Squared	**0.960**	
Durbin-Watson Statistic	**1.734**	

Source: The Conference Board of Canada.

Table 25
Lumber

Variable	Coefficient	T-Statistic
All Ports Results		
Canadian Housing Starts	-0.156	-3.16
U.S. Single-Family Housing Starts	0.274	3.14
Relative Price Term	-0.247	-1.81
Temporary Security Dummy	-0.008	-0.12
Permanent Security Dummy	0.032	1.38
Lagged Dependent	0.728	9.88
Adjusted R-Squared	**0.928**	
Durbin-Watson Statistic	**2.155**	
Panel Results		
U.S. Single-Family Housing Starts	0.506	5.18
Relative Price Term	-0.350	-2.05
Emerson Constant	-3.017	-5.55
Fort Erie Constant	-2.792	-5.21
Lacolle Constant	-3.027	-5.61
North Portal Constant	-2.350	-4.42
Pacific Highway Constant	-2.150	-3.94
Sarnia Constant	-3.057	-5.56
Emerson Temporary Security Dummy	0.111	0.54
Fort Erie Temporary Security Dummy	0.144	0.71
Lacolle Temporary Security Dummy	0.102	0.50
North Portal Temporary Security Dummy	0.150	0.74
Pacific Highway Temporary Security Dummy	-0.021	-0.10
Sarnia Temporary Security Dummy	0.026	0.13

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Table 25 ***(cont'd)***
Lumber

Variable	Coefficient	T-Statistic
Emerson Permanent Security Dummy	-0.050	-0.63
Fort Erie Permanent Security Dummy	-0.204	-3.01
Lacolle Permanent Security Dummy	-0.118	-1.60
North Portal Permanent Security Dummy	-0.025	-0.33
Pacific Highway Permanent Security Dummy	0.024	0.27
Sarnia Permanent Security Dummy	-0.087	-1.22
Emerson Lagged Dependent	0.735	8.87
Fort Erie Lagged Dependent	0.788	8.85
Lacolle Lagged Dependent	0.837	10.87
North Portal Lagged Dependent	0.521	4.97
Pacific Highway Lagged Dependent	0.537	3.36
Sarnia Lagged Dependent	0.889	46.49
Adjusted R-Squared	**0.942**	
Durbin-Watson Statistic	**1.685**	

Source: The Conference Board of Canada.

Table 26
Lumber, Fort Erie

Variable	Coefficient	T-Statistic
Constant	-1.281	-2.98
Single-Family Housing Starts in U.S. Northeast	0.377	3.28
Ratio of Domestic Prices to Export Prices	0.296	1.28
Relative Price Term	-0.467	-2.45
Temporary Security Dummy	0.124	1.32
Permanent Security Dummy	-0.132	-3.11
Lagged Dependent	0.777	12.33
Adjusted R-Squared	**0.790**	
Durbin-Watson Statistic	**1.613**	

Source: The Conference Board of Canada.

Table 27
Lumber, Lacolle

Variable	Coefficient	T-Statistic
Constant	-3.715	-5.38
U.S. Single-Family Housing Starts	0.667	5.27
Ratio of Domestic Prices to Export Prices	-0.568	-2.13
Relative Price Term	-0.280	-1.30
Temporary Security Dummy	0.110	1.02
Permanent Security Dummy	-0.005	-0.08
Lagged Dependent	0.670	10.43
Adjusted R-Squared	**0.929**	
Durbin-Watson Statistic	**1.653**	

Source: The Conference Board of Canada.

Table 28
Newsprint

Variable	Coefficient	T-Statistic
All Ports Results		
U.S. Real GDP	0.070	2.52
Relative Price Term	-0.026	-0.24
Temporary Security Dummy	-0.014	-0.30
Permanent Security Dummy	-0.005	-0.37
Lagged Dependent	0.822	11.61
Adjusted R-Squared	**0.745**	
Durbin-Watson Statistic	**1.521**	
Panel Results		
U.S. Real GDP	0.137	1.63
Relative Price Term	-0.047	-0.32
Emerson Constant	-0.944	-1.30
Fort Erie Constant	-0.841	-1.12
Lacolle Constant	-0.882	-1.12
Lansdowne Constant	-1.100	-1.52
Pacific Highway Constant	-0.831	-1.15
Philipsburg Constant	-1.159	-1.58
Sarnia Constant	-1.124	-1.56
Windsor Bridge Constant	-1.273	-1.58
Emerson Temporary Security Dummy	0.087	0.49
Fort Erie Temporary Security Dummy	-0.078	-0.45

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Table 28 ***(cont'd)***
Newsprint

Variable	Coefficient	T-Statistic
Lacolle Temporary Security Dummy	-0.036	-0.20
Lansdowne Temporary Security Dummy	0.044	0.25
Pacific Highway Temporary Security Dummy	0.041	0.23
Philipsburg Temporary Security Dummy	0.002	0.01
Sarnia Temporary Security Dummy	-0.056	-0.32
Windsor Bridge Temporary Security Dummy	0.032	0.18
Emerson Permanent Security Dummy	-0.051	-0.92
Fort Erie Permanent Security Dummy	-0.030	-0.53
Lacolle Permanent Security Dummy	-0.020	-0.36
Lansdowne Permanent Security Dummy	-0.117	-1.98
Pacific Highway Permanent Security Dummy	0.115	1.93
Philipsburg Permanent Security Dummy	-0.038	-0.68
Sarnia Permanent Security Dummy	0.016	0.27
Windsor Bridge Permanent Security Dummy	-0.027	-0.44
Emerson Lagged Dependent	0.683	7.24
Fort Erie Lagged Dependent	0.756	5.37
Lacolle Lagged Dependent	0.789	6.99
Lansdowne Lagged Dependent	0.851	10.85
Pacific Highway Lagged Dependent	0.618	9.41
Philipsburg Lagged Dependent	0.894	28.80
Sarnia Lagged Dependent	0.929	28.18
Windsor Bridge Lagged Dependent	1.002	12.02
Adjusted R-Squared	**0.920**	
Durbin-Watson Statistic	**1.874**	

Source: The Conference Board of Canada.

Table 29
Other Paper and Paperboard

Variable	Coefficient	T-Statistic
All Ports Results		
Industrial Production at Printers and Publishers	0.025	1.65
Temporary Security Dummy	0.011	0.19
Permanent Security Dummy	-0.024	-1.36
Lagged Dependent	0.972	45.86
Adjusted R-Squared	**0.981**	
Durbin-Watson Statistic	**2.005**	

(cont'd on next page)

Table 29 ***(cont'd)***
Other Paper and Paperboard

Variable	Coefficient	T-Statistic
Panel Results		
Industrial Production at Printers and Publishers	0.423	3.93
Relative Price Term	-0.285	-1.68
Emerson Constant	-2.048	-4.15
Fort Erie Constant	-1.556	-3.41
Lacolle Constant	-1.678	-3.77
Lansdowne Constant	-1.886	-4.03
Pacific Highway Constant	-1.940	-4.12
Sarnia Constant	-1.679	-3.44
Windsor Bridge Constant	-1.662	-3.76
Emerson Temporary Security Dummy	0.047	0.39
Fort Erie Temporary Security Dummy	-0.014	-0.11
Lacolle Temporary Security Dummy	0.051	0.42
Lansdowne Temporary Security Dummy	0.014	0.11
Pacific Highway Temporary Security Dummy	-0.038	-0.31
Sarnia Temporary Security Dummy	-0.025	-0.20
Windsor Bridge Temporary Security Dummy	0.052	0.42
Emerson Permanent Security Dummy	0.109	1.96
Fort Erie Permanent Security Dummy	-0.027	-0.71
Lacolle Permanent Security Dummy	0.023	0.52
Lansdowne Permanent Security Dummy	-0.035	-0.84
Pacific Highway Permanent Security Dummy	-0.032	-0.79
Sarnia Permanent Security Dummy	-0.017	-0.43
Windsor Bridge Permanent Security Dummy	-0.043	-1.13
Emerson Lagged Dependent	0.663	7.71
Fort Erie Lagged Dependent	0.642	4.27
Lacolle Lagged Dependent	0.644	4.73
Lansdowne Lagged Dependent	0.787	9.20
Pacific Highway Lagged Dependent	0.865	15.93
Sarnia Lagged Dependent	0.782	37.11
Windsor Bridge Lagged Dependent	0.751	7.59
Adjusted R-Squared	**0.958**	
Durbin-Watson Statistic	**1.912**	

Source: The Conference Board of Canada.

Table 30
Office Machines and Equipment

Variable	Coefficient	T-Statistic
All Ports Results		
Constant	-11.144	-3.90
U.S. Real GDP	1.376	3.92
Temporary Security Dummy	-0.111	-1.10
Permanent Security Dummy	0.014	0.33
Lagged Dependent	0.654	7.31
Adjusted R-Squared	**0.973**	
Durbin-Watson Statistic	**1.785**	
Panel Results		
U.S. Real GDP	0.643	2.73
Fort Erie Constant	-5.267	-2.62
Lacolle Constant	-5.401	-2.63
Philipsburg Constant	-5.751	-2.72
Sarnia Constant	-5.744	-2.71
Windsor Bridge Constant	-5.626	-2.71
Fort Erie Temporary Security Dummy	-0.089	-0.31
Lacolle Temporary Security Dummy	-0.164	-0.57
Philipsburg Temporary Security Dummy	-0.829	-2.86
Sarnia Temporary Security Dummy	0.057	0.20
Windsor Bridge Temporary Security Dummy	-0.089	-0.31
Fort Erie Permanent Security Dummy	0.057	0.46
Lacolle Permanent Security Dummy	-0.165	-1.56
Philipsburg Permanent Security Dummy	-0.015	-0.14
Sarnia Permanent Security Dummy	-0.054	-0.51
Windsor Bridge Permanent Security Dummy	0.070	0.49
Fort Erie Lagged Dependent	0.812	9.00
Lacolle Lagged Dependent	0.809	8.16
Philipsburg Lagged Dependent	0.915	31.21
Sarnia Lagged Dependent	0.946	37.24
Windsor Bridge Lagged Dependent	0.897	13.32
Adjusted R-Squared	**0.967**	
Durbin-Watson Statistic	**1.985**	

Source: The Conference Board of Canada.

Table 31
Organic Chemicals

Variable	Coefficient	T-Statistic
All Ports Results		
U.S. Manufacturing Industrial Production	0.093	1.90
Relative Price Term	-0.029	-0.16
Temporary Security Dummy	0.003	0.03
Permanent Security Dummy	0.024	0.57
Lagged Dependent	0.832	11.25
Adjusted R-Squared	**0.880**	
Durbin-Watson Statistic	**2.642**	
Panel Results		
U.S. Manufacturing Industrial Production	0.684	5.94
Relative Price Term	-0.141	-0.68
Fort Erie Constant	-2.707	-5.79
Lacolle Constant	-3.385	-6.64
North Portal Constant	-2.817	-5.91
Pacific Highway Constant	-3.257	-6.39
Sarnia Constant	-2.305	-4.80
Windsor Bridge Constant	-3.013	-6.16
Fort Erie Temporary Security Dummy	0.107	0.38
Lacolle Temporary Security Dummy	0.377	1.29
North Portal Temporary Security Dummy	0.036	0.12
Pacific Highway Temporary Security Dummy	0.147	0.52
Sarnia Temporary Security Dummy	-0.138	-0.48
Windsor Bridge Temporary Security Dummy	0.259	0.91
Fort Erie Permanent Security Dummy	-0.122	-1.29
Lacolle Permanent Security Dummy	-0.055	-0.57
North Portal Permanent Security Dummy	-0.095	-1.02
Pacific Highway Permanent Security Dummy	0.118	0.98
Sarnia Permanent Security Dummy	0.080	0.75
Windsor Bridge Permanent Security Dummy	-0.046	-0.47
Fort Erie Lagged Dependent	0.616	5.98
Lacolle Lagged Dependent	0.609	7.81
North Portal Lagged Dependent	0.568	6.89
Pacific Highway Lagged Dependent	0.774	12.87
Sarnia Lagged Dependent	0.464	3.23
Windsor Bridge Lagged Dependent	0.728	14.25
Adjusted R-Squared	**0.917**	
Durbin-Watson Statistic	**2.293**	

Source: The Conference Board of Canada.

Table 32
Other Chemical Products

Variable	Coefficient	T-Statistic
All Ports Results		
Non-Durable Manufacturing Industrial Production	0.060	2.35
Temporary Security Dummy	0.011	0.24
Permanent Security Dummy	0.025	1.31
Lagged Dependent	0.902	20.44
Adjusted R-Squared	**0.953**	
Durbin-Watson Statistic	**2.480**	
Panel Results		
Non-Durable Manufacturing Industrial Production	1.038	2.56
Fort Erie Constant	-4.544	-2.51
Lacolle Constant	-4.641	-2.53
Sarnia Constant	-4.623	-2.52
Windsor Bridge Constant	-4.545	-2.51
Fort Erie Temporary Security Dummy	-0.022	-0.10
Lacolle Temporary Security Dummy	-0.087	-0.39
Sarnia Temporary Security Dummy	0.085	0.38
Windsor Bridge Temporary Security Dummy	-0.036	-0.16
Fort Erie Permanent Security Dummy	-0.010	-0.13
Lacolle Permanent Security Dummy	-0.023	-0.33
Sarnia Permanent Security Dummy	0.015	0.20
Windsor Bridge Permanent Security Dummy	0.046	0.60
Fort Erie Lagged Dependent	0.838	13.63
Lacolle Lagged Dependent	0.781	9.40
Sarnia Lagged Dependent	0.899	29.73
Windsor Bridge Lagged Dependent	0.820	11.38
Adjusted R-Squared	**0.917**	
Durbin-Watson Statistic	**2.014**	

Source: The Conference Board of Canada.

Table 33
Inorganic Chemicals

Variable	Coefficient	T-Statistic
All Ports Results		
U.S. Manufacturing Industrial Production	0.112	2.55
Relative Price Term	-0.219	-0.85
Temporary Security Dummy	0.065	0.64
Permanent Security Dummy	-0.047	-1.44
Lagged Dependent	0.762	9.43
Adjusted R-Squared	**0.786**	
Durbin-Watson Statistic	**2.112**	
Panel Results		
U.S. Manufacturing Industrial Production	0.285	2.21
Relative Price Term	-0.410	-1.18
Fort Erie Constant	-1.137	-2.14
Lacolle Constant	-1.472	-2.75
Pacific Highway Constant	-1.545	-2.76
Sarnia Constant	-1.274	-2.44
Windsor Bridge Constant	-1.310	-2.33
Fort Erie Temporary Security Dummy	-0.082	-0.27
Lacolle Temporary Security Dummy	0.118	0.39
Pacific Highway Temporary Security Dummy	0.036	0.12
Sarnia Temporary Security Dummy	0.092	0.30
Windsor Bridge Temporary Security Dummy	-0.012	-0.04
Fort Erie Permanent Security Dummy	-0.152	-1.50
Lacolle Permanent Security Dummy	-0.009	-0.09
Pacific Highway Permanent Security Dummy	0.081	0.73
Sarnia Permanent Security Dummy	-0.015	-0.16
Windsor Bridge Permanent Security Dummy	-0.167	-1.58
Fort Erie Lagged Dependent	0.654	3.74
Lacolle Lagged Dependent	0.295	3.26
Pacific Highway Lagged Dependent	0.822	10.08
Sarnia Lagged Dependent	0.856	22.84
Windsor Bridge Lagged Dependent	0.824	5.97
Adjusted R-Squared	**0.875**	
Durbin-Watson Statistic	**2.016**	

Source: The Conference Board of Canada.

Table 34
Fish Products

Variable	Coefficient	T-Statistic
U.S. Real Seafood Consumption	0.060	3.19
Relative Price Term	-0.726	-3.74
Temporary Security Dummy	0.089	1.19
Permanent Security Dummy	0.092	2.67
Lagged Dependent	0.513	4.68
Adjusted R-Squared	**0.897**	
Durbin-Watson Statistic	**2.032**	

Source: The Conference Board of Canada.

Table 35
Fish Products, Pacific Highway

Variable	Coefficient	T-Statistic
Consumption	-1.717	-1.16
U.S. Real Seafood Consumption	0.206	1.15
Relative Price Term	-0.460	-1.60
Temporary Security Dummy	0.139	1.77
Permanent Security Dummy	0.012	0.22
Lagged Dependent	0.596	5.26
Adjusted R-Squared	**0.864**	
Durbin-Watson Statistic	**1.890**	

Source: The Conference Board of Canada.

Table 36
Fish Products, Woodstock

Variable	Coefficient	T-Statistic
U.S. Real Seafood Consumption	0.081	4.50
Temporary Security Dummy	-0.009	-0.07
Permanent Security Dummy	0.148	3.18
Lagged Dependent	0.538	5.28
Adjusted R-Squared	**0.648**	
Durbin-Watson Statistic	**2.034**	

Source: The Conference Board of Canada.

APPENDIX C

Related Products and Services

International Trade and Investment Centre

The Centre's main aim is to help Canadian leaders better understand what global economic dynamics—such as global and regional supply chains—mean for public policies and business strategies. It promotes informed dialogue on Canada's global economic role and proposes solutions for improving Canada's future trade and investment performance. For more information on the International Trade and Investment Centre, go to www.conferenceboard.ca/ITIC/.

The Centre for National Security

The Centre brings together senior executives from a variety of organizations with national security mandates. These public and private sector executives will work together to improve the detection of threats, coordination and interoperability of response, the free movement of low-risk people and trade, and communication with the public. For more information on the Centre for National Security, go to http://www.conferenceboard.ca/CNS/.

Reaching a Tipping Point? Effects of Post-9/11 Border Security on Canada's Trade and Investment

This paper brings together the findings from *Tighter Border Security and Its Effect on Canadian Exports* with the results of 60 interviews to provide a comprehensive picture of the cumulative effects of post-9/11 border security policies on Canadian trade and investment. The paper shows that, while Canadian export volumes to the United States have not fallen because of post-9/11 border policies, for many companies the new border environment has increased the cost of access to the U.S. market, which could make Canada a less attractive investment destination in the long term.

Facing the Risks: Global Security Trends and Canada

Over the next 15 years the world will grow increasingly complex, increasing opportunities but also creating new security risks. This report outlines potential risks and suggests approaches for addressing them.

Adopt a More Strategic Approach to International Trade

The ideas in this briefing have been drawn from Volume I of the final report of The Canada Project, *Mission Possible: Sustainable Prosperity for Canada*. At a time when international business and trade is becoming vastly more competitive, Canada needs to become much more strategic in its approach to international trade and related investment. The central challenge is how best to secure and maintain our position in the global value chains of companies in the United States and around the world.

If We Can Fix It Here, We Can Make It Anywhere: Effective Policies at Home to Boost Canada's Global Success

This report discusses five types of barriers that Canada can control—such as labour mobility and infrastructure restrictions, and regulatory differences between provinces—as well as some of their likely effects.

Canada's Changing Role in Global Supply Chains

Companies are reorienting along global and regional supply chains. This report looks at how Canada fits into global supply chains and where others fit into Canadian production—and what it means for decision-makers.

Conference e-Proceedings

Conference e-Proceedings are an audiovisual CD-ROM containing a recorded archive of the presentations made at Conference Board events synchronized directly with all PowerPoint presentations.

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