An Assessment of Future Bilateral Trade Flows and their Implications for U.S. Border Infrastructure Investment

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The BPRI focuses on research that informs policy-makers on matters related to the Canada-U.S. border. Policy areas of importance include transportation and mobility, security, immigration, energy, environment, economics and trade.

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Table of Contents

Executive Summary 1

I. Introduction 3

II. Overview of Bilateral Trade in the Context of Overall U.S. Trade (1990-2013) 6

Changing Shares of U.S. Trading Partners 7

III. Overview of Bilateral Trade on a Commodity Basis 10

Assessing the Pattern of Bilateral Trade 12

Other HTS Categories 14

Summary 18

IV. The Size and Freight Composition of Ports 19

Summary 24

V. Outlook for Specific Commodity Imports and Exports 25

Recent Economic Real Growth and Outlook for Future 25

Outlook for Individual Products 27

HTS 27 (Mineral Fuels) 27

HTS 87 (Motor Vehicles and Parts) 29

HTS 44 (Wood Products) and HTS 48 (Paper Products 30

HTS 84 (Machinery) and HTS 85 (Electrical Machinery) 31

HTS 39 Plastics 32

HTS 73 Iron and Steel 32

HTS 90 Instruments 32

VI. Implications for Individual Products and Major Ports 33

Autos and Parts 33

Mineral Fuels 33

Wood and Paper Products 34

Plastics, Iron and Steel 34

Summary of Implications of Major Commodities for Ports 34

Alexandria Bay 34

Blaine 34

Buffalo 35

Champlain-Rouses Point 35

Detroit 36

International Falls 36

Pembina 37
Port Huron 37
Summary 37
VII. Assessment of Medium Sized and Small/Remote Ports 39
Growth of Shipments through Medium Sized Ports 39
Growth of Shipments through Small Ports 41
VIII. Infrastructure Priorities 43
IX. Summary and Conclusions 45

REFERENCES 47
APPENDIX 49

Executive Summary

There are frequent calls for investment in border infrastructure given security-related delays and transportation bottlenecks associated with physical infrastructure described as outdated and inadequate. Given the potentially large investment expenditures needed to expand inspection and transportation infrastructure at border crossing sites, as well as the irreversibility of many of the investments that might need to be made, it is important that government decision-makers base spending choices on highly-informed forward-looking projections of capacity demands on traffic corridors through which bilateral commercial shipments are likely to travel.

The objective of this study is to provide and discuss a plausible scenario for changes in the volumes of commercial shipments at individual land ports along the Canada-U.S. border over the next decade, and to relate the scenario to port expansion priorities. For U.S.-based land ports, changes in capacity needed to inspect and process commercial shipments will strongly depend upon changes in total imports coming into the United States via Canada, as well as changes in the product mix of those imports. Changes in product mix are relevant, in addition to the import volumes entering at individual U.S. land ports, since the mix of commodities passing through individual ports differs substantially. For example, bilateral trade in motor vehicles and parts is primarily processed at border crossing stations in Detroit and Buffalo and their counterpart Canadian stations in Windsor and Niagara Falls.

While future increases in U.S. imports from Canada will add to capacity demands at most border ports, the pressures are likely to be greater for some locations than for others depending upon overall changes in the mix of products imported from Canada. Likewise, for individual Canadian-based land ports, changes in the capacity demanded to inspect and process goods will depend upon changes in the overall volume of U.S. exports to Canada, as well as changes in the product mix of those exports. Specifically, increases in total U.S. exports will increase processing demands on Canadian land ports generally, while changes in the product mix of U.S. exports will contribute to unequal increases in capacity requirements for individual ports.

The primary focus of this study is to project a plausible outlook for the growth of overall bilateral trade, particularly prominent bilaterally traded products, over the next decade, as well as for changes in the relative importance of specific northern border land ports in terms of trade flows through those ports. While a ten-year time horizon is arbitrary, and planning authorities might well need to think in even longer terms, the reliability of projections becomes increasingly questionable the longer the forecast time horizon. Furthermore, as we shall discuss, changes in trade patterns tend to be gradual, so that policies influenced by prospective developments over the next decade are unlikely to be rendered inappropriate by changes that occur much beyond the next ten years.

We first present data summarizing overall U.S. trade with Canada, as well as with a number of other major U.S. trading partners over the time period 1990-2013. This information identifies recent declines in Canada's share of U.S. trade and points to competition from China and Mexico. To look at future changes in bilateral trade flows, we discuss several scenarios bearing upon how the volumes and composition of specific U.S. imports from Canada and exports to Canada might change over the next decade. There are several key background assumptions underlying our main conclusions. One is that real economic growth rates for both Canada and the United States through the year 2025 are likely to be similar to the relatively slow growth rates experienced in recent years, as opposed to the substantially faster growth rates of the 1990s. A second assumption is that third-party trade undertaken by U.S.-based businesses, particularly with Mexico, will continue to increase as it has in recent years. The implication is a further slowing of trade growth between Canada and the U.S., particularly a continuation of a slowdown in the growth of Canadian exports to the U.S. This phenomenon is most likely to be observed in the motor vehicle and parts industry.

The shale oil and gas drilling "revolution" in the U.S. will also exert a substantial influence on future bilateral trade flows. In particular, substantial future increases in domestic oil and natural gas supplies will decrease the growth in U.S. demand for Canadian oil and gas. To the extent that Mexico's energy sector becomes more efficient as it relaxes legal restrictions on foreign investment in that sector, imports of Mexican oil by U.S. buyers may further reduce exports of Canadian oil to the United States. On the other hand, increased supplies of relatively cheap shale oil and gas may promote increased exports form the U.S. to Canada. We discuss the likely shipping modes for this energy trade.

Our outlook for future sectoral trade flows informs our assessment of future trade flows through individual land ports on the Canada – U.S. border. We identify the mix of goods processed through individual border ports to assess whether the port processes goods where trade growth can be characterized as above-average, average or below-average, by comparison to the growth of overall bilateral trade. The outcome is an identification of ports that are likely to grow relatively quickly and, therefore, more likely to benefit from expenditures on infrastructure expansion, and those that are less likely to need expansion of infrastructure capacity.

Our baseline annual growth scenario for U.S. imports is 3.4 percent per year based on a roughly 1.7 percent growth rate of real GDP and a U.S. import elasticity of 2.0. Our projection for relatively slow (by recent standards) average growth of bilateral trade over the next decade suggests a modest need for infrastructure expansion at border ports generally, although a select number of ports are higher priorities than others for what infrastructure expansion is undertaken. We identify Alexandria Bay, Champlain-Rouses Point, International Falls, and Pembina as ports whose mix of goods traded will likely lead above average growth of traffic. We also project U.S. exports of machinery to increase at a rate that is faster than the average to be experienced by U.S. exports as a whole. This growth makes a number of small U.S. ports priority candidates for infrastructure expansion given the concentration of machinery exports that are processed by those ports.

We compare our results with published Canadian and U.S. governments prioritized lists of ports in need of infrastructure expansion based upon surveys of shippers and local officials. There is some concordance between the two governments' priority lists and our own evaluations. However, there are also some important differences. In particular, the U.S. government has identified Buffalo and Port Huron as priorities for infrastructure expansion, while we believe that trade processed through these ports will increase at relatively slow rates.

Despite forecasts of more modest growth of Canada – U.S. trade, wait times at border ports continue to be of concern going forward. Variable wait times continue to be an issue for shippers, and any increase in bilateral trade will exacerbate wait times in the absence of any response by policymakers or companies involved in moving goods across the border. What our results suggest is that capacity problems, particularly at the largest land ports, may be less severe over the next decade than policymakers currently anticipate. Against this background, a greater emphasis might be placed on utilizing existing port infrastructure more efficiently relative to expanding physical infrastructure and staffing. One potential approach is to implement border slot mechanisms similar to those used by airports. Another broad approach to managing capacity utilization would permit the flexible use of FAST lane capacity by non-FAST approved shippers depending upon the expected arrival rates of FAST-approved shippers.

I. INTRODUCTION

"In addition to improving processes, it is clear that the borders of North America (including U.S. – Canada) need significant investment in infrastructure" (Dawson, Sands and Woods, 2013, p. 22).

This quote represents one of a number of calls for governments in Canada and the U.S. to invest in infrastructure at border crossing sites in order to expedite increased trade flows between the two countries. Goldfarb (2006, p. 24) makes the point quite directly in her claim that policymakers should improve the infrastructure at ports and borders.

Economists and transportation planners have long recognized that changes in trade patterns can affect the volume and composition of freight passing through individual sea and land ports of entry. Such changes will, in turn, influence the need for physical infrastructure, technology and human resources to expedite the movement of freight through individual ports.[1] While the overall growth of trade volumes should increase capacity demanded at most, if not all, border crossings, changes in the mix of commodities traded are likely to have asymmetrical impacts on capacity demanded because the main trade corridors differ across commodities. For example, bilateral trade in motor vehicles and parts is primarily processed at border crossing stations in Detroit and Buffalo and their counterpart Canadian stations in Windsor and Niagara Falls.

Delays in processing commercial shipments crossing the Canada – U.S. border have been a prominent concern of politicians, corporate executives and policy analysts, particularly since the imposition of enhanced border security procedures in the post – 9/11 period (Moens and Gabler, 2012). Reducing border crossing times, as well as lowering the costs to shippers of dealing with administrative procedures at border crossing stations, are recognized as important priorities for public policies. Success in such matters should foster closer bilateral economic integration and, in turn, yield benefits from economies of scale and specialization in manufacturing facilities that contribute to improvements in the standards of living of Canadians and Americans.

Several potential contributors to border crossing delays have been identified in the literature. One is enhanced border security procedures implemented post – 9/11 which particularly affected Canadian exports to the United States (Globerman and Storer, 2009; Grady, 2009). Regulatory inspections and requirement for goods clearance that are governed by different national regulatory regimes are another factor (Moens and Cust, 2008). As noted above, transportation bottlenecks associated with outdated and inadequate physical infrastructure have also been identified as adversely affecting the cross-border movement of commercial goods and passenger vehicles (Blank, 2008).

Federal and other levels of government have made efforts, to a greater or lesser extent, to address these various impediments to cross-border commercial shipments. For example, trusted trader programs such as FAST have expedited cross-border commercial shipping for at least some carriers, although less-than-truckload carriers seem not to have benefited much from FAST and related trusted trader programs (Globerman and Storer, 2009b). The Canadian and U.S. governments have signed a regulatory cooperation agreement that is designed to streamline regulatory approvals of goods crossing from one country to another, as well as to try to harmonize major differences in the regulatory treatment of commodities by each government (Dawson, Sands and Wood, 2013). Finally, provincial and state governments, with funding help from the federal governments, have made investments over the past few years to address bottlenecks to cross-border shipments imposed by limitations on physical infrastructure such as highway access to border-

[1] For example, Eriksen, Casavant and Farrell (2007) estimated how the Canada-U.S. Free Trade Agreement and the North American Free Trade Agreement would impact trade volumes passing through Washington State.

crossing points. Indeed, on February 4, 2011, Canadian Prime Minister Harper and U.S. President Obama issued a joint declaration entitled "Beyond the Border: A Shared Vision for Perimeter Security and Economic Competitiveness," which included a commitment to focus investment in modern infrastructure and technology at the busiest land ports of entry along the northern border.[2] Canadian and U.S. authorities have prioritized land ports of entry for purposes of modernizing and upgrading, although it is unclear precisely how priorities for future investments are determined.[3]

Given the potentially large investment expenditures needed to expand inspection and transportation infrastructure at border crossing sites, as well as the irreversibility of many of the investments that might need to be made, it is important that government decision-makers base spending choices on highly-informed forward-looking projections of capacity demands on traffic corridors through which bilateral commercial shipments are likely to travel. [4]

The objective of this study is to provide and discuss a plausible scenario for changes in the volumes of commercial shipments at individual land ports along the Canada-U.S. border over the next decade, and to relate the scenario to port expansion priorities. For U.S.-based land ports, changes in capacity needed to inspect and process commercial shipments will strongly depend upon changes in total imports coming into the United States via Canada, as well as changes in the product mix of those imports. Changes in product mix are relevant, in addition to the import volumes entering at individual U.S. land ports, since (as we shall discuss in a later section) the mix of commodities passing through individual ports differs substantially. Hence, while future increases in U.S. imports from Canada will add to capacity demands at most border ports, the pressures are likely to be greater for some locations than for others depending upon overall changes in the mix of products imported from Canada. Likewise, for individual Canadian-based land ports, changes in the capacity demanded to inspect and process goods will depend upon changes in the overall volume of U.S. exports to Canada, as well as changes in the product mix of those exports. Specifically, increases in total U.S. exports will increase processing demands on Canadian land ports generally, while changes in the product mix of U.S. exports will contribute to unequal increases in capacity requirements for individual ports.

From a U.S. perspective, which is the perspective of this study, imports from Canada contribute to needed capacity for border services, as well as for transportation infrastructure on the U.S. side of the border in order to facilitate the carriage of goods away from the port. On the other hand, U.S. exports require transportation infrastructure to facilitate the carriage of goods to Canadian-run inspection stations. The capacity demands at the Canadian inspection stations are presumably the responsibility of Canadian federal and provincial governments. As a practical matter, therefore, facilitating increased trade at any specific U.S. border crossing location requires cooperative initiatives on the part of both U.S. and Canadian governments.

The primary focus of this study is to project a plausible outlook for the growth of overall bilateral trade, particularly prominent bilaterally traded products, over the next decade, as well as for changes in the relative importance of specific northern border land ports in terms of trade flows

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[2] For a discussion of border infrastructure plans under the Beyond the Border declaration, see Transport Canada (2013).

[3] For a discussion of how the federal government prioritizes border infrastructure investments, see "Ports of Entry Infrastructure: How Does the Federal Government Prioritize Investments?" July 16, 2014, http://www.hispanicbusiness.com/2014/7/16/port_of_entry_infrastructure_how_does.htm

[4] Almost all border infrastructure investments will involve a large government role, either alone or as part of a public-private partnership. Governments can also implement innovative peak-load pricing schemes and other demand-management techniques to address capacity constraints. Demand management initiatives will be discussed in the conclusions of this report.

through those ports. We recognize that a ten-year time horizon is arbitrary, and that planning authorities might well need to think in even longer terms when committing resources to major expansions of existing facilities. However, the reliability of projections becomes increasingly questionable the longer the forecast time horizon. Furthermore, as we shall discuss, changes in trade patterns tend to be gradual, so that policies influenced by prospective developments over the next decade are unlikely to be rendered inappropriate by changes that occur much beyond the next ten years.

The study proceeds as follows. In the next section of this report, we present data summarizing U.S. trade with Canada, as well as with a number of other major U.S. trading partners over the time period 1990-2013. This information identifies recent changes over time in Canada's share of U.S. imports and exports, as well as changes in the shares of U.S. imports and exports accounted for by other countries. It provides some broad insight into whether Canada's relative importance as a trading partner with the U.S. has changed over time, as well as which countries might be directly or indirectly contributing to any changes identified.

Section 3 identifies the main products imported into the U.S. from Canada, as well as the main products exported from the U.S. to Canada. Furthermore, it considers Canada's primary "competitors" for shares of U.S. trade, as well as how Canada's share of U.S. trade has changed over time relative to those of other countries for the products in question. This evaluation helps explain which specific components of bilateral trade account for changes in Canada's overall importance as a trading partner with the United States. It also helps point to explanations of Canada's changing role as a U.S. trade partner and how that role might or might not continue to change in the future.

In Section 4, we document differences in the composition of trade flows passing through specific U.S. northern border ports by identifying the shares of imports and exports passing through those ports in selected years over our sample time period. We also link trade in specific commodities to the main U.S. partners in those trade flows, which effectively links the volume of trade processed through any specific border port to changes in U.S. trade flows with particular countries. For example, U.S. land ports that disproportionately process imports of wood products will be particularly affected by changes in U.S. imports of wood products.

Section 5 focuses on future changes in bilateral trade flows. Specifically, it discusses several scenarios bearing upon how the volume and composition of specific U.S. imports from Canada and exports to Canada might change over the next decade. The scenarios are based on qualitative evaluations of ongoing political and economic developments.

In Sections 6 and 7, the scenarios developed in the preceding section are linked to prospective changes in the relative importance of individual northern border ports in terms of future trade volumes. That is, the scenarios are linked to relative growth in the demand for future trade processing capacity at the individual port level. As noted earlier, changes in Canada's trade flows with the U.S. will affect the capacity demands placed on individual border ports, particularly if the product composition of bilateral trade changes in the future. In Section 6, we assess future capacity demands on large ports. We pay particular attention to small and medium-sized ports in Section 7, because these ports could be impacted significantly by relatively small changes in trade patterns.

In the final section, a summary of our analysis and a brief set of policy conclusions are presented and discussed.

II. OVERVIEW OF BILATERAL TRADE IN THE CONTEXT OF OVERALL U.S. TRADE (1990-2013)

Canada has historically been the largest trading partner of the United States; however, in relative terms, the bilateral relationship has become less important in recent years. The broad bilateral trade relationship is summarized in Table 1 which reports U.S. imports of goods from Canada and U.S. exports of goods to Canada, for selected years over the period 1990-2013 expressed in nominal dollars, as well as Canada's share of total U.S. imports and exports of goods. It is seen that Canada's share of U.S. imports peaked in 1996, while Canada's share of U.S. exports peaked in 1998.[5] By 2013, Canada's share of U.S. imports was almost 5 percentage points below its value in 1996. In a comparable manner, Canada's share of U.S. exports in 2013 was almost 4.5 percentage points below its peak value in 1998.[6]

Table 1. Canada's Trade with the United States

	Imports ($ 1,000s)	% of U.S. Imports	Exports ($ 1,000s)	% of U.S. Exports
1990	91,372,024	18.4	83,673,800	21.6
1992	98,629,800	18.4	90,594,300	20.6
1994	128,405,900	19.2	114,438,600	22.8
1996	153,892,600	19.4	134,210,200	21.9
1998	173,256,000	18.9	156,603,500	23.3
2000	230,838,300	18.7	178,940,900	22.7
2002	209,087,700	17.8	160,922,700	23.1
2004	256,359,800	17.2	189,879,900	23.1
2006	302,437,900	16.1	230,656,000	22.1
2008	339,491,400	15.9	261,149,800	20.0
2010	277,636,700	14.3	249,256,500	19.3
2013	332,077,869	14.7	301,609,600	18.9

Source: U.S. Census Foreign Trade Data, Trade in Goods – Balance of Payments Basis,
Trade with Canada: https://www.census.gov/foreign-trade/balance/c1220.html
Trade with all countries: https://www.census.gov/foreign-trade/statistics/historical/gands.pdf

As Table 1 reveals, the U.S. dollar value of trade with Canada increased fairly consistently over the sample period with the exception of the period between 2008-2010 when both economies, but particularly the U.S. economy, experienced recessions. However, the monetary value of bilateral trade flows might not represent the behavior of the physical volume of trade, given that the average price of imports and exports changed over the sample period. In this regard, we used the U.S. import price index for all commodities from Canada to calculate the real U.S. dollar value of imports from Canada. Using nominal dollar values, U.S. imports from Canada increased by approximately

[5] Admittedly, both peaks could be in 1997 given the two-year data intervals in Table 1.
[6] Price deflators for U.S. exports to Canada are unavailable.

113% over the period 1996-2013; however, the real value of imports increased by only 32% over the same period. By contrast, the real value of U.S. imports from Canada increased by almost 90% over the period 1990-1998. Clearly, Canada's importance as a trading partner with the United States has become less prominent in recent years compared to the 1990s

Another approach to measuring the physical volume of shipments is to use Bureau of Transportation Statistics data on the weight of goods traded. For example, from 1996 to 2013 the weight of goods imported by surface mode (truck, rail or pipeline) grew by 37%, which is much closer to the real growth rate of 32% than to the nominal value growth rate of 113%. Unfortunately, we can only obtain weight data for imports, and that data only begins in 1995 for surface modes. If we want weights for all modes (surface plus air, vessel, and "other"), data are not available prior to 2004, and this is a relatively short sample period. It is interesting to note that the composite growth in the weight of surface imports was 19 percent in both the period 1995-2000 and the period 2000-2013, despite the fact that the latter period contains almost three times as many years. Looking at growth rates for total surface imports could be misleading, however, because the ratio of the value of total U.S. imports from Canada to the value of surface imports only varied between 1.03 and 1.18 over the 1995-2013 time period. We will make some additional use of weight data later in the paper when we look at individual land border ports of entry that have no air or vessel trade.

Changing Shares of U.S. Trading Partners

To the extent that Canada's relative importance as a trading partner with the United States diminished in the post-2001 period or thereabouts, it is interesting to identify the countries that have become relatively more important trading partners. In this regard, Table 2 reports the share of U.S. imports originating in each major source country, along with the share of the rest-of-the-world (ROW), for selected sample years. Canada's declining share of U.S. trade post-2000 is apparent, as is the dramatic increase in China's share. To the extent that China's share of U.S. imports continues to grow, seemingly at least in part at the expense of imports from Canada, both the future volumes and composition of goods entering the U.S. from Canada might be greatly affected.[7] We recognize that some U.S. imports from China may enter the United States via Canada. Indeed, the Port of Prince Rupert has been promoted as a North American gateway for trade with Asia. Hence, China's growing trade with the U.S. might imply increased shipments from Canada to the U.S. in some circumstances.

[7] We shall consider China's future trading relationship with the United States in more detail in a later section. It should be noted explicitly that we are assuming that value shares of trade are good approximations to volume shares of trade over time.

Table 2. Country Shares of U.S. Imports

	1990	2000	2013
Canada	18.4	18.8	14.6
China	3.1	8.2	19.4
France	2.7	2.5	2.0
Germany	5.7	4.8	5.1
Italy	2.6	2.1	1.7
Japan	18.2	12.1	6.1
Korea	3.7	3.3	2.8
Mexico	6.1	11.2	12.4
Taiwan	4.6	3.3	1.7
U.K.	4.1	3.6	2.3
ROW	30.8	30.1	31.9

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Several other observations are worth highlighting based on Table 2. Namely, Mexico became an increasingly important source of U.S. imports relative to Canada over the sample time period, and particularly during the 1990s, while Japan's relative importance declined quite substantially. Conversely, the import shares of most other trading partners remained relatively constant. In short, the data in Table 2 suggest that Canada lost market share in the U.S. to China and Mexico over the sample time period, although the loss might have been mitigated by gains at Japan's expense.

Table 3 reports the shares of leading destination countries for U.S. exports for the same three years as Table 2. The picture for Canada in this regard is broadly similar to that presented in Table 2. Specifically, Canada's share of U.S. exports is slightly higher in 2000 than in 1990 but lower in 2013 than 2000. In the case of exports, as we found for imports, China became a significantly more important trading partner with the United States over the sample period and particularly after 2000. Mexico also became a substantially more important destination country for U.S. exports, although Mexico's share of U.S. exports was essentially unchanged between 2000 and 2013. The decreasing relative importance of Japan as a U.S. trading partner is reflected in Table 3, as it was in Table 2.

Table 3. Country Shares of U.S. Exports

	1990	2000	2013
Australia	2.2%	1.6%	1.7%
Belgium	2.6	1.8	2.0
Canada	21.1	22.6	19.0
China	1.2	2.1	7.7
France	3.5	2.6	2.0
Germany	4.8	3.8	3.0
Japan	12.4	8.4	4.1
Korea	3.7	3.6	2.6
Mexico	7.2	14.3	14.3
Netherlands	3.3	2.8	2.7
Singapore	2.0	2.3	1.9
Taiwan	2.9	3.1	1.6
U.K.	6.0	5.3	3.0
ROW	27.1	25.7	34.4

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

In summary, Canada's share of U.S. imports and exports declined over the period 2000-2013 after increasing modestly over the period 1990-2000. The rapid growth of China's share of U.S. trade might explain some of Canada's declining share of trade in recent years. It might also be the case that the markets for goods that traditionally comprise bilateral trade have grown more slowly than the markets for goods that the U.S. imports and exports with other countries. In the next section of the paper, we consider some evidence bearing upon these two possible contributors to Canada's recent history of changing shares of U.S. imports and exports. Specifically, we report data identifying changes in the main goods traded between Canada and the U.S., as well as Canada's share of trade in those goods.

III. OVERVIEW OF BILATERAL TRADE ON A COMMODITY BASIS

The majority of Canada's goods trade with the United States has historically been concentrated in a relatively small number of product categories. By way of illustration, Table 4 reports the total value of U.S. imports for the seven 2-digit HTS chapters that accounted for the largest individual shares of total U.S. imports from Canada in 1990. In total, the seven commodity groups identified accounted for approximately 68 percent of all U.S. imports from Canada in 1990. Besides the total value of each HTS import category, Table 4 reports the share of total imports from Canada accounted for by each 2-digit HTS category for 1990, 2000 and 2013.[8]

Table 4. Top U.S. Commodity Imports from Canada

HTS	$ Millions			Percentage of Total Imports from Canada		
	1990	2000	2013	1990	2000	2013
87 (motor vehicles and parts)	26,271	56,000	55,704	28.8	24.5	16.8
27 (mineral fuels)	9,865	31,000	109,000	10.8	13.7	32.9
84 (nuclear reactors, barriers, machinery and mechanical appliances)	7,537	18,776	19,752	8.3	8.2	6.0
48 (paper and products)	6,324	10,133	6,790	6.9	4.4	2.0
85 (electrical machinery)	4,568	16,910	7,881	5.0	7.4	2.4
98 (special)	3,763	10,849	10,176	4.1	4.7	3.1
44 (wood and products)	3,487	10,802	7,884	3.8	4.7	2.4

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

While there are several substantial changes in the shares of individual commodities imported by the U.S. from Canada, the total share of U.S. imports from Canada accounted for by the seven HTS commodity categories doesn't change very much from 1990 to 2013. Specifically, the total share is approximately 68 percent in 2000 (as it was in 1990) and about 66 percent in 2013. What is obvious is the dramatic growth in the value of mineral fuels imports from Canada between 2000 and 2013, as well as the share of total U.S. imports from Canada accounted for by that commodity. In fact, the growth of mineral fuels imports is in large part due to a dramatic increase in energy prices, especially over the period 2000-2013.[9] Whether Canada increased its share of U.S. mineral fuel imports relative to other countries will be considered below.

Another noteworthy observation from Table 4 is the small absolute decline in the dollar value of U.S. imports of motor vehicles and parts from Canada over the period 2000-2013. The small absolute decline understates the decrease in the volume of motor vehicle and parts imports, since the reported nominal dollar value ignores inflationary increases in prices affecting that commodity category. While the share of HTS 87 in total U.S. imports from Canada decreased consistently from 1990 to 2013, the decrease became particularly marked in the post-2000 period.

[8] Data for all years over the period 1990-2013 are available from the authors upon request.
[9] For example, the price of oil increased from around $20 barrel in 2000 to over $95 barrel in 2013.

These observations support a conclusion that U.S. imports of motor vehicle and parts from Canada decreased significantly in real terms from 2000-2013.

Table 5 summarizes analogous information to that provided in Table 4. Specifically, it reports the nominal value of U.S. exports to Canada for the eight largest HTS commodity exports (by value) to Canada in 1990. It also reports the shares of total U.S. exports to Canada that are accounted for by each of the individual HTS categories. The data are reported for three years (1990, 2000, 2013).[10] The eight HTS categories accounted for almost 68 percent of U.S. exports to Canada in 1990 and approximately 70 percent of U.S. exports to Canada in 2000. The aggregate share declined to around 63 percent in 2013. Hence, the HTS categories reported upon in Table 5 account for a substantial share of U.S. exports to Canada over the sample period.

Table 5. Top U.S. Commodity Exports to Canada

HTS	$ Millions			Percentage of Total Exports to Canada		
	1990	2000	2013	1990	2000	2013
87 (motor vehicles and parts)	17,926	33,746	51,702	21.6	19.1	17.2
84 (machinery)	16,097	35,739	45,298	19.4	20.3	15.1
85 (electrical machinery)	9,717	25,382	26,774	11.7	14.4	8.9
98 (special)	3,163	4,108	8,890	3.8	2.3	3.0
90 (instruments)	2,726	6,513	9,373	3.3	3.7	3.1
39 (plastics)	2,611	7,119	13,047	3.2	4.0	4.4
27 (mineral fuels)	2,171	2,781	24,658	2.6	1.6	8.2
73 (iron and steel)	1,561	3,849	7,879	1.9	2.2	2.6

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Clearly, motor vehicles and parts and two categories of machinery (HTS 84 and 85) account for a substantial share of U.S. exports to Canada by value. Since price deflators for specific commodities exported to particular countries are generally unavailable, it is impossible to determine with certainty if export volumes increased over the full sample period. However, given that the value of electrical machinery barely changed over the period 2000-2013, it is possible that the real value of those exports actually declined, unless there was a decline in prices for this category of exports to Canada. Such a price decline is possible because the deflator for HTS 85 exports to all countries declined by 18 percent over this time period. Certainly in relative terms, HTS 87, 84 and 85 became less important categories of U.S. exports to Canada over the time period 2000-2013. Conversely, mineral fuels became a substantially more important U.S. export to Canada in the post-2000 time period, although the value of U.S. imports of mineral fuel from Canada far exceeds the value of U.S. exports of mineral fuel to Canada.[11]

In summary, relatively slow growth in bilateral trade in motor vehicles and parts, as well as in machinery, explains a substantial portion of the slowdown in the growth of overall bilateral trade in

[10] Again, we note that annual values for all years from 1990-2013 are available from the authors upon request.

[11] Prior to the recent growth of U.S. shale oil production, Canada tended to export crude oil to the United States, and the United States predominantly exported refined products such as jet fuel to Canada.

the post-2000 period. The slower growth in these two HTS categories is offset somewhat by faster growth in bilateral trade in mineral fuels.

Assessing the Pattern of Bilateral Trade

It is clear from the information summarized in Tables 4 and 5 that motor vehicles and parts remain a very prominent bilateral trade category; however, its importance as a U.S. import from Canada has diminished both absolutely and relatively in recent years. A continuation of this recent behavior would have important implications for the continued concentration of shipments of imports from Canada through border ports located in Michigan, most notably Detroit. Specifically, it would diminish the importance of expanding the capacities of those specific ports, other things constant. The growth of U.S. exports of motor vehicles and parts to Canada has also slowed in recent years, although not as dramatically as imports. To the extent that motor vehicles and parts continue to diminish in absolute and relative importance as a U.S. export to Canada, capacity requirements on border ports in Southern Ontario are also likely to diminish, at least relative to other ports on the northern border. A more detailed assessment of the outlook for U.S. trade with Canada in motor vehicles and parts, as well as other major commodities, is presented in Section 5 of this report. At this point, we identify and briefly consider how Canada's share of bilateral trade in HTS 87 has fared relatively to that of other U.S. trading partners.

Some insight into this issue is provided by data presented in Tables 6 and 7. Specifically, Table 6 reports the share of U.S. imports of motor vehicles and parts accounted for by Canada, several other individual countries and the rest-of-the-world for the years 1990, 1995, 2000, 2005 and 2013. These data provide some insight into whether the diminishing importance of U.S. imports of motor vehicles and parts from Canada primarily reflects a redirection of sourcing by the U.S. away from Canada and towards other countries or a general decrease in U.S. imports of this HTS commodity. Table 7 provides similar data for U.S. exports of motor vehicles and parts, thereby providing some insight into whether U.S. export opportunities outside of Canada are increasing relative to opportunities inside Canada.

Table 6. U.S. Imports of HTS 87 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	35.2	39.7	34.2	31.0	22.4
China	0.1	0.5	1.2	2.1	3.9
Germany	9.6	7.8	10.2	12.2	13.2
Japan	38.0	31.2	26.2	24.8	20.0
Korea	1.8	1.8	3.2	5.1	6.6
Mexico	4.9	10.1	15.9	13.4	23.9
U.K.	2.3	2.3	2.4	3.6	2.5
ROW	8.1	6.6	6.7	7.8	7.5

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 7. U.S. Exports of HTS 87 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	55.6	50.2	54.5	51.3	38.6
China	0.2	0.3	0.3	1.1	7.7
Germany	3.8	3.5	3.4	5.9	4.5
Japan	5.1	8.0	4.2	1.9	1.2
Korea	1.1	1.3	0.7	0.8	0.9
Mexico	10.5	8.6	18.2	13.6	16.1
U.K.	1.5	1.4	1.9	2.0	1.6
ROW	22.2	26.7	16.8	23.4	29.4

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 6 shows that Canada's share of U.S. imports of HTS 87 decreased modestly over the period 1990-2000; however, its share decreased quite dramatically over the subsequent period 2000-2013. Over the full time period, there was a notable increase in the share of U.S. imports of HTS 87 originating in Mexico. Indeed, by 2013, Mexico's share of U.S. imports of motor vehicles and parts exceeded Canada's share. Germany's share also increased fairly consistently from around 1990 through 2013, while Japan's share decreased substantially and consistently over the time period, and China's share increased modestly.

In terms of exports, Canada's share of U.S. exports of HTS 87 was only slightly lower in 2000 than it was in 1990. However, Canada's share of U.S. exports in 2013 was substantially below its share in 2000. Moreover, Mexico's share of U.S. exports in 2013 is also below that country's share in 2000, although there was a steady increase in Mexico's share from 1995-2000. China became a more important market for U.S. exports of HTS 87 post-2000, although the latter's increase in share appears to just offset Japan's decrease in share.

In short, the decline in Canada's share of U.S. imports of motor vehicles and parts coincides primarily with an increase in Mexico's share of U.S. imports post-2005. On the export side, Canada's declining share of HTS 87 over the period 2000-2013 coincides with China's increasing share. However, there was also an increasing export share enjoyed by third countries classified in the category "rest-of-the-world."[12]

In summary, the decrease in bilateral trade in HTS 87 reflects, to a significant extent, changes in Canada's "competitiveness" as a trade partner relative to other U.S. trading partners. A continued increase in Mexico's share of U.S. imports of HTS 87 would therefore imply smaller relative capacity demands on northern border land ports that are important processers of imports of HTS 87 compared to the past. Likewise, a continued increase in China's share of U.S. exports of HTS 87 goods would also contribute to smaller demands on capacity for northern land ports that intensively

[12] Countries such as Saudi Arabia, the United Arab Emirates, Russia and Nigeria account for a large portion of this "rest of world" growth.

process shipments of motor vehicles and parts being exported to Canada, at least compared to other ports and holding other trade determinants constant.

It is interesting to note that there was a greater increase in Mexico's share of U.S. imports of HTS 87 than in its share of U.S. exports. The impact of enhanced border security by itself would presumably have had a greater negative impact on U.S. imports than on exports. It is possible that HTS 87 was less affected by U.S. border security measures given that trusted-trader programs are so well-suited to the nature of trade in the automotive sector, at least when bottlenecks don't extend beyond the access points for trusted trader lanes.

Trends for other main HTS categories are illustrated in Tables 8 through 18 (See Appendix for Tables 8 through 18). As we found for HTS 87, there is a decline in Canada's share of U.S. imports of HTS 48 and 44 (Tables 14 and 15). If this trend continues, it would significantly dampen pressures for expansion of capacity of the northern border ports processing those imported goods. In the cases of HTS 84 and, even more so, HTS 85 (Tables 10 through 13), Canada's share of U.S. imports became so small by 2013 that future decreases are either unlikely to occur or would be modest in terms of their impacts on capacity demand. Conversely, continued growth of U.S. imports of HTS 27 (Table 8) would escalate capacity demands for the main land ports processing imports of petroleum products.

Canada's post-2000 declining shares of U.S. exports of HTS 39, 73, 90, 85 and 84 all point to downward pressure on the demand for relevant port capacity if that trend continues, although the decreases in Canada's shares of U.S. exports for these goods categories were relatively modest in the post-2000 period. On the other hand, there was a sharp decrease in Canada's share of U.S. exports of HTS 27 from 2001-2013 (Table 9). Of course, demands on port capacity could still increase despite declining Canadian trade shares, if the overall level of U.S. exports or imports grew sufficiently rapidly. In this regard, recent discussion of a decline in the growth rate of U.S. potential GDP may be relevant.[13] Slower potential growth of U.S. GDP by itself would contribute to a slowdown of Canadian exports to the U.S.

Other HTS Categories

To this point, we have focused on the main categories of bilateral imports and exports. With the exception of U.S. imports of petroleum products from Canada, the recent behavior of bilateral imports and exports suggests a more modest increase in the need for commercial border crossing infrastructure capacity than might have been extrapolated from bilateral trade patterns prior to 2005; however, it is certainly possible that goods characterized by historically small values of bilateral trade will grow more rapidly in the future, thereby placing increased capacity demands on infrastructure, although perhaps in different locations than has historically been the case. In fact, there are numerous goods whose cross-border shipments have grown quite rapidly in recent years.

Table 19 summarizes the growth of imports for the twenty 2-digit HTS categories that experienced the fastest growth over the period 2005-2013.[14] Specifically, the first column reports the HTS category. The second and third columns report total U.S. imports (in $1,000) for the years 2005 and 2013, respectively. Column 4 reports the growth rate of imports over the period 2005-2013, while column 5 shows the contribution to the absolute growth of imports accounted for by each

[13] An overview of the discussion of the growth rate of U.S. potential real GDP is provided by the article "Jobs are not enough" published in the July 19, 2014 issue of *The Economist*. This article notes that the estimate of potential real GDP produced by the Congressional Budget Office grew faster than 3 percent in the 1990s, but it decreased to 2.6 percent in 2007, and is now down to 2.1 percent in 2014.

[14] It also reports the growth experience for the five large import HTS categories (84, 87, 85, 48 and 44) that were not among the top 20 fastest growing categories.

HTS category. Column 6 provides perhaps the most informative data. Specifically, it provides an estimate of the relative contribution of each HTS category to the growth of U.S. imports from Canada over the period 2005-2013. Note that the total relative contributions to the growth of U.S. imports must sum to 100 percent across all HTS categories (some of these growth contributions are negative, of course).

Table 19. Growth of Top Commodities for U.S. Imports from Canada

HTS	Imports ($ 1,000s) 2005	Imports ($ 1,000s) 2013	Growth 2005-2013	Growth Contribution	Growth Share	Share of 2013 Imports
96	$69, 133	$628,112	810%	0.2%	1.3%	0.19%
10	413,330	2,096,261	407	0.6	3.8	0.63
80	9,814	49,501	404	0.0	0.1	0.01
15	469,850	1,945,105	314	0.5	3.3	0.58
23	414,683	1,716,099	314	0.5	2.9	0.52
9	117,811	427,579	263	0.1	0.7	0.13
71	2,281,506	7,607,972	234	1.9	11.9	2.29
12	330,059	1,026,508	211	0.2	1.6	0.31
78	211,119	573,858	172	0.1	0.8	0.17
11	250,234	614,102	145	0.1	0.8	0.18
50	14	34	139	0.0	0.0	0.00
43	90,325	177,485	96.5	0.0	0.2	0.05
31	2,007,313	3,932,119	95.9	0.7	4.3	1.18
24	88,741	161,320	81.8	0.0	0.2	0.05
38	1,053,732	1,870,428	77.5	0.3	1.8	0.56
46	5,959	10,290	72.7	0.0	0.0	0.00
5	65,602	112,964	72.2	0.0	0.1	0.03
7	880,628	1,498,124	70.1	0.2	1.4	0.45
27	65,771,381	109,586,871	66.6	15.2	98.1	32.95
8	226,437	375,886	66.0	0.1	0.3	0.11
84	19,705,155	19,881,507	0.9	0.1	0.4	5.98
87	61,722,146	55,702,340	-9.8	-2.1	-13.5	16.75
85	10,836,724	7,886,546	-27.2	-1.0	-6.6	2.37
48	10,421,193	6,788,865	-34.9	-1.3	-8.1	3.62
44	14,188,201	7,884,026	-44.4	-2.2	-14.1	4.93
All Commodities	287,870,207	332,552,763	15.5	15.5	100%	100%

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

It might be noted that with the exception of HTS 27, the contributions to import growth of the other individual HTS categories are generally quite small, both in terms of their absolute contribution to growth, as well as their share of import growth.[15] Furthermore, their shares of total commodity imports (again with the exception of HTS 27) are fairly small. The implication of this observation is that even if the fast-growing HTS categories maintain their growth rates into the future, their impacts on commodity shipments crossing the border will remain modest, particularly for the major border ports.

Table 20 identifies the twenty HTS categories for which exports from the U.S. to Canada grew most rapidly over the period 2005-2013. In particular, it identifies the absolute and relative contribution to the growth of U.S. exports over the sample period for the fastest growing HTS categories. It also reports data for the major HTS export categories that do not make the list of the fastest growing categories, namely, HTS 87, 84, 85, 90, 39 and 73.

As is the case for U.S. imports, most of the fastest growing export HTS categories account for a relatively small share of the growth of U.S. exports from the U.S. to Canada in 2013. However, several exceptions might be noted in this regard. One is HTS 27 which is one of the fastest growing export categories, as well as a quantitatively important export product. Another is HTS 88 (aircraft and parts) which accounted for over two percent of total U.S. exports to Canada in 2013.

While the contributions to overall export or import growth are modest for most of these fast-growing categories, it is possible that trade in these "rising" commodities is concentrated at individual ports. Such concentrated trade could strain port capacity if it grew quickly, particularly if it occurred at smaller ports. We will examine this possibility in Sections 6 and 7 when we look at the distribution of trade by commodity and port.

[15] The one minor exception is HTS 71 (jewelry) but much of the growth contribution for this category reflects increases in prices of precious metals such as gold.

Table 20. Growth of Top Commodities for U.S. Exports to Canada

HTS	Exports ($ 1,000s) 2005	Exports ($ 1,000s) 2013	Growth 2005-2013	Growth Contribution	Growth Share	Share of 2013 Exports
24	25,190	217,870	765%	0.1%	0.2%	0.1%
22	602,023	2,398,065	298	0.9	2.0	0.8
31	319,438	1,048,060	228	0.3	0.8	0.4
43	59,390	190,795	221	0.1	0.2	0.1
27	8,143,865	24,658,069	203	7.8	18.6	8.2
2	659,113	1,972,767	199	0.6	1.5	0.7
80	26,198	76,019	190	0.1	0.1	0.0
96	355,860	1,021,587	187	0.3	0.8	0.3
71	1,452,879	4,225,517	183	1.3	3.1	1.4
11	98,243	271,785	177	0.1	0.2	0.1
42	220,114	579,798	163	0.2	0.4	0.2
9	333,454	823,208	147	0.2	0.6	0.3
93	160,402	392,156	145	0.1	0.3	0.1
16	439,561	1,043,961	138	0.3	0.7	0.4
88	2,857,224	6,547,467	129	1.8	4.2	2.2
66	6,002	13,295	122	0.0	0.0	0.0
21	977,733	2,147,205	120	0.6	1.3	0.7
4	160,513	350,125	118	0.1	0.2	0.1
20	850,310	1,823,690	115	0.5	1.1	0.6
19	1,137,270	2,410,052	112	0.6	1.4	0.8
73	4,848,265	7,878,984	63	1.4	3.4	2.6
90	6,784,993	9,372,473	38	1.2	2.9	3.1
39	9,806,455	13,046,801	33	1.5	3.7	4.4
85	21,723,784	26,773,946	23	2.4	5.7	8.9
87	42,671,015	51,701,674	21	4.3	10.2	17.2
84	38,687,856	45,297,773	17	31	7.4	15.1
All Commodities	211,420,450	300,244,595	42	42	100	100

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Summary

Given the many bilateral commodity imports and exports, it is difficult to summarize their recent growth experiences in a simple and convenient way; however, several major features of this recent experience stand out. One is the rapidly growing prominence of HTS 27 (petroleum products) in bilateral trade. Any continuation of this development will certainly affect future needs for capacity expansion at border ports that process this commodity.[16] A second is the decreasing relative importance of HTS 87 (autos and parts), particularly imports of this commodity into the U.S. from Canada. Two other HTS categories -- 84 (machinery and mechanical appliances) and 85 (electrical machinery and equipment) --are also becoming relatively less important bilaterally traded goods, although the growth in exports of these two commodities continues to account for a significant share of total U.S. export growth to Canada.

[16] It might be noted in this regard that petroleum products are increasingly being transported by rail relative to pipeline. The main impacts on infrastructure requirement would be experienced if there was an increase in truck transportation of HTS 27.

IV. THE SIZE AND FREIGHT COMPOSITION OF PORTS

In this section of the report, we identify and assess the value and composition of imports and exports passing through specific northern land border ports.[17] The goal is to link this information to our assessment of changing trade patterns in order to identify changing relative capacity pressures on specific ports.

Tables 21 and 22 provide an overview of the largest northern border ports in terms of the percentages of commercial imports and exports that they process. Specifically, Table 21 reports the dollar value of imports passing through the 15 largest (by value) northern border ports, along with the share of total imports passing through those ports that is accounted for by each specific port listed. Table 22 reports comparable data when the focus is on exports. These two tables exclude ports such as Burlington, VT, which are not located on the physical border.

Table 21. Import Values and Percentages by Port - 2013

	Port	Imports ($)	Share of Total
1	Detroit, MI	$58,992,240,383	26.97%
2	Port Huron, MI	$41,498,927,253	18.97%
3	Buffalo-Niagara Falls, NY	$38,171,424,440	17.45%
4	Champlain-Rouses Point, NY	$13,545,991,983	6.19%
5	Pembina, ND	$10,181,400,323	4.65%
6	International Falls, MN	$9,019,775,557	4.12%
7	Blaine, WA	$7,975,074,811	3.65%
8	Alexandria Bay, NY	$7,578,394,336	3.46%
9	Sweetgrass, MT	$7,320,059,394	3.35%
10	Portal, ND	$7,126,823,827	3.26%
11	Eastport, ID	$5,008,421,585	2.29%
12	Highgate Springs/Alburg, VT	$4,182,571,612	1.91%
13	Great Falls, MT	$3,900,803,846	1.78%
14	Houlton, ME	$2,154,829,228	0.99%
15	Ogdenburg, NY	$2,100,942,326	0.96%
		$218,757,680,904	100.00%

Source: Bureau of Transportation Statistics, North American Transborder Freight Data, http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html

[17] We should clarify here that we use the term "port" in an administrative sense, since there will be both Canadian and U.S. crossings in the relevant physical location.

Table 22. Export Values and Percentages by Port - 2013

	Port	Exports ($)	Share of Total
1	Detroit, MI	$63,570,555,540	27.95%
2	Buffalo-Niagara Falls, NY	$42,201,335,228	18.56%
3	Port Huron, MI	$40,021,662,075	17.60%
4	Pembina, ND	$17,091,394,477	7.51%
5	Blaine, WA	$13,016,116,090	5.72%
6	Portal, ND	$12,292,959,706	5.41%
7	Sweetgrass, MT	$9,926,695,846	4.36%
8	Champlain-Rouses Point, NY	$9,235,269,642	4.06%
9	Alexandria Bay, NY	$6,583,609,812	2.89%
10	International Falls, MN	$4,728,913,812	2.08%
11	Eastport, ID	$2,298,991,786	1.01%
12	Highgate Springs/Alburg, VT	$2,197,584,268	0.97%
13	Sumas, WA	$1,734,514,927	0.76%
14	Calais, ME	$1,412,267,237	0.62%
15	Houlton, ME	$1,123,769,122	0.49%
		$227,435,639,568	100.00%

Source: Bureau of Transportation Statistics, North American Transborder Freight Data, http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html

There is a good deal of concordance in terms of port identities when comparing the two tables, since ports responsible for processing large values of imports are also likely to process large values of exports. Nevertheless, the correspondence of port identities is not perfect, since a few small ports are focused more prominently on either imports or exports. Reporting results for only the 15 largest ports is somewhat arbitrary, as there are 121[18] northern land border crossings, some of which are combined into a single port;[19] however, the ports listed in the two tables account for essentially all bilateral trade. Specifically, the 15 ports listed in Table 21 account for around 93 percent of all U.S. northern border imports from Canada, while those listed in Table 22 account for almost 98 percent of all U.S. northern border exports to Canada.

It is also obvious from the data reported in Tables 21 and 22 that imports and exports are highly concentrated in a relatively small number of ports. As noted earlier, the four largest ports account for around 65 percent of all U.S. imports from Canada and approximately 70 percent of all U.S. exports to Canada. Hence, major changes in bilateral trade patterns would presumably impose substantial impacts on these four major ports.

[18] The estimate of 121 border crossings is based on Appendix B of the April 2013 Canada-U.S. Border Infrastructure Investment Plan.

[19] For example, the Detroit Port of Entry includes both the Ambassador Bridge and the Detroit-Windsor tunnel.

As might be expected, the major land ports process a substantial share of the main import and export commodity groups identified earlier in the report. Table 23 reports the percentage of imports (by value) passing through the 8 busiest ports in 2013 for the main import commodity groups discussed earlier. Clearly, the leading import commodities account for the majority of goods passing through three of the leading ports; namely, Buffalo -Niagara Falls, Detroit and Port Huron. Over half of the imports processed through those ports are one or more of the top six import commodity groups. In the case of exports, as reported in Table 24, the leading export commodities account for the majority of goods processed through the ports of Buffalo/Niagara, Detroit, International Falls, Pembina and Port Huron.[20] The implication of the data presented in Tables 23 and 24 is that changes affecting bilateral trade flows of the historically most important traded commodities will have disproportionate impacts on a handful of land ports.

Table 23. Percentage of Imports in the Main Import Commodity Groups at the 8 Busiest Ports

	Alexandria Bay, NY	Blaine, WA	Buffalo-Niagara Falls, NY	Champlain-Rouses, Point NY	Detroit, MI	Int'l Falls, MN	Pembina, ND	Port Huron, MI
Oil 27	0.89%	6.77%	12.86%	13.92%	0.63%	25.06%	10.50%	15.47%
Wood 44	1.59	14.79	1.06	3.90	0.59	15.25	2.45	1.75
Paper 48	7.17	6.90	2.06	5.57	1.99	3.30	1.01	2.78
Machinery 84	4.50	8.59	6.02	5.08	10.13	0.32	10.89	7.45
Elec.Mach. 85	4.13	2.84	2.63	1.92	2.70	0.06	2.04	2.03
Vehicles 87	2.05	1.83	30.02	7.38	49.66	0.05	7.36	29.53
Other Goods	79.67	58.28	45.35	62.23	34.30	55.96	65.75	40.99

Source: Bureau of Transportation Statistics, North American Transborder Freight Data, http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html

[20] International Falls and Pembina are large importers and exporters of HTS 27.

Table 24. Percentage of Exports in the Main Export Commodity Groups at the 8 Busiest Ports

	Alexandria Bay, NY	Blaine, WA	Buffalo-Niagara Falls, NY	Champlain-Rouses Point, NY	Detroit, MI	Int'l Falls, MN	Pembina, ND	Port Huron, MI
Oil 27	0.58%	5.83%	7.65%	0.85%	1.13%	18.16%	22.55%	5.24%
Plastic 39	6.68	4.18	5.03	6.28	4.53	7.63	3.72	7.91
Iron/steel 73	2.33	2.57	2.13	1.72	2.00	15.54	3.29	2.22
Machinery 84	14.16	15.65	13.47	13.82	16.82	4.25	22.28	15.54
Elec. Mach. 85	5.42	7.79	7.50	6.81	10.08	0.75	6.03	8.97
Vehicles 87	9.30	10.80	19.42	9.50	28.98	5.35	12.06	14.06
Other Goods	61.53	53.18	44.80	61.02	36.46	48.32	30.07	46.06

Source: Bureau of Transportation Statistics, North American Transborder Freight Data, http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html

Tables 25 and 26 highlight which specific leading commodities are most importantly linked to the levels of processing activities at each of the largest ports. Specifically, the tables show the percentages of each of the leading import (or export) commodities that are processed through the leading ports. For example, almost 53 percent of imports of motor vehicles and parts is processed through the port of Detroit. Another 22 percent of imports of HTS 87 is processed through Port Huron, with an additional 21 percent processed through Buffalo. Hence, essentially all imports of HTS 87 are processed through those three ports. The distribution of import processing is a bit more dispersed in the case of the other leading import commodities, although three or four ports typically account for the majority of all imports with the exception perhaps of HTS 27 and 44. However, by and large, the eight largest ports account for the vast majority of import and export shipments of the main bilaterally traded commodities.

It is worth noting that northern border ports handle freight from countries other than Canada. For example, in 2013, just over $5 billion in imports from China entered the U.S. through the Detroit customs district. While this number is small in comparison to the $102 billion in imports from Canada through this same district, the growth rate for imports from China was much higher than that for Canada. A continuation of very rapid growth of goods arriving from China through Canada could be a significant source of capacity demand for affected U.S. land ports.

Table 25. Percentage of Imports Crossing at the 8 Busiest Ports for the Main Import Commodity Groups

	27	44	48	84	85	87
Alexandria Bay, NY	0.22%	1.54%	8.20%	1.95%	5.32%	0.28%
Blaine, WA	1.73	15.10	8.30	3.91	3.85	0.26
Buffalo-Niagara Falls, NY	15.73	5.17	11.84	13.12	17.08	20.60
Champlain-Rouses Point, NY	6.04	6.76	11.38	3.93	4.42	1.80
Detroit, MI	1.20	4.44	17.70	34.14	27.16	52.65
International Falls, MN	7.25	17.61	4.49	0.16	0.09	0.01
Pembina, ND	3.43	3.19	1.55	6.33	3.54	1.35
Port Huron, MI	20.58	9.29	17.42	17.66	14.35	22.02
Other Ports	43.83	36.91	19.12	18.78	24.18	1.03

Source: Bureau of Transportation Statistics, North American Transborder Freight Data, http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html

Table 26. Percentage of Exports Crossing at the 8 Busiest Ports for the Main Export Commodity Groups

	27	39	73	84	85	87
Alexandria Bay, NY	0.27%	3.65%	2.24%	2.38%	1.84%	1.43%
Blaine, WA	5.46	4.54	4.90	5.21	5.24	3.29
Buffalo-Niagara Falls, NY	23.25	17.68	13.21	14.54	16.37	19.15
Champlain-Rouses Point, NY	0.56	4.82	2.32	3.26	3.24	2.04
Detroit, MI	5.17	23.97	18.62	27.37	33.13	43.06
International Falls, MN	6.18	3.01	10.78	0.51	0.18	0.59
Pembina, ND	27.77	5.30	8.25	9.75	5.33	4.82
Port Huron, MI	15.11	26.38	13.06	15.92	18.57	13.16
Other Ports	16.23	10.65	26.62	21.07	16.09	12.47

Source: Bureau of Transportation Statistics, North American Transborder Freight Data, http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html

Summary

While there are many northern border ports, a relatively small subset are responsible for the bulk of trade in the leading bilaterally traded commodities. Hence, a continuation (or acceleration) of trade patterns influencing the leading traded commodities will clearly affect the demand for infrastructure at the largest land border ports.

Whether recent trends in bilateral trade will continue for the foreseeable future requires forecasts that are, at best, uncertain. In particular, developments in bilateral trade of the leading commodities will be affected by the overall growth of bilateral trade, as well as the share of bilateral trade that consists of the historical leading commodities. Specifically, for each of the imported commodities identified in Table 4, its future growth will depend largely upon real economic growth in the United States, as well as the competitiveness of producers in Canada relative to producers in other countries.[21] The future growth of each of the exported commodities listed in Table 5 depends importantly on the real economic growth rate of Canada's economy, as well as the competitiveness of U.S. producers relative to competitors exporting to Canada from other countries. We consider alternative scenarios for these developments in the next section of the report.

[21] Factors affecting HTS 98 are likely to be unique given the idiosyncratic nature of this commodity category. Hence, we do not consider future trade scenarios for this category any further in this report.

V. OUTLOOK FOR SPECIFIC COMMODITY IMPORTS AND EXPORTS

For any commodity imported into the United States, the quantity imported should respond positively to an increase in the gross domestic product of the U.S. Furthermore, since a substantial share of U.S. imports are parts of cumulative value-adding supply chains, imports should also respond positively to an increase in Canada's gross domestic product. This is because the growth of Canada's economy should stimulate demand for goods produced in the United States which, in turn, use those products as inputs in their production.

The influence of the sizes of the domestic economies on the overall trade that takes place between those economies is summarized by the gravity trade model which is the basis for virtually all trade equations. The basic gravity model states that the volume of trade between any two countries will be a positive function of the product of each country's real GDP, other things constant. Of course, the growth of trade need not be equal for all commodities. One reason is that the structure of each country's economy will change as that economy gets larger. Typically, as economies become wealthier, services become a larger share of economic activity, while basic goods become a smaller share. As well, exchange rate changes may have different "pass through" rates which result in differences in the impact of exchange rate changes on imports and exports of specific goods.[22]

In short, a "top down" approach to developing broad scenarios for how U.S. imports and exports of specific commodities will change over time needs to recognize both the impacts of overall economic growth in the U.S. and Canada, as well as circumstances more specific to particular commodities.

Recent Economic Real Growth and Outlook for Future

The substantially more robust growth in bilateral trade from 1990-2000 compared to 2000-2013 is consistent with slower real economic growth in both Canada and the United States in the latter period compared to the former period. Table 27 reports the simple average annual rates of real GDP growth for each country for the two time periods. It also reports forecasts of real economic growth for both countries over the next decade as estimated by the Conference Board.

The combined average real economic growth rate in Canada and the United States over the period 2000-2013 was about 70 percent of the combined average growth rate over the period 1990-2000. The decline in the growth of nominal value of imports between the two time periods is even more dramatic. Specifically, nominal imports grew at an annual rate in the later period that was around one-ninth the annual rate of growth in the earlier period. The annual average rate of growth of exports from the U.S. to Canada in the later period was slightly less than half its value in the earlier period.

[22] Beckman (2012) estimates that a one percent increase in real U.S. GDP results in around a two percent increase in real merchandise exports from Canada to the U.S. A one percent increase in the value of the U.S. dollar results in about a one-half percent increase in Canadian exports to the U.S.

Table 27. Historical Real GDP Growth Rates and Forecasts

	Average Annual Real GDP Growth	
	1990-2000	2000-2013
Canada	2.63%	2.23%
U.S.	3.30	1.91
	Forecast Average Annual Real GDP Growth	
	2014-2019	2020-2025
Canada	2.1%	1.8%
U.S.	1.7	1.7

Source: Historical data: GDPCA from FRED (U.S.) and Table 380-0100 from CANSIM (Canada). Forecasts from Erumban, de Vries and van Ark (2013).

The Conference Board forecasts in Table 27 point to even lower rates of real economic growth in Canada and the U.S. over the next decade than was experienced during the relatively slow growth period from 2000-2013. Another set of GDP growth forecasts for the United States is provided by the Congressional Budget Office (CBO). The CBO projects average annual real economic growth to be 2.1 percent over the period 2014-2024. Hence, the CBO's forecast for U.S. real GDP growth over that period is only slightly above the rate projected by the Conference Board as reported in Table 27. This still represents a substantial slowdown in real economic growth compared to the 1990-2000 time period.

Given Beckman's (2012) estimates of import and price elasticities of Canadian exports to the U.S., the dramatic decrease in the growth of U.S. imports from Canada comparing 1990-2000 to 2000-2013 seems disproportionate to the decrease in the combined bilateral real economic growth rate over the same time period. For example, U.S. real GDP grew by 25 percent from 2000 to 2013, and in the absence of other effects such as exchange rate changes, Beckman's income elasticity of 2 would predict real import growth from Canada of around 50 percent, rather than the observed 0.4 percent real decline. Some of the shortfall in real import growth from Canada reflects a real appreciation of the Canadian dollar relative to the U.S. dollar, but given the low exchange rate elasticity, and the fact that the nominal appreciation of the Canadian dollar was about 44 percent, the gap between the expected and actual change in real U.S. imports from Canada is quite substantial.

This finding reinforces our earlier discussion of China and Mexico taking market share from Canada in the U.S. market. Deutsche Borse Group (2014) argues that the primary reason for the collapse in Canadian sales to the U.S. is Canada's massive loss of cost competitiveness over the post-NAFTA period, notwithstanding a depreciation of Canada's exchange rate over the period 1991-2002. On the other hand, the decrease in U.S. exports to Canada over the 2000-2013 time period seems more consistent with the decrease in the combined bilateral real economic growth rates between the two time periods.

One implication of the growth forecasts is that U.S. imports from Canada may grow at an even slower rate in the future, unless real economic growth in the U.S. in particular increases substantially, or Canadian exporters become more competitive in the U.S. market relative to foreign exporters. A second is that U.S. exports to Canada may grow at a significantly slower rate if foreign markets become more attractive to U.S. exporters relative to Canada, unless bilateral real economic growth accelerates.

In fact, most longer-run forecasts of real economic growth suggest that it is likely to be comparable to, or even lower than, real economic growth over the period 2000-2013. It is certainly possible that factors such as a substantial depreciation of the Canadian dollar or rapid inflation in emerging markets might promote increased bilateral trade, notwithstanding the projected slow growth of the U.S. and Canadian economies. We consider potential changes in the trade competitiveness of different countries below. Putting aside speculation regarding possible extenuating circumstances for the moment, we can use real GDP forecasts and estimated elasticities to create a baseline prediction for total U.S. – Canada exports over the 2014-25 period. A constant 1.7 percent growth rate for U.S. real GDP through 2025 translates into a 3.4 percent annual growth rate of aggregate U.S. imports from Canada. The cumulative effect of this annual growth rate would be a 44.5 percent increase in U.S. imports from Canada by 2025. For U.S. exports to Canada, the growth rates of Canadian real GDP are expected to be faster than in the United States, but the lower income elasticity of Canadian imports means that U.S. real exports will likely grow more slowly than U.S. real imports. Specifically, we expect Canadian real imports from the United States to grow at 2.9 percent annually over 2014-2019, and then at 2.5 percent annually from 2019 to 2025. Cumulative real growth for Canadian imports is therefore forecasted to be about 34 percent by 2025.

As in previous periods, growth rates for individual commodities will differ from the baseline growth rate for all goods. In the next section of the paper we consider which commodities are likely to experience faster or slower trade growth than the benchmark rates. This information will be combined with commodity mixes at ports to identify which ports are likely to experience above-average growth rates of trade and which are likely to experience below-average growth rates.

Outlook for Individual Products

The outlook for relatively slow economic growth in the U.S. and Canada suggests that bilateral trade, overall, will continue to grow at the relatively slow pace it has experienced in recent years; however, other trade determinants may differ across commodities such that trade might grow faster than average for specific commodities and slower for others. We therefore consider the trade outlook for the specific commodities listed in Tables 4 and 5.

HTS 27 (Mineral Fuels)

It seems unlikely that the rapid absolute and relative growth of bilateral trade in mineral fuels that characterized the period 2000-2013 will continue over the next 10 years. Perhaps the most important development in this regard is the spectacular growth in U.S. production of shale oil and natural gas which is rapidly diminishing the demand for imports of oil and gas from Canada.

Gattinger (2013) identifies and discusses the fundamental changes in North American energy markets that are making north-south energy trade linkages increasingly less important than east-west linkages. The main factor is that the U.S. has gone from being a net importer of natural gas (virtually all from Canada) to a potential net exporter.[23] The dramatic expansion of shale exploration has also increased the supply of relatively low cost crude oil in the United States. Although it is unlikely that

[23] The legal status of natural gas exports from the United States remains in debate, although limited exports are currently allowed.

the U.S. will stop importing crude oil completely over the next ten years, it is extremely likely that it will cut back substantially on such imports.

A substantial expansion of crude oil exports from Canada to the United States requires the expansion of north-south pipeline capacity. The main source of new Canadian oil exports is the oil sands in Northern Alberta; however, the U.S. government has been reluctant to approve the main pipeline proposal (Keystone XL Pipeline) which would carry oil from the oil sands into the main U.S. markets.[24] Gattinger (2013) notes that even if the Keystone XL Pipeline is ultimately approved, oil from the oil sands would face substantial price competition from shale oil produced in the U.S. such that it might not be profitable to export oil to the U.S. from oil sands locations.[25] More likely are increased shipments from Alberta to Eastern Canada and to British Columbia for export to Asia. In this regard, a number of proposals have been filed to enable shipments of crude oil from Western Canada to Eastern Canada. For example, Trans Canada has proposed a pipeline project that would move 1.1 million barrels per day (bbl/d) from Alberta and Saskatchewan to refineries in Eastern Canada. Additionally, both Trans Canada and Kinder Morgan are seeking approval for projects that would carry oil from Alberta west to the Pacific Coast in British Columbia. [26]

At the same time, Canadian refineries, like those in the U.S., are working to increase their use of growing crude oil from new shale-oil fields in Texas and North Dakota. Monthly exports of crude oil from the U.S. to Canada historically averaged 24,000 (bbl/d); however, U.S. exports to Canada averaged nearly 100,000 (bbl/d) over the first three months of 2013.[27] Canadian petroleum purchases from the U.S. primarily supply refineries in Eastern Canada that are configured to run light crude oil. At the same time, refineries in eastern Canada are making logistical changes needed to replace imports of Atlantic Basin crudes with lower priced oil produced in North America. Furthermore, the liberalization of foreign ownership restrictions in Mexico's energy sector enhances prospects for a substantial improvement in supply conditions in Mexico's oil industry. This, in turn, could result in exports of oil from Mexico displacing Canadian exports to the U.S.

The growth of shale oil production in the eastern portion of the United States creates the potential for U.S. exports of oil to displace some of the domestic sales of oil from Western Canada to Canadian refineries in Ontario and Quebec. It is certainly possible that U.S. shale oil exports will preempt some shipments of oil sands crude from Alberta to Eastern and Central Canada.[28] To the extent that increased shale oil exports are carried by pipeline, they will have limited implications for expanding conventional border port infrastructure; however, gaining legal approval for new pipeline capacity is extremely slow and difficult. Hence, a growing share of oil shipments is being carried by rail, and this is likely to continue in the future. Consequently, the most likely opportunity for increased trade in HTS 27 would seem to be increased oil exports from the U.S. to Eastern and Central Canada as well as increased imports of Canadian oil into the U.S. for re-exporting from U.S.

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[24] A recent (November 18, 2014) vote in Congress led to a rejection of a bill approving construction of the Keystone XL Pipeline.

[25] In a more recent study, Blank and Gattinger (2014) note that Alberta's heavy oil is better suited for America's Gulf Coast refineries than shale oil.

[26] U.S. Energy Information Administration, "This Week in Petroleum," October 22, 2014, http://www.eia.gov/petroleum/weekly/archive/2014/141022/includes/analysis_print.cfm.

[27] U.S. Energy Information Administration, "This Week in Petroleum," May 30, 2013, http://www.eia.gov/petroleum/weekly/archive/2013/130530/twipprint.html. Exporting crude oil from the U.S. has been tightly controlled, but U.S. crude can be shipped to Canada with authorization (Blank and Gattinger, 2014). Also, crude shipped from Canada can be re-exported. These re-exports could grow substantially in future years by some estimates.

[28] Current exports of U.S. shale oil to Quebec appear to be "backing out" imported oil from North Africa.

gulf ports. If carried by rail, such increased trade might create an increased demand for port capacity in the affected regions.

Canada – U.S. trade in natural gas is also undergoing significant changes as a result of increased production from shale gas deposits. According to the U.S. Energy Information Agency (EIA),pipeline imports of natural gas from Canada have been declining steadily since 2007. The EIA notes that increased natural gas production from the Marcellus shale in the northeast likely displaced natural gas imports from Canada. Almost all natural gas exported to Canada from the United States flows by pipeline and crosses at either St. Clair, MI or Niagara Falls, NY. The latter pipeline began carrying natural gas from Pennsylvania in 2012 after completion of the Northern Access Expansion Project. As of 2013, while Canadian pipeline exports of natural gas to the United States have been declining, at 2,785 bcf they still exceeded U.S. pipeline exports to Canada of 911 bcf. There were also small amounts of CNG and LNG exported to Canada by truck.

To the extent that restrictions on natural gas exports from the U.S. are relaxed by the U.S. government, there could be a substantial increase in such exports to Canada in future years. Conversely, increased production of shale gas in the U.S. should continue to depress the growth of imports of natural gas from Canada.

HTS 87 (Motor Vehicles and Parts)

Motor vehicles and parts are the single most important bilaterally traded commodity. As identified in Tables 6 and 7, there was a dramatic decline in Canada's share of U.S. imports and exports for this commodity category. The primary explanation for Canada's declining share of U.S. imports would appear to be competition from Mexico. Canada has also experienced growing exposure to China in the HTS 87 category (Sawchuk and Yerger, 2006).

Much has been written about the economic prospects of Mexico and China, including the likelihood of vehicles and parts producers in those countries becoming more competitive in the Canadian and U.S. markets. Sawchuk and Yerger (2006) argue that Canadian manufacturers of motor vehicles and parts are already exposed to substantial competition from Chinese producers in the U.S. market, and that this competition is likely to increase in the future, as China gains expertise and market share in higher-skilled sectors such as HTS 87.[29] On the other hand, they argue that Chinese manufacturers of motor vehicles and parts have not yet posed a competitive challenge to U.S. exporters in the Canadian market, although they also expect more exposure in the near future to competition from Chinese sellers for reasons cited above.

Mexico is now the fourth largest auto exporter behind Japan, Germany and South Korea. A spate of recently announced factory investments by foreign companies underscores the emergence of Mexico as a leading home-country location for global auto makers (Althaus, 2014). It seems reasonable to infer that a substantial portion of the production capacity being created in Mexico is meant to support export initiatives, particularly to the United States. This development certainly suggests increasing competitive pressures on Canadian exporters of autos and parts to the United States. The growth of capacity in Mexico is also creating indirect competitive pressures on Canadian exporters to the United States, as it is encouraging (along with other factors) a southward movement of auto and parts production in the U.S. which would increase transportation and related costs for Canadian exporters tied into U.S.-based supply chains.[30]

[29] For a negative assessment of the international competitiveness of Chinese vehicle manufacturers, see Murphy (2014).

[30] Vellequette (2014) discusses how the center point of the North American auto industry which was located in central Illinois in 2000 has moved south into Arkansas and will continue to move south in the future. The reason is primarily automaker investments pouring into Mexico.

To be sure, not all analysts agree that Chinese manufacturers will become more competitive participants in North American markets. For example the Boston Consulting Group (2014) highlights increasing manufacturing costs in China tied to higher costs of labor and energy. Indeed, the Boston Consulting Group argues that China's manufacturing cost advantage relative to the U.S. has essentially disappeared. Conversely, Mexico's cost competitiveness has improved relative to most other countries, including China, owing in part to relatively low energy costs. Dawson, Sands and Woods (2013) also highlight Mexico's closer geographic distance to the U.S., and transportation costs and wage rates that are rising faster in China than in Mexico as factors improving Mexico's competitive position. The prospects for a liberalization of foreign investment restrictions in Mexico's energy sector is seen by many observers as likely providing a major boost to the efficiency of Mexico's manufacturing sector by dramatically increasing domestic energy supplies, thereby reducing costs of energy feedstocks and electricity.

The Boston Consulting Group also argues that U.S.-based manufacturers are becoming more efficient relative to many other foreign manufacturers. The improved efficiency is partly driven by lower energy costs associated with the previously discussed shale-oil drilling boom in the United States. Some evidence of the improving competitive position of U.S.-based auto and parts manufacturers is provided by recent announcements of new factory openings in the U.S. including several investments that displaced capacity in Mexico.[31] Improvements in the competitiveness of U.S. manufacturers should provide greater competition for Canadian exporters in the U.S. market, further dampening the growth in U.S. imports of autos and parts from Canada.

Lower energy costs in the U.S. might promote increased exports of HTS 87 commodities to Canada, although energy costs in Canada remain competitive with those in the U.S., as discussed by the Boston Consulting Group. To the extent that more developed supply chain linkages between U.S. and Mexican producers contribute to more efficient U.S. production capacity, U.S. exports might displace domestic Canadian production.

There are also claims that U.S. natural gas exports to Mexico will power a manufacturing boom in Mexico (Ailworth, 2014). Some projections call for U.S. gas exports to Mexico to double over the next few years. The increasing flow of gas will lower the energy costs of many Mexican manufacturing industries including auto manufacturing and petrochemicals. While Mexico has significant shale resources of its own, its energy companies lack the expertise to tap them. As those companies gain expertise, relative energy costs in Mexico could decrease quite substantially.

Obviously, federal and provincial governments in Canada might respond with policies to support Canadian producers and maintain bilateral trade flows, although NAFTA ensures that there cannot be legal discrimination against Mexican-based suppliers. On balance, it seems plausible that Canadian exports of autos and parts to the United States will continue to be displaced by exports from Mexico, as well as by increased domestic production by U.S.-based companies. As well, a faster growth of consumer demand for autos in Mexico compared to Canada, particularly given relatively slow projected growth for Canada, could divert sales of U.S.-made vehicles and parts to Mexico from Canada.

HTS 44 (Wood Products) and HTS 48 (Paper Products)

Canadian exports of lumber and wood products to the U.S. have suffered in recent years from several developments. The most obvious is the collapse of the U.S. housing construction industry in 2008 followed by a relatively slow recovery in housing starts. It seems unlikely that there

[31] For example, General Motors recently announced that it would invest as much as $185 million to build small engines at its Spring Hill, Tennessee factory and move production of its Cadillac SRX cross-over vehicle from Mexico. See Bennett (2014).

will be a substantial acceleration of housing starts given projections of slow economic growth for the U.S. economy. Furthermore, restrictions on Canadian exports of softwood lumber imposed by The Softwood Lumber Agreement would constrain the growth of lumber exports in any case. In addition, damage to timber by mountain pine beetle infestation could limit the supply of B.C. lumber available to the U.S. market (Penner, 2014). Burt and Ai (2012) highlight The Softwood Lumber Agreement, as well as Canadian government limits on exports of raw logs from Crown land as factors accounting for Canada's loss of market share in the U.S. in forestry products.[32] In terms of wood products, competition from China in the U.S. market has also obviously been a relevant factor as suggested by Table 15. Such competition might be expected to weaken as China moves towards manufacturing higher value-added products; however, rather than Canadian exports filling the gap created by decreasing Chinese exports, it seems more likely that the U.S. will increase its imports of wood products from other emerging markets enjoying relatively low costs of labor (Burt and Ai, 2012).

The outlook for Canadian exports of paper products to the U.S. is conditioned by the fact that newsprint accounts for an outsized share of those exports, and U.S. demand for newsprint continues to decline due to the shift in advertising to digital format. As well, Canadian paper makers face increasing competition from emerging market competitors based in warmer climates (Burt and Ai, 2012).

HTS 84 (Machinery) and HTS 85 (Electrical Machinery)

The prospects for bilateral trade in various segments of the machinery sector depend upon the growth prospects of the customers for those segments. In particular, bilateral trade in metal and wood-working machinery is linked to housing and commercial construction, while oil and gas drilling equipment is linked to oil and gas exploration activity. Longer-run prospects for machinery used in the energy sector should be relatively attractive given the shale oil and gas revolution in both countries, as well as the continued expansion of the oil sands. The housing sector in the United States is likely to improve compared to the experience of 2008-2013, as mortgage availability improves. Hence, it is plausible that both U.S. imports and exports of HTS 84 commodities might increase somewhat faster than would be suggested by the projected overall growth rates for the two economies. This is particularly plausible to the extent that China's costs of production increase in the future at an anticipated faster pace than in the past.

Canadian shipments of electrical machinery were a very small share of U.S. imports by 2013. A substantial part of the explanation is the collapse of Canadian production by Research-in-Motion (RIM), which was accompanied by RIM establishing major assembly plants in Mexico. It seems unlikely that Canadian exports of HTS 85 will revive substantially over the foreseeable future. On the other hand, the U.S. comparative advantage in electrical machinery remains strong, although some observers argue that the leading role of the U.S. as an exporter of high-tech goods will come under pressure in the years ahead (HSBC Global Connections, 2014). If Canadian business investment picks up in future years, U.S. exports of HTS 85 commodities could increase at a faster rate than suggested by the relatively slow growth we project for the Canadian economy as a whole.

[32] A pine beetle infestation in British Columbia forests has reduced harvesting of trees, but it has not been sufficiently severe to limit, by itself, exports of wood to the U.S., especially given weak housing starts in the U.S. post-2007. However, a scarcity of harvestable wood might limit exports in the future if there were a substantial increase in U.S. demand for B.C. wood.

HTS 39 Plastics

Plastic products (including resins) are used in many industries. Hence, the overall demand for plastic resins and final products will be strongly tied to the overall growth of the importing economy. It is possible that U.S. exporters will increase their penetration of the Canadian economy given the abundant supplies of natural gas-related feedstock that U.S. producers will enjoy going forward. Hence, exports of HTS 39 commodities may well increase at a faster rate than the average growth of U.S. exports to Canada.

HTS 73 Iron and Steel

Iron and steel products are also ubiquitous imports in modern economies, although they are more important imports in some sectors than in others. Perhaps the main point to make in considering U.S. exports of iron and steel to Canada is that Chinese production capacity continues to increase, at the same time as some countries have imposed anti-dumping rulings against Chinese steel producers; however the Chinese national government is interested in reducing excess capacity in iron and steel, aluminum and related industries. To the extent it is successful, Chinese suppliers may be less formidable competitors to U.S. exporters in the Canadian market. Nevertheless, suppliers based in other countries have cost structures that are quite comparable to U.S. producers. As a result, it seems unlikely that U.S. iron and steel exports to Canada will expand at a faster pace than is dictated by the overall growth rate of the Canadian economy.

HTS 90 Instruments

HTS 90 consists of precision measuring instruments used for navigation, for measurement, and for medical applications. These instruments can be found in a diverse range of contexts such as in a semiconductor chip fabrication plant, in a shale oil or gas operation, or in a hospital. Demand for instruments in the medical and oil/gas industries (including liquefied natural gas export facilities) will likely show strong growth in coming years in both Canada and the United States.

While there is potential for strong overall growth in the use of instruments in Canada and the United States, it seems likely that other countries will meet much of this demand. The United States currently provides over half of the value of Canada's imports of HTS 90, but the growth rate of Canadian HTS 90 imports from the U.S. over the last 10 years was just 1.3% versus 61% for Mexico and 55% for China. Canada's share of U.S. imports of HTS 90 is just 4%, which puts Canada in eighth place as a supplier of U.S. HTS 90 imports. A recent Conference Board of Canada on-line analysis of export competiveness of the instruments industries in industrialized countries[33] concludes that the small size of Canada's producers means that they can't compete well against larger producers from countries such as China, Mexico, or Switzerland.

[33] See: http://www.conferenceboard.ca/hcp/details/innovation/export-market-share-instruments.aspx

VI. IMPLICATIONS FOR INDIVIDUAL PRODUCTS AND MAJOR PORTS

Table 28 provides a broad summary of the growth prospects for the major U.S. imports and exports with Canada. The benchmark is average growth of imports and exports given our aggregate economic growth forecasts for the U.S. and Canada. Since we believe that aggregate growth in trade will resemble the recent experience of 2005-2013, the overall growth experience of imports and exports is projected to parallel that experience.

Table 28 is meant to provide indirect insight into which ports are likely to experience above-average or below-average increases in capacity demands based on future growth of the traded commodities that pass primarily through specific ports.

Table 28. Trade Growth Prospects for Major Commodities

	U.S. Imports	U.S. Exports
Above-average growth	Machinery	Machinery Mineral fuels Plastics Electrical machinery
Average growth	Mineral fuels Wood products	Iron and steel
Below-average growth	Motor vehicles and parts Paper products Electrical machinery	Motor vehicles and parts Instruments

Autos and Parts

Focusing on HTS 87, our analysis suggests that over the next 10 years, there will be relatively slow growth in bilateral imports and exports of motor vehicles and parts from a U.S. trade perspective. Holding other factors constant, this suggests that ports which concentrate on processing trade in motor vehicles and parts will be characterized by relatively weak increases in the demand for additional infrastructure capacity.

Mineral Fuels

Our earlier discussion suggested the potential for an above-average growth rate for mineral fuel exports from the U.S. to Canada, particularly shale oil and gas destined for Quebec and possibly Eastern Canada. The outlook for mineral fuels imports is less optimistic. Increased shale and gas production in the U.S., plus the potential for increased imports from Mexico, dampen the outlook for imports of mineral fuels from Canada, although there might be an increase in Canadian exports to third countries using U.S. pipeline infrastructure. On balance, we believe that mineral imports from Canada will increase at an average rate, at best. However, since a substantial proportion of re-exported mineral fuels will be carried by pipeline, the impact on infrastructure demand would be modest, at best.

Wood and Paper Products

As noted earlier, U.S. imports of wood products over the foreseeable future will depend upon the strength of recovery of the U.S. housing sector. Since it seems likely that housing starts in the U.S. will increase modestly compared to the recent past, HTS 44 might enjoy a somewhat better-than-average growth as a U.S. import category; however, the slower than average growth projected for paper products imports from Canada somewhat offsets the relatively optimistic projection for wood products. Furthermore, competition from third countries, and domestic supply constraints will limit the growth of Canadian exports of wood products to the U.S.

Plastics, Iron and Steel

Above average growth is projected for U.S. exports to Canada of plastics with average growth projected for iron and steel.

Summary of Implications of Major Commodities for Ports

Alexandria Bay

As can be seen from Tables 23 and 24, machinery (HTS 84) is a significant bilaterally traded commodity passing through the port of Alexandria Bay. To the extent that businesses in Canada and the U.S. increase spending substantially on capital equipment, exports and imports of this product should grow at above-average rates in the future. Plastics are also an important trade item accounting for around 6 percent of exports and also 6 percent of imports passing through Alexandria Bay.[34] Trade in this product, as noted earlier, should enjoy above-average growth; however, reduced trade in vehicle and parts passing through Alexandria Bay should by itself contribute to below average growth in trade through this port.

The single most important import category for Alexandria Bay is pearls and other jewelry (HTS 71). It accounts for 23 percent of imports passing through the port and 6 percent of exports. Furthermore, trade has grown relatively rapidly for this commodity. For example, exports of the HTS 71 category increased from around $4.8 million in 2007 to around $402 million in 2013. Imports increased from around 1 billion to around $1.8 billion over that same time period. HTS 71 is an eclectic category which also includes gold and silver unwrought or in semi-manufactured form. The rapid increase in the prices of gold and silver from 2003-2012 might account for part of the increase in export and import values described above. Since jewelry demand depends primarily upon real economic growth, the rapid increase in trade for HTS 71 over the period 2007-2013 is a bit surprising; however, demographics also play a role in jewelry demand. Specifically, older people spend a larger share of their income on jewelry than younger people. As the population ages over time, demand for jewelry will increase, other things constant. Our best guess is that growth in trade for HTS 71 will slow in future periods compared to the recent past; however, growth is likely to be faster for HTS 71 commodities than for overall trade. Hence, based on its trade product mix, we would identify Alexandria Bay as a land port that will experience above-average growth in bilateral trade.[35]

Blaine

As noted earlier, if there is a sustained recovery of home construction in the U.S., it is likely to be modest. Therefore, the volume of wood product imports through Blaine is likely to increase compared to recent years; however, the modest projected recovery of residential construction in the U.S. combined with supply constraints and third-country competition mentioned earlier point to

[34] The imports of plastic products is part of the category "other goods" in Table 23.
[35] Virtually all exports passing through this port are carried by truck.

average growth, at best, in this import category. The relatively large share of imports accounted for by wood products processed through Blaine implies an average growth in demand for capacity at this port.

Machinery is the second largest import processed through Blaine, and we projected earlier that bilateral trade for this commodity is likely to grow at an above-average rate. Partially offsetting this phenomenon are projected slower rates of growth for mineral fuels and paper products. On the export side, the prominence of the machinery and electrical machinery categories support faster than average growth of trade through Blaine, other things constant. Conversely, the growth rate of exports of vehicles is likely to slow down over the foreseeable future.

In the other products category, a significant volume of grains, oilseed and food products are exported and imported through Blaine. While no single HTS category is large, the cumulative volume of trade is relevant to capacity demands for that port. Since the main source of future growth for U.S. and Canadian grain and food products is Asia, bilateral trade in these products is unlikely to grow at above-average rates. On balance, we believe that Blaine belongs in the average-growth category.[36]

Buffalo

The prominence of motor vehicles and parts in both imports and exports passing through this port by itself suggests that the growth of this port will be relatively slow. In addition, a slower growth of imports of mineral fuels might further restrict trade growth. Machinery is a category of goods which we projected as being likely to have above-average growth in trade barring stagnating business investment. This category is the second largest source of bilateral trade going through the port of Buffalo. In the "other goods" category, non-ferrous metal products are a significant import category with around $3 billion of imports in 2013. It seems likely that future growth of such imports will be dictated largely by the average growth of the U.S. economy.

The most likely sources of faster than average trade growth are exports of mineral fuels, plastics and electrical machinery. However, collectively these HTS categories represent a relatively small share of trade passing through this port. Hence, we would characterize Buffalo as likely to have below-average growth in the demand for infrastructure over the foreseeable future.

Champlain-Rouses Point

On the import side, mineral fuels are the predominantly traded commodity for this port, while machinery is the predominant export. As discussed earlier in the report, we anticipate below average growth in imports of mineral fuels over the next ten years, and above-average growth in exports of machinery. Imports and exports of motor vehicles and parts are also prominently traded goods which should further contribute to below-average growth in trade for this port. Exports of electrical machinery and plastics are important categories of trade for Champlain-Rouses Point, and such exports should grow at above-average rates. Among the category of "other goods," pearls and other jewelry (HTS 71) represents a significant amount of trade.[37] As was the case for Alexandria Bay, the HTS 71 category increased at an above-average rate over the period 2007-2013. Again, while we would expect a slowdown in the rate of growth of bilateral trade for this category, it is likely to be a source of above-average growth in trade for this port over our sample time period.

[36] Almost three-quarters of all exports passing through Blaine are shipped by trucks. Usage of rail is intensive for imports of wood – about 64 percent of wood imports are carried by rail. For all imports, rail accounts for around 35 percent of value.

[37] In 2013, imports were slightly over $900 million, while exports were around $860 million. The combined volume of trade in this category was slightly greater than the combined value of trade in vehicles and parts.

On balance, it is difficult to characterize the future growth prospects of the port of Champlain-Rouses Point given the "mixed" prospects for the various commodities passing through the port. One potentially important consideration in this regard is exports of mineral fuels. If exports of shale oil and natural gas currently being produced in Ohio and Pennsylvania find export markets in Quebec and Eastern Canada, total exports through this port are likely to increase significantly. In light of this possibility, and given other above-average growth prospects for trade, we project this port to have above-average growth in demand for infrastructure over the next ten years.[38]

Detroit

The outlook for the growth of trade through the port of Detroit is dominated by the outlook for the growth of bilateral trade in motor vehicles and parts, and machinery. These two commodity categories account for 60 percent of imports through this port and 47 percent of exports. As suggested in Table 28, both imports and exports of motor vehicles and parts are projected to grow at relatively slow rates, with trade in machinery growing at an above-average rate.

Other commodities accounting for a significant share of trade processed through the port of Detroit include plastics, paper and paperboard and iron and steel. Collectively, these commodities accounted for approximately 9 percent of total imports handled by the port in 2013 and around 12 percent of total exports; however, only plastics is projected to grow at an above-average rate, while paper and paperboard should grow at a below-average rate. Given the predominance of motor vehicles and parts in the trade passing through this port, we project a below-average growth in demand for physical infrastructure.

International Falls

Oil and wood products constitute the main imports through this port, while oil and machinery constitute the main exports. As noted earlier, our expectation is for a recovery in the U.S. housing market to stimulate an average growth in imports of wood products, at the same time that exports of fuel should grow at an above-average rate. Also, exports of machinery are likely to grow at an above-average rate, while oil imports are projected to grow at an average rate. Furthermore, food products and fertilizer are fairly prominent traded commodities that fall into the "other goods" category in Tables 23 and 24. It is unlikely that bilateral trade in food products would grow at above-average rates. Finally, imports and exports of plastics are important traded goods, as are exports of iron and steel. The former are projected to enjoy above-average growth, while the latter are projected to grow at an average rate.[39]

Given the varied expected growth rates for commodities passing through International Falls, it is difficult to assign it any precise overall classification in terms of expected growth in the demand for infrastructure capacity. Our qualitative assessment is that the growth of trade passing through International Falls over the next 10 years is likely to be somewhat faster than the average growth of trade through the major eight ports. However, virtually all goods passing through the port are shipped by rail. Adding rail capacity might be relatively easy if it simply involves adding some additional rail cars. On the other hand, it might be difficult if it involves creating more rail track and secondary inspection capacity.

[38] It might be noted in this regard that exports of HTS 27 through Champlain-Rouses Point are predominantly carried by truck or rail and not by pipeline. For all exports, truck is the predominant mode of carriage.

[39] The value of imported plastics in 2013 was about 30 percent greater than the value of exported iron and steel.

Pembina

Mineral fuels are the single most prominently traded commodity passing through the Pembina port. Imports of mineral fuels comprised about 10 percent of total imports and approximately 23 percent of total exports in 2013.[40] The importance of fuel exports identifies the potential for trade through this port to grow at an above-average rate, although we note that over 90 percent of HTS 27 products are currently exported through Pembina by pipeline. As well, machinery accounts for about 23 percent of exports, and (as noted earlier) we project this category of exports to experience an above-average growth rate. Motor vehicles and parts account for another 12 percent of exports, and this category of goods should grow at a below-average rate. On balance, therefore, we project trade through the port of Pembina to increase at an above-average growth rate.

Port Huron

Since vehicles and ports are such a prominently traded commodity passing through this port, it argues in favor of categorizing the future growth of trade passing through Port Huron as below-average. Oil imports are also an important import category that are projected to grow at an average rate, at best, while machinery (an important export) will grow at an expected above-average rate. There are no substantial groups of products in the "other goods" classification that are projected to be relatively fast-growing. Hence, it seems fair to characterize the growth outlook for Port Huron as being below-average.

Summary

Table 29 summarizes our ranking for future infrastructure expansion needs at eight major ports based on scenarios for changes in the future volumes of trade.[41] Plausible bilateral trade scenarios identify the likelihood that the three largest northern border ports (Buffalo, Detroit and Port Huron) will experience the slowest increases in demand for infrastructure going forward. Conversely, the smaller of the main northern border ports (Alexandria Bay, Champlain-Rouses Point, International Falls and Pembina) are likely to experience above-average growth in utilization over the foreseeable future.

Table 29. Projected Demand for Additional Infrastructure

Above-Average	Average	Below-Average
Alexandria Bay	Blaine	Buffalo
Champlain-Rouses Point		Detroit
International Falls		Port Huron
Pembina		

Additional validation of our classification of ports in Table 29 can be obtained from border crossing wait-time data. Ports with strong growth in demand should start to experience capacity constraints that produce longer wait times, as the exit rate from the inspection facility can't adjust

[40] As in the case of several other ports, agricultural and food products collectively are an important traded commodity passing through Pembina.

[41] It should be emphasized that these are relative rankings or, equivalently, our priority rankings for future infrastructure expansion demands.

sufficiently to meet the elevated arrival rate. While there are several web sites that offer real-time data on expected border wait times, most of these sources offer just a point-in-time snapshot of border delays. There are two sources that archive and present historical data for a relatively long series of wait times. The Cascade Border Wait Time Archive has wait times that stretch back to 2007. The Canada – U.S. Border Wait Time Archive includes much of the Cascade gateway data plus data for the Buffalo-Niagara region. The Buffalo-Niagara data are available for a much shorter time period than the Cascade Gateway data.

The Canada – U.S. Border Wait Time Archive includes observations for Blaine, a port that we classify in Table 29 as having an average need for additional physical infrastructure, as well as for Buffalo, a part that we classify as having a below-average need. While this wait time data covers just a few of the ports listed in Table 29, comparing wait-times for Blaine and Buffalo provides an independent check on our trade-based classification results. The data in the on-line archive show longer delays at the Blaine crossing than at the Buffalo crossings. For example, entering the U.S., the delay is two minutes shorter at the Peace Bridge than at Blaine (7.8 minutes versus 9.8 minutes) and six minutes shorter at the Queenston-Lewiston Bridge (3.8 minutes versus 9.8 minutes). Delays into Canada are also longer for Blaine, but the fact that different years are being compared means that caution is needed when comparing the figures.

Additional information on wait times in the 2010 and 2012 federal government fiscal year is provided by Roberts et al (2014). This data was provided to the authors by U.S. Customs and Border Protection. Overall averaged delays were 11 minutes at Pacific Highway versus 3.8 minutes at Buffalo and 4 minutes at Detroit.[42] The figures in the on-line archive and in Roberts et al support our classifications of Blaine, Buffalo, and Detroit in Table 29.

It can be argued that the major ports of Port Huron, Detroit and Buffalo received the most government attention in the post-9/11 period in terms of reducing border wait times, so that by 2007, crossing times at the Ambassador Bridge were actually faster than at other major crossings (Gillen and Gados, 2007). While median crossing times at the Blue Water Bridge (Port Huron) and Peace Bridge (Buffalo) were slightly longer and more variable than for the Ambassador Bridge, they were not noticeably longer than for the other major crossings.

Finally, we can consider how the use of data on weights of U.S. imports would impact the rankings in Table 29. The ratios of weight to value are relatively high at International Falls, Blaine**,** and Pembina and low at Detroit. If weight is more closely correlated with infrastructure than value, then the use of weight would further support our classification of Detroit, Pembina, and International Falls in Table 29 and might nudge Blaine closer to the "above average" column. The weight-to-value ratios for the other four ports are fairly similar both in levels and patterns over time, so there would be no strong influence on their classification in Table 29 from using weight in place of value.

[42] To calculate the Buffalo figure, we averaged values of 2.3 minutes at the Lewiston Bridge and 5.3 minutes at the Peace Bridge. Likewise, for Detroit we averaged 3.5 minutes at the tunnel and 4.6 minutes at the Ambassador Bridge.

VII. ASSESSMENT OF MEDIUM-SIZED AND SMALL/REMOTE PORTS

While the largest land border ports account for the bulk of bilateral trade, a significant amount of trade passes through medium and smaller-sized ports. A full set of scenarios should therefore include an attempt to identify differences in the growth outlook for medium-sized and small, remote ports. Since it is not feasible to assess every individual medium and small-sized northern border port, we focus on a sample of U.S. ports that experienced relatively fast growth rates for exports over the period 2007-2013. The notion here is that if recent and projected growth rates for medium-sized ports exceed those for large ports, more policy attention should be paid to addressing capacity issues confronting the former set of ports, all other things constant.

Growth of Shipments through Medium-Sized Ports

Given the large number of intermediate-sized ports, it is not possible to evaluate the growth prospects of all of them. Therefore, our basic focus in this section is to assess the outlook for medium-sized ports that have been experiencing relative rapid growth in recent years. If the faster growing ports in recent years continue to grow at a relatively rapid pace, it would argue for more resources being dedicated to capacity expansion at those ports.

Table 30 summarizes the growth rate of exports for the 14 medium-sized border ports that experienced the fastest growth in exports over the period 2007-2013. Specifically, the table reports the growth rate in value of exports from 2007-2013, as well as the leading commodity exports. The growth rates reported in Table 30 are substantially higher than the export growth rates for the eight large ports identified in Table 29. By way of illustration, the average growth rate over the sample period is 125 percent for the 14 medium-sized ports. In contrast, the average export growth rate was 39 percent for the eight large ports.

Given the smaller sizes of the medium-sized ports, any given volume increase will contribute to relatively fast growth compared to the large ports. Furthermore, a number of the medium-sized ports have their exports concentrated in commodities such as vehicles and iron and steel which are products whose export growth rates are projected to be average or below average. Conversely, a number of ports have mineral fuels and/or machinery as a substantial export. These ports include most prominently Dalton Cache, Alaska; Trout River, New York; Raymond, Montana; Dunseith, North Dakota; Portal, North Dakota and Sweetgrass, Montana. The concentration of these ports in Montana and North Dakota undoubtedly reflects their proximity to the Bakken Shale oil and gas field. To the extent that mineral fuel exports are primarily carried by pipeline, there will be less pressure to expand the physical infrastructure at those ports. In fact, the bulk of oil exports at the Montana and North Dakota ports are carried by rail and, to a lesser extent, by truck.

Table 30. Growth in Value of Exports 2007-2013 for Selected Medium-Sized Ports

	Port	Export Growth	Main Products
1	Dalton Cache, AK	420%	Mineral fuels
2	Trout River, NY	381%	Iron and steel Paper and paper board Mineral fuels
3	Raymond, MT	210%	Machinery Mineral fuels, Vehicles
4	Danville, WA	100%	Electrical machinery Vehicles, Plastics
5	Porthill, ID	95%	Food products Furniture, Instruments Vehicles
6	Dunseith, ND	94%	Machinery Mineral fuels Vehicles, Cereals
7	Fort Fairfield, ME	83%	Vegetables Iron and steel Cereals
8	Sumas, WA	69%	Vehicles Machinery Wood products
9	Grand Portage, MN	61%	Machinery Vehicles Electrical machinery
10	Portal, ND	59%	Machinery, Vehicles Iron and steel Mineral fuels
11	Houlton, ME	49%	Vehicles Machinery Fish
12	Sweetgrass, MT	47%	Machinery, Vehicles Electrical machinery Iron and steel Mineral fuels
13	Ogdensburg, NY	46%	Machinery Electrical machinery Glass, Vehicles
14	Sault Ste. Marie, MI	39%	Ores, Machinery Inorganic chemicals Vehicles

Source: Bureau of Transportation Statistics, North American Transborder Freight Data, http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html

For the 14 medium-sized ports identified in Table 30, import growth was substantially slower than export growth. Over the 2007-2013 time period, imports grew at a 6 percent average rate in contrast to the average growth rate of 125 percent for exports.[43] Of the medium-sized ports, only eight imported wood products in any significant volume.[44] Of these eight, two ports (Trout River, New York and Portal, North Dakota) were also identified as significant exporters of mineral fuels. On balance, therefore, a number of fast-growing medium-sized ports are likely to enjoy growth rates in infrastructure capacity demand that exceed those of major ports, particularly the three largest ports.

Growth of Shipments through Small Ports

Comparable to Table 30, Table 31 summarizes the growth rate of exports for 15 small ports that experienced relatively fast growth over the period 2007-2013.[45] It must be acknowledged that given the absolute small average size of the ports identified in Table 31, export growth rates are highly sensitive to small absolute changes in trade flows. Notwithstanding this caveat, it is interesting to observe the concentration of relatively fast export growth in small ports located in Montana and North Dakota. Moreover, with the exception of Westhope, North Dakota, machinery is the most frequently cited major export for the small land ports in Montana and North Dakota.

The concentration of exports of machinery in the sample of fast-growing small ports underscores the sensitivity of our conclusions about the relative growth of infrastructure demands to our assumptions about the future growth of exports of specific commodities. In particular, we project machinery exports to grow at an above-average rate compared to total U.S. exports to Canada. If, in fact, machinery exports do increase at an above-average rate, many of the small ports identified in Table 31 will experience faster than average increases in utilization rates, particularly those that also export mineral fuels.

[43] The average growth rate in the value of imports for the 8 largest ports over the period was also approximately six percent.

[44] The reader should recall that wood products are an import category projected to increase at an average rate. The 8 ports are Portal, North Dakota; Houlton, Maine; Sault Ste. Marie, Michigan; Grand Portage, Minnesota; Ogdensburg, New York; Danville, Washington; Sumas, Washington and Trout River, New York.

[45] The average growth rate over the sample period is 183 percent for the 15 small ports. The average growth rate for imports was approximately 41 percent.

Table 31. Growth in Value of Exports 2007 – 2013 for Selected Small Ports

	Port	Export Growth	Main Products
1	Westhope, ND	944%	Mineral fuels
2	Vanceboro, ME	812%	Mineral fuels
3	Bridgewater, ME	311%	Mineral fuels Vegetable products
4	Scobey, MT	131%	Aluminum Plastics Machinery Iron and steel
5	Walhalla, ND	116%	Machinery Vegetable products Vehicles
6	Roseau, MN	93%	Vehicles
7	Turner, MT	91%	Machinery Vehicles
8	Noonan, ND	88%	Vegetable products Machinery
9	Whitlash, MT	34%	Machinery
10	Van Buren, ME	32%	Wood products Vegetable products
11	Northgate, ND	31%	Machinery Iron and steel Vehicles
12	Antler, ND	29%	Vehicles Fertilizer Machinery
13	Del Bonita, MT	16%	Machinery Oil seed
14	Laurier, WA	8%	Machinery Vehicles Electrical machinery Paper and board
15	Canbury, ND	6%	Machinery Iron and steel Vehicles

Source: Bureau of Transportation Statistics, North American Transborder Freight Data, http://transborder.bts.gov/programs/international/transborder/TBDR_QA.html.

VIII. INFRASTRUCTURE PRIORITIES

As noted earlier in the report, the Canadian and U.S. governments recently identified priorities with respect to construction projects at land ports of entry. If a project involves a new border crossing and/or a substantial modification of an existing crossing, the General Services Administration (GSA) works closely with the State Department to determine whether the project is in the national interest. In doing so, the GSA also works closely with the Department of State to coordinate with federal and local governments in Canada. When assessing any options, the GSA and Customs and Border Protection (CBP) must look comprehensively at the full life-cycle cost of a port (land, infrastructure, and funds for staffing, technology and equipment).[46]

The report identifies U.S. ports that have been prioritized for construction projects. It also identifies Canadian government prioritized projects. It seems reasonable to presume that expansion and modernization efforts on one side of the border will be accompanied by activities on the other side of the border. Hence, ports prioritized by the Canadian government might be seen as also indirectly prioritizing the U.S.-side of the border.

Table 32 lists U.S. prioritized ports, as well as Canadian prioritized ports. For the Canadian-prioritized ports, we also report the companion U.S. port. Comparing Tables 29 and 32, we see that Alexandria Bay is a priority port, and it is also a port that we have identified as likely to experience above-average future growth. Champlain-Rouses Point is a companion port to the Canadian priority port of La Colle, Quebec. In turn, Champlain-Rouses Point is identified as a priority U.S. port. Furthermore, Pembina and Portal are companion U.S. ports to the Canadian priority ports of Emerson, Manitoba and North Portal, Saskatchewan. We have classified Pembina as likely to experience above-average growth, and Portal as an intermediate-sized port that is expected to experience above-average growth in the foreseeable future.

Table 32. U.S. and Canadian Government Prioritized Ports

U.S. Priorities	Canadian Priorities/Companion U.S. Port
Alexandria Bay, NY	La Colle, Quebec/Champlain-Rouses Point, NY
Lewiston, NY	Landsdowne, Ontario/Alexandria Bay, NY
Buffalo, NY	Fort Erie, Ontario/Buffalo, NY
Port Huron, MI	Emerson, Manitoba/Pembina, ND
	North Portal, Saskatchewan/Portal, ND

Source: Transport Canada (2013), Border Infrastructure Investment Plan Canada – United States, http://www.tc.gc.ca/media/documents/mediaroom/BIIP-Eng-Final.pdf

None of the small ports listed in Table 31 have been explicitly identified by the U.S. government as a priority for infrastructure investment. Nor are any of those ports a "sister port" of smaller Canadian ports identified as high priorities for infrastructure investment. Given our forecast of above-average growth of mineral fuel exports and machinery, we would characterize the Vanceboro and Bridgewater ports as candidates for above-average growth in demand for

[46] "Ports of Entry Infrastructure: How Does the Federal Government Prioritize Investments?" July 16, 2014, http://www.gsa.gov/portal/content/194547.

infrastructure, since mineral fuels constitute the bulk of exports passing through these two ports. As noted above, a number of small border ports in Montana and North Dakota would also become candidates for above-average growth in infrastructure demand if machinery exports grow at faster-than-average rates going forward, as we project.

IX. SUMMARY AND CONCLUSIONS

This study sets out and evaluates the implications of what we deem a plausible future bilateral trade scenario for prioritizing land ports for the purpose of investing in physical infrastructure, as well as increasing personnel. Specifically, we identify as a benchmark the expected increase in overall bilateral trade flows based on expected real economic growth rates for Canada and the United States over the next 10 years, the outlook for bilateral trade to be influenced by increased trade with "third countries" and elasticity coefficients that link trade flows to real economic growth.

There are several key background assumptions underlying our main conclusions. One is that real economic growth rates for both Canada and the United States through the year 2025 are likely to be similar to the relatively slow growth rates experienced in recent years, as opposed to the substantially faster growth rates of the 1990s. A second assumption is that third-party trade undertaken by U.S.-based businesses, particularly with Mexico, will continue to increase as it has in recent years. The implication is a further slowing of trade growth between Canada and the U.S., particularly a continuation of a slowdown in the growth of Canadian exports to the U.S. This phenomenon is particularly likely to be observed in the motor vehicle and parts industry, as the geographical "center of gravity" of the motor vehicle industry continues to move to southern states and away from the traditional Midwestern locations.

The shale oil and gas drilling "revolution" in the U.S. will also exert a substantial influence on future bilateral trade flows. In particular, substantial future increases in domestic oil and natural gas supplies will decrease the growth in U.S. demand for Canadian oil and gas exports. To the extent that Mexico's energy sector becomes more efficient as it relaxes legal restrictions on foreign investment in that sector, imports of Mexican oil by U.S. buyers may further reduce exports of Canadian oil to the United States. On the other hand, increased supplies of relatively cheap shale oil and gas may promote increased exports form the U.S. to Canada, particularly to refineries in Eastern Canada that are importing oil from outside of North America.

Our outlook for future sectoral trade flows informs our assessment of future trade flows through individual land ports on the Canada – U.S. border. Specifically, we identify individual industries as likely to experience trade growth at either above-average, average or below-average rates. We then identify the mix of goods processed through individual border ports to assess whether the port processes goods where trade growth can be characterized as above-average, average or below-average, by comparison to the growth of overall bilateral trade. The outcome is an identification of ports that are likely to grow relatively quickly and, therefore, more likely to benefit from expenditures on infrastructure expansion, and those that are less likely to need expansion of infrastructure capacity.

The Canadian and U.S. governments have also prioritized ports in need of infrastructure expansion based upon surveys of shippers and local officials. There is some concordance between the two governments' priority lists and our own evaluations. However, there are also some important differences. In particular, the U.S. government has identified Buffalo and Port Huron as priorities for infrastructure expansion, while we believe that trade processed through these ports will increase at relatively slow rates.

Our benchmark scenario obviously is sensitive to several key assumptions and inferences. In particular, we project U.S. exports of machinery to increase at a rate that is faster than the average to be experienced by U.S. exports as a whole. A faster-than-average increase in machinery exports would likely make a number of small U.S. ports priority candidates for infrastructure expansion given the concentration of machinery exports that are processed by those ports.

Our projection for relatively slow average growth of bilateral trade over the next decade suggests a modest need for infrastructure expansion at border ports generally, although a select number of ports are higher priorities than others for what infrastructure expansion is undertaken. This is not to say that wait times at border ports are of no concern going forward. As noted earlier, variable wait times continue to be an issue for shippers, and any increase in bilateral trade will exacerbate wait times in the absence of any response by policymakers or companies involved in moving goods across the border. What our results suggest is that capacity problems, particularly at the largest land ports, may be less severe over the next decade than policymakers currently anticipate. Against this background, a greater emphasis might be placed on utilizing existing port infrastructure more efficiently relative to expanding physical infrastructure and staffing.

While it is beyond the scope of this report to develop specific recommendations for using existing port facilities more efficiently, there are several potential broad initiatives that we would mention. One is to implement border slot mechanisms similar to those used by airports (Gillen and Gados, 2007). That is, shippers would be assigned specific crossing times at particular border ports. The assignment process could be implemented through an auction or some other mechanism that allows shippers to reveal the value to them of reducing uncertainty about wait times to cross the border. Another technique is to use peak and off-peak pricing to manage congestion problems at specific ports. As Gillen and Gados (2007) note, the road pricing literature presents a clear case for the welfare-enhancing benefits of variable tolls based on travel at peak and non-peak times.

Another broad approach to managing capacity utilization is a variant on slot management. This approach would permit the flexible use of FAST lane capacity by non-FAST approved shippers depending upon the expected arrival rates of FAST-approved shippers. For the Blaine, Washington border crossing, Springer and Davidson (2014) show that a fully dedicated FAST lane can be inefficient if there is a preponderance of non-FAST approved truckers drawing on the capacity of a port. In this case, overall wait times can be reduced by granting FAST-approved trucks primary access to the FAST lane but allowing use of the lane by other trucks if there are no FAST-approved trucks waiting to be cleared through the inspection process.

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Appendix

Table 8. U.S. Imports of HTS 27 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	15.3	23.1	23.6	23.0	28.8
China	1.0	0.7	0.6	0.3	0.1
Mexico	8.2	9.8	9.6	9.0	9.2
Saudi Arabia	15.2	13.0	10.0	9.2	13.3
U.K.	3.2	4.7	3.1	3.0	1.9
ROW	57.1	48.7	53.1	55.5	46.7

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 9. U.S. Exports of HTS 27 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	17.6	14.1	20.8	30.8	16.6
Japan	12.0	9.5	6.3	2.6	1.8
Korea	5.9	6.0	2.7	2.2	1.0
Mexico	6.7	12.5	32.2	20.3	15.5
Netherlands	8.3	4.9	3.7	2.6	7.9
ROW	49.5	53.0	34.3	41.5	57.2

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 10. U.S. Imports of HTS 84 by Country (Percentage Share)

Country	Percentage Share 1990	1995	2000	2005	2013
Canada	11.3	10.9	10.4	8.8	6.5
China	0.7	3.0	7.4	23.7	33.0
Germany	11.0	8.4	7.0	8.0	7.2
Japan	30.4	27.2	19.5	13.9	10.0
Mexico	3.6	5.2	9.4	9.6	14.0
Singapore	7.0	9.5	5.7	3.1	1.1
Taiwan	6.6	7.5	7.3	3.5	2.2
U.K.	6.4	4.9	4.8	3.4	2.8
ROW	23.0	23.4	28.5	26.0	23.2

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 11. U.S. Exports of HTS 84 by Country (Percentage Share)

Country	Percentage Share 1990	1995	2000	2005	2013
Canada	21.6	21.9	22.5	23.3	21.2
France	6.1	4.4	4.1	3.9	1.3
Germany	6.4	5.5	4.9	4.3	2.8
Japan	8.6	7.9	7.2	4.5	2.7
Korea	3.1	4.6	3.7	2.8	3.2
Mexico	5.5	5.5	9.8	12.1	18.1
U.K.	8.4	6.7	6.8	5.3	2.6
China	1.2	1.9	2.2	3.8	5.7
ROW	39.1	41.6	38.8	40.0	42.4

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 12. U.S. Imports of HTS 85 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	7.9	6.1	9.1	5.2	2.6
Japan	32.9	27.6	16.9	10.9	6.2
Mexico	13.3	15.2	19.8	19.2	19.2
Taiwan	6.5	5.8	6.6	5.7	4.7
China	3.3	6.9	10.5	25.6	39.4
Korea	7.7	9.0	7.8	6.6	4.9
ROW	28.4	29.4	29.3	26.8	23.0

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 13. U.S. Exports of HTS 85 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	21.6	18.9	17.1	16.8	16.2
Japan	8.1	8.8	6.8	4.6	3.0
Mexico	12.5	12.0	19.9	18.2	22.1
Taiwan	4.5	4.4	4.8	4.2	2.4
Korea	4.0	4.2	5.9	5.3	3.7
Singapore	5.1	5.7	4.0	4.2	2.4
U.K.	6.3	6.0	4.4	3.2	2.0
China	0.6	1.4	1.8	5.3	6.9
ROW	37.3	38.1	35.3	38.2	41.3

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 14. U.S. Imports of HTS 48 by Country (Percentage Share)

Country	1990	1995	2000	2005	2013
	Percentage Share				
Canada	73.9	71.2	65.8	58.5	44.1
China	0.6	1.9	4.0	8.8	16.9
Germany	3.5	3.4	3.8	4.4	5.1
Japan	2.8	2.4	3.4	3.3	2.5
Mexico	2.3	2.8	3.3	4.4	5.8
U.K.	1.9	2.1	2.4	1.7	1.5
ROW	15.0	16.2	17.3	18.9	24.1

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 15. U.S. Imports of HTS 44 by Country (Percentage Share)

Country	1990	1995	2000	2005	2013
			Percentage Share		
Canada	67.6	71.9	69.9	59.7	51.8
China	0.8	2.3	4.9	9.8	21.9
Mexico	4.1	3.1	2.5	1.4	1.8
Taiwan	5.8	1.7	0.8	0.4	0.3
ROW	21.7	21.0	21.9	28.7	24.2

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 16. U.S. Exports of HTS 39 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	23.5	23.6	25.3	25.7	21.4
China	1.5	1.8	2.6	5.9	7.8
Japan	6.8	5.5	4.8	4.3	3.0
Mexico	11.6	14.7	25.6	24.5	25.1
Netherlands	5.7	4.4	2.6	2.3	1.9
U.K.	4.4	3.4	2.8	2.3	2.0
ROW	46.5	46.6	36.3	35.0	38.8

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 17. U.S. Exports of HTS 73 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	44.0	38.7	42.1	43.0	35.7
China	0.8	1.7	0.9	2.8	3.4
Japan	4.4	3.8	2.6	2.7	1.6
Mexico	12.7	18.2	28.7	21.5	22.4
U.K.	4.4	3.4	3.5	2.8	2.2
ROW	33.7	34.2	22.2	27.2	34.7

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.

Table 18. U.S. Exports of HTS 90 by Country (Percentage Share)

	Percentage Share				
Country	1990	1995	2000	2005	2013
Canada	15.5	14.8	14.5	12.3	11.1
China	1.3	1.6	1.8	4.3	9.1
Japan	12.9	14.4	13.7	11.4	9.5
Mexico	5.8	5.0	6.7	6.8	6.8
U.K.	7.7	6.4	7.2	5.2	3.2
ROW	56.8	57.8	56.1	60.0	60.3

Source: U.S. International Trade Commission International Trade Database, http://dataweb.usitc.gov/.