We Make Things Together: Potential Impact of Changes to NAFTA on the Great Lakes Region

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EXECUTIVE SUMMARY

By most accounts the North American Free Trade Agreement (NAFTA) has been a good thing for the three signing countries. Some might even say it has been *great* for the United States. Under NAFTA, U.S. companies saw tariffs on imports drop by 98%, exports increase, employment climb, and output almost triple; Americans saw new jobs created, real wages increase, and welfare improvements. Governments saw GDP increase, unemployment drop, foreign investment flow into the country, and productivity improve.

The natural outcome of NAFTA has been a highly integrated North American marketplace where, for the most part, goods move tariff-free across borders. It has also led to a new economic reality where exports today are likely to include commodities and intermediary goods sourced from other countries. In this study we aim to understand the movement of goods across the Canada-U.S. border and the impact of any "thickening" of the border. Our findings reinforce the critical nature of a tariff-free trade agreement and its ability to provide stability to the supply chains of global corporations.

Many studies exist that explore the trade relationship between Canada and the U.S., our study aims to provide a more detailed picture of the trade dependence between Ontario and each of the eight states making up the Great Lakes region (the GLS8): New York, Indiana, Pennsylvania, Illinois, Ohio, Michigan, Minnesota, and Wisconsin. The integrated nature of regional supply chains is also explored by looking at imports and exports between the regions of final and intermediary goods, and capital goods trade.

The significant movement of goods and services between Ontario and the GLS8 makes the region a powerful "super-cluster" that draws competitive advantage from its highly integrated supply chains. This economic engine allows the region to compete globally in key industries, such as automotive, agri-food, and services. To reinforce the observation of integration, we look at two companies moving goods and people within the region. Their stories reveal the benefits of free-trade and present the implications for both countries should the border thicken.

The latter part of our study investigates the impact of a negative shock to the GLS8 regional economy. Due to its interdependencies, a negative shock to any member of the cluster will be felt across the region and on both sides of the border. Several studies have explored the possible impact of removing NAFTA or ceasing trade all together between Canada and the United States. We explore this idea further by looking specifically at the potential impact of trade interruptions on the relationships between Ontario and Michigan, Ohio and Indiana.

All findings lead to the conclusion that the United States will be harmed if trade between Canada and the United States becomes more expensive. Hampered trade will mean job loss, decreased economic output, higher costs of production, lower returns for investors, fewer choices, and higher costs for consumers. In order to remain competitive, the Ontario-GLS8 cluster must operate as efficiently as possible by avoiding these cost increases and limiting the red tape. The manufacturing plants that "win" through a thickening of the Canada-U.S. border are not in North America; rather, they are in Europe and Asia, as Great Lakes firms will no longer be able to compete with low-cost developing regions.

INTRODUCTION

The surprising outcome of the 2016 U.S. presidential election has left the world wondering what economic policies a Trump administration may pursue. To forecast policies, we must first understand the priorities of the incoming President. During a June campaign speech in Monessen, Pennsylvania, Donald Trump vowed to bring more manufacturing jobs to the United States:[1]

> *I have visited cities and towns across this country where one-third or even half of manufacturing jobs have been wiped out in the last 20 years. Today, we import nearly US$800 billion more in goods than we export. We can't continue to do that. This is not some natural disaster, it's a political and politician-made disaster. Very simple. And it can be corrected and we can correct it fast when we have people with the right thinking.*

This message resonated with voters in the GLS8. In the 2012 presidential election, the Democrats won seven of the GLS8, losing only Indiana. In 2016, the Republicans under Trump were able to maintain Indiana while adding Michigan, Ohio, Pennsylvania, and Wisconsin, which gave the party an additional 64 votes in the electoral college. Coincidentally, the Republicans fell 64 electoral votes short of victory in 2012, so in a very real sense, these states were pivotal in the Trump victory.

The Trump administration provided details on how it planned to "correct" a loss of manufacturing jobs through trade policy with the release of Wilbur Ross and Peter Navarro's *Scoring the Trump Economic Plan*:[2]

> *As a very practical matter, as Trump pursues a policy of more balanced trade, our major trading partners are far more likely to cooperate with an America resolute about balancing its trade than they are likely to provoke a trade war. This is true for one very simple reason: America's major trading partners are far more dependent on American markets than America is on their markets.*
>
> *Consider that roughly half of our trade deficit is with just six countries: Canada, China, Germany, Japan, Mexico, and South Korea. If we look at the bilateral relationships of America with each of these countries, improvement in our trade balance is clearly achievable through some combination of increased exports and reduced imports, albeit after some tough, smart negotiations—an obvious Trump strength.*
>
> *Ultimately, our view is that doing nothing about unfair trade practices is the most hazardous course of action—and the results of this hazard are lived out every day by millions of displaced American workers and deteriorating communities. There are many markets in the world and China is just one of them. We simply cannot trade on their onesided terms as they are too destructive to the U.S. growth process. The same is true of other trading partners.*

Ross and Navarro, along with veteran trade lawyer Robert Lighthizer, will play key roles in addressing U.S. trade issues. These issues are likely to include pre-existing trade "irritants" between Canada and the United States, such as the softwood lumber dispute. The *2016 National Trade Estimate Report on*

[1] Time Staff, "Read Donald Trump's Speech on Trade" (June 28, 2016) http://time.com/4386335/donald-trump-trade-speech-transcript/. Accessed on January 17, 2017.
[2] Navarro and Ross, "Scoring the Trump Economic Plan: Trade, Regulatory, & Energy Policy Impacts", (September 29, 2016) https://assets.donaldjtrump.com/Trump_Economic_Plan.pdf. Accessed on January 17, 2017.

Foreign Trade Barriers[3] lists additional Canadian barriers to trade, including supply management in the dairy and poultry industries, alcohol distribution rules, aerospace subsidies, and intellectual property laws.

Taken as a whole, the trade focus of the incoming administration raises four concerns for Ontario:

1. The incoming administration is looking to bring manufacturing jobs to the United States. Ontario has a significant number of manufacturing jobs, and there is a history of U.S. policy makers attempting to "poach" facilities away from Ontario; the movement of Electro-Motive Diesel from London, Ontario to Muncie, Indiana is a prime example.
2. One of the goals of the administration is to eliminate trade deficits, and one of the United States' largest trade deficits is with Canada.
3. From a U.S. perspective, other trade "irritants" exist that the administration may wish to address in a trade negotiation.
4. Finally, Ontario and Canada could simply be "collateral damage" in a dispute between the United States and Mexico.

However, our American counterparts in the GLS8 should be equally concerned. Rather than being competitors, Ontario and the GLS8 comprise a "super cluster" with highly integrated supply chains—one that competes with other regions in the world in some key industries, including automotive and agri-food. Due to this interdependence, a negative shock to any member of the cluster will be felt across the region, on both sides of the border.

The purpose of this report is straightforward. Our goal is to illustrate that any "thickening" of the border between Canada and the United States will negatively impact the GLS8 by raising their production costs, thereby forcing them to charge higher prices to the end consumer and leaving them vulnerable to foreign competition.

THE VALUE OF NAFTA TO THE UNITED STATES AND CANADA: REVIEW OF THE LITERATURE

The North American Free Trade Agreement (NAFTA) was signed on January 1, 1994, by Canada, Mexico, and the United States, creating a free-trade bloc in North America. NAFTA superseded the existing Canada-U.S. Free Trade Agreement (CUSFTA) that was signed in 1988.

Before NAFTA, there were concerns that the benefits from the agreement would not be evenly distributed among the member nations due to their striking differences in the state of economic development. At the time, mainstream consensus indicated that NAFTA would have a small positive impact on the U.S. economy in comparison to a much larger positive impact that was expected for the Mexican economy. To understand the potential effects of a thickening of the Canada-U.S. border, it is helpful to know what effects the deal had in both the United States and Canada. Fortunately, a substantial body of literature exists on the subject.

Since NAFTA's signing, a 2002 study by Kyoji Fukao, Toshihiro Okubo, and Robert M. Stern[4] found that foreign direct investment (FDI) inflows caused shifts in overall import shares between the member countries, rather than tariff reductions. In 2008, a study by Dorothee J. Feils and Manzur Rahman found

[3] Michael Froman, "The 2016 National Trade Estimates Report", 2016. https://ustr.gov/sites/default/files/2016-NTE-Report-FINAL.pdf. *Accessed on January 17, 2017.*

[4] Fukao, Okubo and Stern, "An Econometric Analysis of Trade Diversion under NAFTA." School of Public Policy at the University of Michigan, http://fordschool.umich.edu/rsie/workingpapers/Papers476-500/r491.pdf Accessed January 18, 2017.

that NAFTA has had a positive effect on inward FDI into the region, with the benefits accruing only to the U.S. and Canada, and trends favouring the former more so than the latter.

A 2014 report by M. Angeles Villarreal and Ian Fergusson[5] found that the most significant trade-related effects were felt in industries exposed to the removal of tariff and non-tariff trade barriers, particularly textiles, apparel, automotive, and agriculture. Vertical supply relationships were created between NAFTA partners because much of their trade is from production sharing, as manufacturers in each country work together to create goods. These supply chain relationships highlight the growing importance of intermediate goods and supply chains in North American trade.

In 2012, Sergiy Rakhmanyil, Ted Rogers, and Ayse Yuce[6] reported that corporate output, profitability, and efficiency increased in all three NAFTA countries, which has subsequently led to higher corporate valuations. Additionally, Canadian firms exhibited an overall increase in investments.

Corporations are not the only ones benefiting from NAFTA. Vanessa Humm[7] showed that NAFTA has helped to significantly increase consumer choice over the agreement's lifespan thus far. She also found that trade has increased among Canada, the U.S., and Mexico—from US$290 billion in 1993 to US$1 trillion in 2014, representing one-third of all global trade. At the same time, NAFTA has helped modernize manufacturing across the three countries involved.

A 2014 briefing published by the Peterson Institute for International Economics[8] found that NAFTA promoted the integration of the regional energy market, particularly between Canada and the United States. This integration somewhat mitigated U.S. reliance on imports from sources across the Atlantic, while encouraging greater energy independence within the region. The authors concluded that the signing and acceptance of NAFTA ultimately conveyed a broader message of cooperation.

Effects on the Canadian Economy

Because Canada and the U.S. signed CUSFTA years before NAFTA, it is difficult to evaluate the incremental effects of NAFTA. Although trade between these two countries did not see quite the great leap in trade that Mexico saw (mainly because the two countries were already well integrated before NAFTA), trade liberalization through both free trade agreements still left a strong mark on the Canadian economy.

Villarreal and Fergusson's 2014 report revealed significant impacts on the United States' trade relationship with Canada after NAFTA. Trade with Canada more than doubled during the first 10 years of CUSFTA/NAFTA (1989–1999), rising from US$166.5 billion to US$362.2 billion. By 2015, this number had grown to an estimated US$662.7 billion[9] worth of goods and services traded between the two

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[5] Villarreal, and Fergusson, "NAFTA at 20: Overview and Trade Effects." Congressional Research Service (2014): https://fas.org/sgp/crs/row/R42965.pdf Accessed January 18, 2017.

[6] Rakhmanyil, Rogers and Yuce, "NAFTA Effect On Company Values And Performance." International Business & Economics Research Journal. (2012): <http://cluteinstitute.com/ojs/index.php/IBER/article/view/6877/6952>. Accessed January 18, 2017.

[7] Vanessa Humm, "American Trade News Highlights for Spring 2014 Promises Kept and Promises Broken-NAFTA at Twenty." Law and Business Review of the Americas (2014): <https://litigation-essentials.lexisnexis.com/webcd/app?action=DocumentDisplay&crawlid=1&doctype=cite&docid=20+Law+%26+Bus.+Rev.+Am.+363&srctype=smi&srcid=3B15&key=ddc11435936167cdbd371fbeff741e2d>. Accessed January 18, 2017.

[8] Peterson Institute for International Economics, "NAFTA 20 YEARS LATER - Peterson Institute." (2014). <https://www.bing.com/cr?IG=A5C807C8F3BE44EAAA6939EE8B24D0A3&CID=03F2BCA9E1B563311C5EB6A0E08462A4&rd=1&h=z4YDXUzWtAoDdCs__nn_nkvD4Zz1SWD2JInncI4O5dk&v=1&r=https%3a%2f%2fpiie.com%2fpublications%2fbriefings%2fpiieb14-3.pdf&p=DevEx,5086.1>. Accessed January 13, 2017.

[9] "Canada | United States Trade Representative." Canada | United States Trade Representative <https://ustr.gov/countries-regions/americas/canada>. Accessed January 13, 2017.

countries, quadrupling in size since 1989. Overall, U.S. exports to and imports from Canada have experienced tremendous growth (Table 1). Canada has enjoyed a healthy trade surplus with the U.S. since 1989, with the surplus growing from US$9.9 billion in 1989 to US$33.9 billion in 2014.

TABLE 1: CANADA-U.S. GOODS AND SERVICES EXPORTS AND IMPORTS

Item	**1993 (billions USD)**	**Updated (Year)** (billions USD)	**Percentage Change**
U.S. exports to Canada	$100.2	$312.1 (2014)	+211.4%
U.S. imports to Canada	$110.9	$346.1 (2014)	+212.1%
U.S. private services exports to Canada	$17	$63.3 (2013)	+272.4%
U.S. private services imports from Canada	$9.1	$30.5 (2013)	+235.2%

Source: NAFTA at 20: Overview and Trade Effects

Although the increase in goods exports and imports between Canada and the U.S. have experienced almost the same percentage growth and are similar in dollar value, the U.S. private services sector currently outperforms Canada's in both percentages change as well as total value. The data from Table 1 indicates that the U.S. exports twice as many services (in dollar terms) as it imports, and that its private services exports have grown 37.2% more than Canada's have. The U.S. services trade surplus with Canada was US$32.8 billion in 2013. Regarding trade market shares, the U.S. is the top purchaser of Canadian goods and supplier of imports to Canada.

When it comes to FDI, the U.S. is the largest single investor in Canada, with a stock of FDI rising from US$69.9 billion in 1993 to US$368.3 billion in 2013, a 426.89% increase.[10] Today, U.S. investment represents nearly 51.5% of total stock FDI in Canada from global investors. U.S. FDI is now equivalent to 18% of the value of Canada's gross domestic product (GDP), versus 1% at the beginning of CUSFTA.[11] This surge in investment indicates a strong vote of confidence in Canada's long-term economic stability and vitality.

According to the previously mentioned 2014 briefing by the Peterson Institute, Canada has enjoyed extra merchandise trade valued at US$247 billion since CUSFTA was introduced in 1988. This amount represents 37% of North American trade. It was also noted that CUSFTA and NAFTA had not exerted the same buoyant impact on North American services trade as they had for merchandise trade. A 2010 paper by Alla Lileeva and Daniel Trefler[12] found that tariff reductions resulted in a total increase in Canadian manufacturing labour productivity of approximately 14%, including within-plant effects.

From a more holistic perspective, a 2014 working paper by Lorenzo Caliendo and Fernando Parro[13] found that there have been mixed results after NAFTA relating to welfare, intra-bloc trade, real wages, and terms of trade. Intra-bloc trade has increased by 11% for Canada, but Canada's terms of trade have deteriorated by 0.11%, mostly due to a reduction in export prices. Real wages increased for all NAFTA

[10] Villarreal, and Fergusson, "NAFTA at 20: Overview and Trade Effects." Congressional Research Service (2014): https://fas.org/sgp/crs/row/R42965.pdf Accessed January 18, 2017.
[11] Ibid.,
[12] Lileeva, Alla and Trefler, "Improved Access to Foreign Markets Raises Plant-Level Productivity… for Some Plants*." Quarterly Journal of Economics 125.3 (2010): < http://www-2.rotman.utoronto.ca/~dtrefler/papers/Exporting_Lileeva_Trefler.pdf>. Accessed January 13, 2017.
[13] Caliendo, Lorenzo and Parro, "Estimates of the Trade and Welfare Effects of NAFTA." Yale School of Management. Oxford University Press, (2014): <http://faculty.som.yale.edu/lorenzocaliendo/ETWENAFTA.pdf>. Accessed January 17, 2017.

members, rising by 0.96% for Canada, while welfare in Canada has declined by 0.06%.[14] This report highlights the importance of not just looking at high-level trade data, but taking a closer look at the rippling effects trade has on indicators that impact the everyday lives of Canadians.

Effects on the U.S. Economy

In 2003, M. Angeles Villarreal's report for Congress[15] showed that NAFTA benefited some industries more than others. For example, automotive, chemicals, textiles, and electronics industries greatly benefited because they were able to achieve synergies across the North American market. Villarreal found that the overall U.S. economy benefited from trade expansion regarding improved production processes and the increased availability of better goods and services for U.S. customers at lower cost. Without NAFTA, these North American synergies and benefits of trade would be at risk.

A 2010 U.S. Chamber of Commerce report[16] revealed that out of 14 U.S. FTA partnerships, NAFTA has had the greatest effect. Because it had been in force longer than many of the other FTAs, NAFTA trade represented 92% of the net employment gains across all FTAs, 92% of the output gains, and 80% of the total U.S. goods and services export increases.

In Villarreal and Fergusson's 2014 report, it was noted that 25% of the content of U.S. imports from Canada are American in origin, indicating high-frequency border crossings between the two countries during the manufacturing process. This figure also highlights how critical the Canada-U.S. border is in providing stability to the supply chains of global corporations. Regarding Canada-U.S. FDI, the authors found that the U.S. was the largest destination for Canadian FDI, with a stock of US$237.9 billion in 2013, up from US$26.6 billion in 1988, marking a 794.3% increase. Of Canadian FDI, 40.7% was invested in the U.S. by 2012, and average FDI flows to the U.S. increased from an annual average of US$2.3 billion in 1995 to US$9.9 billion in 2012—a 330.4% gain.

The Peterson Institute found that with NAFTA, local U.S. manufacturing wages have not been reduced, nor was there an industry-wide decrease in wages. Since 1988, the U.S. has realized US$635 billion in extra merchandise trade on top of trade driven by GDP growth. This additional merchandise trade accounts for 55% of total North American trade. The U.S. has experienced strong real export growth, with exports to Canada rising by over 150% since 1988, and exports to Mexico increasing by over 200% since 1994.

Unlike in Canada, the effects of NAFTA on trade and welfare in the U.S. have been mostly positive. The U.S. has experienced increases in welfare by 0.08%, real wages by 0.17%, intra-bloc trade by 41%, and terms of trade by 0.04%.[17] The increase in terms of trade is mostly due to lower import prices from Mexico.

Trade Partnership Worldwide's 2008 NAFTA study[18] found U.S. national income and wages to be higher. Every U.S. household enjoyed the equivalent of nearly US$2,000 in extra income annually because of

[14] Ibid. 1, 4, 21.
[15] Villarreal, "Industry Trade Effects Related to NAFTA." Congressional Research Service (2003): <http://digitalcommons.ilr.cornell.edu/cgi/viewcontent.cgi?article=1037&context=key_workplace>. Accessed January 17, 2017.
[16] U.S. Chamber of Commerce, "Opening Markets, Creating Jobs: Estimated US Employment Effects of Trade with FTA Partners" (2010): <https://www.uschamber.com/sites/default/files/legacy/reports/100514_ftajobs_full_0.pdf>. Accessed January 17, 2017.
[17] Caliendo, Lorenzo and Parro, "Estimates of the Trade and Welfare Effects of NAFTA." Yale School of Management. Oxford University Press, (2014): <http://faculty.som.yale.edu/lorenzocaliendo/ETWENAFTA.pdf>. Accessed January 17, 2017
[18] Trade Partnership Worldwide, "*America, Canada and Mexico: Mutual Benefits from Trade and Investment*" (2008): <http://www.tradepartnership.com/pdf_files/NAFTAStudy%205.2009.pdf> *Accessed January 17, 2017.*

NAFTA, which is more than the value of the economic stimulus cheques sent to most households at the time. Without trade with Canada and Mexico, total U.S. national income would be US$221 billion lower than it was in 2007. Hourly wages adjusted for inflation have been increasing since NAFTA went into effect, even for manufacturing workers.

U.S. exports have boomed, with export rates to Canada and Mexico increasing at an average annual rate of 7%. The 2008 study revealed that U.S. farmers and manufacturing workers depend more on exports to Canada and Mexico than ever before. Exports per American agricultural and manufacturing worker increased by 169.9%, from US$7,650 in 1995 to US$20,650 in 2007. Michigan, Ohio, Texas, and Indiana are four of the top 10 states that rely on exports to Canada to drive their economies. Over the last eight years, about half of U.S. imports from Canada and Mexico came from companies located in Canada or Mexico that are related to U.S. companies. These firms have been making the most of foreign tax breaks, access to natural resources, or other competitive advantages offered outside of the U.S. to boost profitability and growth. NAFTA has also provided significant savings in duty costs, which translated into drastically lowered manufacturing costs for U.S. companies and workers. During the five years before NAFTA (1989–1993), U.S. companies paid a total of US$84.2 billion on goods they imported from Canada and Mexico, an average of US$16.84 billion per year. After NAFTA, over a period of 14 years (1994–2007), total duties paid amounted to just US$7.4 billion, an average of US$528.57 million per year, or a 96.86% reduction.

Peter Dixon and Maureen Rimmer's 2013 report[19] found that Canada is the biggest market for U.S. exports and that over the decades, Canada-U.S. trade has had a net positive effect on GDP of 6.5% and boosting output from 81.98% of American industries. Trade with Canada generates 24% of U.S. exports: for many industries, exports to Canada provide the economies of scale that are necessary to sustain U.S. competitiveness in other export markets. Furthermore, Canada-U.S. trade has had a positive effect on employment in every state (and the District of Columbia) and every congressional district. Due to the links between states, even states that share little direct connection with Canada-U.S. trade benefit in one way or another.

Dixon and Rimmer then considered the consequences if trade between the two nations ceased altogether. They found that U.S. GDP would be reduced by 6.47% and employment would fall by 4.54%—equivalent to a US$1,085 billion reduction and a loss of 8.27 million jobs. The elimination of exports would lead to a contraction in total U.S. exports of 24.28%, and without Canada as a partner, trade would become much less efficient, making it harder for the U.S. economy to satisfy the needs of its citizens. For other industries, output losses would reflect increases in the cost of their inputs caused by the unavailability of imports from Canada. Industries with little or no direct connection with Canada would suffer from the overall contraction in the U.S. economy.

Regarding employment, every state would lose jobs from the cessation of Canada-U.S. trade. These losses range from 1.95% (in Oklahoma) to 6.3% (in South Carolina). Individual states do not need a direct connection with Canada-U.S. trade to experience significant job losses since they are closely linked by interstate trade and movements of capital and labour. Thus, negative effects for one state quickly flow to other states. Of the millions of jobs at stake, there are currently 571,000 U.S. residents employed by Canadian majority-owned affiliates operating in the U.S.

In May 2016, Trade Partnership Worldwide released a report that was commissioned by the Canadian Embassy in Washington.[20] This report revealed that Canada-U.S. trade supported 8.3 million U.S. jobs, not including the 500,000 U.S. jobs resulting from direct Canadian investment in the U.S., bringing the

[19] Dixon and Rimmer, "*The Dependence of US Employment on Canada*." Centre of Policy Studies Knowledgebase. Centre of Policy Studies (2013): <http://www.copsmodels.com/pdf/canada_trade_2013.pdf>. *Accessed January 13, 2017*.

20 Trade Partnership Worldwide, op. cit.

total number to 8.8 million; 414,000 to 563,000 U.S. manufacturing jobs alone rely on Canada-U.S. supply chains. These job numbers must be kept in mind, since U.S. public policy initiatives can have a negative impact on U.S. companies and workers if they fail to recognize the integrated nature of Canada-U.S. goods and services production.

Of the US$363 billion worth of Canadian imports to the U.S., raw materials, parts and components, and services used to make other goods and services in the United States represent 78% of that figure, proving that American corporations are heavily reliant on Canadian suppliers within their respective supply chains. For example, the U.S. does not produce enough of primary aluminum to meet domestic demand. Consequently, U.S. manufacturers rely on 2.2 million tonnes[21] of primary aluminum sourced from Canada. Today, millions of tons of aluminum from Canada are used in iconic American products like the all-aluminum bodied Ford F-150 pickup truck. In 2015, Ford sold 780,354 units of its F-Series trucks, making it America's best-selling pickup for 39 consecutive years, and the best-selling vehicle for 34 straight years. An American symbol built from Canadian natural resources shows that trade with Canada plays a key role in the U.S. supply chain and the competitiveness of U.S. farmers, manufacturers, and services providers.

As a further example of the importance of U.S. imports, nearly all of the US$100 billion in U.S. oil and natural gas imports from Canada went to firms, not consumers. Additionally, nearly 97% of non-manufactured goods went to firms.[22] Changes to NAFTA will dramatically disrupt how American businesses operate, as they will lose access to key natural resources that fuel their operations. Finally, U.S. workers that benefit the most from the Canada-U.S. supply chain are those in sectors that see increased spending from the cost savings associated with trade: government, health, education, and defense, as well as wholesale and retail trade. NAFTA's effects extend beyond manufacturing to providing essential services to millions of Americans.

Before NAFTA, there was a wide range of concerns and skepticism surrounding the trade agreement. Since NAFTA's implementation, both the Canadian and the U.S. economies have benefitted greatly as trade between the two nations boomed. The creation of integrated vertical supply chains between NAFTA partners has improved production processes and increased the availability of better goods and services at a lower cost for consumers. Today, trade between Canada-U.S. accounts for US$1,085 billion of US GDP, impacts over 8 million jobs, and exports to Canada consists of 24.28% of total US exports. A thickening of the border between Canada and the US threatens to reverse decades of progress.

HOW MIGHT A BORDER THICKENING OCCUR?

Although we know the Trump administration has the related goals of bringing manufacturing jobs to the United States and eliminating American trade deficits, the mechanism to accomplish these objectives is unclear; it will likely involve some form of thickening of borders, which will raise the cost of international trade. These border thickenings could be any combination of tariffs, enhanced border inspections and fees, adjustment taxes, preferential rules of origin, or other non-tariff barriers. For the analysis in this report, we will simply discuss a thickening of borders—and in particular, the Canada-U.S. border—in general terms. Below, we briefly review a handful of the ways in which border thickening could occur.

[21] "Economic Impact of US-Canada Supply Chains." Trade Partnership Worldwide. Trade Partnership Worldwide, May 2016: http://tradepartnership.com/wp-content/uploads/2016/05/Canada-Supply-Chain_Final.pdf., *Accessed January 13, 2017*.
[22] Ibid.,

A Full Trade War with Mexico and China

In their September 2016 analysis of presidential candidates' trade agendas, the Peterson Institute analyzed a "nuclear" scenario of a full-fledged trade war with both Mexico and China.[23] In this scenario, the new administration places a 45% tariff on non-oil imports from China, and a 35% tariff on non-oil imports from Mexico, with those countries responding in kind. The analysis found that every U.S. state suffered a drop in employment of 3% or more, with the GLS8 being particularly affected (each suffering a 4–5% reduction in employment). Given these effects, it seems unlikely that the administration would choose this path.

> ***IF YOU LOOK AT THE STATES THAT DELIVERED THE PRESIDENCY — MICHIGAN, PENNSYLVANIA, OHIO, WISCONSIN —THEY'RE IN THE WORLD'S MOST INTEGRATED INDUSTRIAL SUPPLY CHAIN WITH ONTARIO… AND I THINK THAT YOU WILL HARM THE AMERICAN WORKER AND THE AMERICAN INTERESTS IF YOU THICKEN THE BORDER BETWEEN MICHIGAN AND ONTARIO.***
>
> ***FLAVIO VOLPE, PRESIDENT, AUTOMOTIVE PARTS MANUFACTURERS' ASSOCIATION***

The potential impact on Ontario under such a scenario would likely be negative. While Ontario could perhaps gain from a trade diversion effect, picking up U.S. market share from China and Mexico, there are some significant downsides for the province. First, any border thickening of this magnitude will disrupt global supply chains of Canadian companies. Second, any economic decline in the GLS8 would be transmitted to Ontario through lower exports.

Other Tariff Increases

Although the full-scale trade war option seems unlikely, the United States could raise tariffs in a more surgical fashion. Unfortunately, it is impossible to know how high the tariffs would be, what goods they would be placed on, and which countries would be targeted. Without this information, a full-scale economic analysis is impossible.

One open question on tariffs is whether the President could raise them unilaterally, or if it would require congressional action. The Peterson Institute examined this question and found that the President almost certainly could act unilaterally:

> *Since the legislation to implement NAFTA and other FTAs, as well obligations under the WTO, was enacted by Congress, which also approved normal trade relations with China upon its accession to the WTO in 2001, the question arises whether a President Trump could unilaterally carry out his threats. The short answer, at least in the short term, is "yes," both because of the president's constitutional power over foreign affairs and because multiple statutes enacted by Congress over the past century authorize the president to impose tariffs or quotas on imports and regulate foreign commerce in other ways as well . . . .*
>
> *Any effort to block Trump's actions through the courts, or amend the authorizing statutes in Congress, would be difficult and would certainly take time. There is*

[23] Noland et. al., "Assessing Trade Agendas in the US Presidential Campaign" (September 2016): https://piie.com/system/files/documents/piieb16-6.pdf, Accessed January 17, 2017.

> *practically no chance that Congress can enact appropriate amendments before the next president is inaugurated, and even less chance that congressional action could surmount a presidential veto if Trump is elected. Thus, at least for a few years, a President Trump would have the stronger legal hand and his actions would very likely survive challenges in the U.S. courts and Congress. U.S. citizens and firms should not rely on the U.S. courts or Congress to shield them from the consequences of Trump's threats, should he carry them out.*

As such, America's trade partners should not assume that Congress will prevent a tariff increase.

Border Adjustment Tax

Rather than using tariffs, the U.S. government could use the related tool of a border adjustment tax (BAT), defined by Investopedia as follows:[24]

> *Also called a border-adjusted tax, border tax adjustment, or destination tax, this is a tax levied on goods based on where they are sold. Goods that are exported are exempt from tax; goods that are imported and sold in the U.S. are subject to tax.*
>
> *A BAT is a tax based on where a product ends up instead of where it is produced. For example, if a corporation ships tires to Mexico where they will be used to make cars, the profit the tire company makes on the tires it exports is not taxed. However, if an American car company purchases tires from Mexico for use on cars made in America, the money it makes on the cars (including the tires) sold in the U.S. is taxed. In addition, the company cannot deduct the cost of the imported tires as a business expense.*
>
> *This tax setup is designed to incentivize corporations to produce and export more, and import less.*

There has been some talk of the Trump administration placing a 10%, or even 20%, BAT on imports. Economic theory would suggest that in the long run, the U.S. dollar should appreciate by an off-setting amount, leaving net trade unchanged. However, short-run adjustments can be quite challenging, and such a tax reform will create both winners and losers.

Beyond economics, there are two major drawbacks to a BAT. First, it may violate World Trade Organization (WTO) rules. Second, it would tie importers and exporters up in significant red tape, as they would need to keep track of the source and value of every single component of their products. Mathew Wilson of the Canadian Manufacturers & Exporters described the problem in further detail:[25] "Would you tax the full value, or do you only tax the amount that came from Canada? How do you even figure out the amount that came from Canada? There is no regulation or law that asks for how much comes from Canada. All you have to track is how much comes from the NAFTA partners." Such a tax would place U.S. manufacturers in the GLS8 at a competitive disadvantage, as they would have significant tracking costs not borne by their overseas competitors.

[24] Investopedia Border Adjustment Tax, http://www.investopedia.com/terms/b/border-adjustment-tax.asp. Accessed January 17, 2017.
[25] Younglai, "Canada won't escape Trump's protectionist measures as 'border tax' threatens exporters" (January 11, 2017): http://www.theglobeandmail.com/report-on-business/economy/canada-wont-escape-trumps-protectionist-measures/article33571210/. Article accessed January 17, 2017.

Eliminating NAFTA but keeping CUSFTA

During his presidential campaign, Trump made his plans on NAFTA quite clear, stating,[26] "We're going to renegotiate NAFTA, probably the worst trade deal ever agreed to, signed, in the history of the world. If we don't get the deal we want, we will withdraw from NAFTA and start all over and get a much, much better deal than we ever had before." Legally, walking away from NAFTA would be straightforward, as the agreement contains a clause (Article 2205) allowing any country to exit the deal with six months' notice. If the U.S. did withdraw from NAFTA, it is likely that the suspended CUSFTA would remain in force,[27] though this is not a universally held opinion.

Although it may appear that such a move would simply be carving Mexico out of NAFTA and leaving the Canada-U.S. trade relationship intact, the reality is far more complicated. First, NAFTA is much more than "CUSFTA with Mexico added on," as there are significant differences between the two agreements beyond the number of countries. Second, many companies, particularly in the automotive industry, have integrated supply chains that cross all three countries, so any thickening of the U.S.-Mexico border will impact production in the Great Lakes region. Finally, Mexico is Ontario's third largest export market for goods, so the elimination of a deal between Canada and Mexico, along with the resultant economic shock to Mexico's economy, will have a significant impact on the province.

Eliminating both NAFTA and CUSFTA

The conventional wisdom is that if the Trump administration were to "rip up" NAFTA, Canada and the U.S. would simply revert to CUSFTA. Matthew S. Kronsby and Milos Barutciski of Bennett Jones provide one argument as to why this may occur:

> *When NAFTA was concluded, the intention was that CUSFTA would kick back in automatically if NAFTA ceased to apply to Canada-U.S. trade, but it is not entirely clear if some sort of affirmative action is required. And the U.S. potentially could terminate CUSFTA too, also on six months' notice, leaving Canada-U.S. trade to be governed by WTO rules, including the WTO's "most favoured nation" duty rates.*
>
> *However, that scenario seems highly unlikely. The principal focus of Trump's opposition to North American free trade has been Mexico. By contrast, CUSFTA was one of the legacy achievements of the Reagan Administration. It is difficult to imagine Trump wanting to undo that legacy, or that his new U.S. Trade Representative, who helped to negotiate CUSFTA, would want to do so either. Nevertheless, the mercantilist orientation of the Trump administration means that it may want to get something in exchange for continuing CUSFTA.*

Based on our discussions with trade lawyers and industry leaders, we believe this to be an overly optimistic view. There are a number of ongoing trade irritants that the United States could address should the country withdraw from CUSFTA. In a widely cited *Globe and Mail* piece,[28] John Weekes, also of Bennett Jones, provides a list of "specific problems" Canada would experience in returning to the CUFTA. In his words,

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[26] Sherman,"NAFTA Is Here to Stay, Even Under Trump" (December 6, 2016): http://www.forbes.com/sites/eriksherman/2016/12/06/nafta-is-here-to-stay-even-under-trump/#45c93f7b560f. *Article accessed January 17, 2017.*

[28] Weekes, "Glib talk about NAFTA won't help Canada", (December 15, 2015): http://www.theglobeandmail.com/report-on-business/rob-commentary/glib-talk-about-nafta-wont-help-canada/article33322574/. Accessed January 17, 2017.

- The binational-panel system for addressing anti-dumping and countervailing disputes—a major accomplishment—expired under the FTA after seven years, but was made permanent under NAFTA. It would not be replaced, as the United States never liked it;
- Going back to the less precise FTA rules of origin would risk returning to FTA-era disputes (Honda, GM-Cami) about whether certain Canadian-made products qualified for FTA treatment;
- Losing the strong NAFTA framework of rules for trade in services and investment under which companies have expanded and invested for over 20 years would pose serious uncertainties for established business relationships;
- Some have questioned the utility of keeping the investor-state dispute settlement provisions of NAFTA. They may be about to become more useful to Canadian business in a more protectionist U.S. trade environment where deal making may trump a framework of laws and regulations;
- Unlike the FTA, NAFTA has an effective provision to protect Canadian exporters from being sideswiped in a general U.S. safeguard action against injurious imports from all countries when Canadian products are not part of the problem;
- The general intergovernmental dispute settlement procedures in the FTA were strengthened in NAFTA.29

We believe that CUSFTA has not aged well enough to simply return to the deal in the absence of NAFTA. The lack of rules for trade in service, along with the imprecise rules of origin in the automotive industry, would necessitate a renegotiation of the deal.

Summary

All of these policies have the same effect of raising the cost of production in the Great Lakes region, as goods cross the border several times in production. This is due, in part, to production specialization in the region, as illustrated by trade flow data between Ontario and the GLS8.

TRADE FLOWS IN THE GREAT LAKES REGION

Using the Government of Canada's *Trade Data Online* service,[30] we estimate the Ontario-GLS8 trade in goods to be worth CA$200 billion in 2015, with Ontario having a trade surplus in goods of roughly CA$5 billion. Drilling down to the product level, the top 10 imports and exports between Ontario and the GLS8 are dominated by automotive-related categories.

TABLE 2: ONTARIO GOODS EXPORTED TO THE GLS8 IN 2015

Top 10 Export Categories by Harmonized System (HS) Product Group	2015 Exports (in CAD)
8703 - Motor Vehicles for Passenger Transport (Other than Buses/Public Transport)	$33,073,558,510
8708 - Motor Vehicle Parts (Excl. Body, Chassis, and Engines)	$8,747,116,230

[29] Weekes, op. cit.
[30] Government of Canada, "Trade Data Online" http://www.ic.gc.ca/eic/site/tdo-dcd.nsf/eng/Home. Accessed January 17, 2017.

8407 - Spark-Ignition Reciprocating or Rotary Internal Combustion Pistol Engines	$2,129,634,314
7108 – Gold	$2,029,331,182
3004 - Medicaments - Put up in Measured Doses or Packed for Retail Use	$1,950,328,008
9401 – Seats	$979,561,167
8409 - Parts for Engines	$965,602,147
1905 - Bread, Pastry, Cakes, Biscuits, and Other Bakers' Wares	$889,329,467
7210 - Flat Rolled Products of Iron/Non-Alloy Steel (Width >600mm) - Clad, Plated, or Coated	$752,238,138
8480 - Moulding Boxes for Metal Foundry, Mould Bases, Moulding Patterns, and Moulds	$751,461,493
TOTAL EXPORTS	$104,033,635,240

TABLE 3: ONTARIO GOODS IMPORTED TO THE GLS8 IN 2015

Top 10 Import Categories by HS Product Group	**2015 Imports (in CAD)**
8708 - Motor Vehicle Parts (Excl. Body, Chassis, and Engines)	$11,977,815,499
8703 - Motor Vehicles For Passenger Transport (Other than Buses/Public Transport)	$8,422,375,978
8704 - Trucks and Other Vehicles for the Transport of Goods	$6,790,121,936
8407 - Spark-Ignition Reciprocating or Rotary Internal Combustion Pistol Engines	$2,792,706,863
2711 - Liquefied Petroleum or Hydrocarbon Gases	$2,093,552,311
8716 - Trailers and Other Wheeled Vehicles Nes	$1,060,609,617
3923 - Articles for the Conveyance or Packing of Goods of Plastics	$936,261,502
7606 - Aluminum Plates, Sheets and Strip	$922,627,869
8409 - Parts For Engines	$912,503,123
9401 – Seats	$891,819,849
TOTAL IMPORTS	$98,899,650,750

A quick examination of the above charts reveals that the shipment of parts and raw materials plays an important role in cross-border trade in this region; this is emblematic of Canada-U.S. trade as a whole, with *Trade Partnership Worldwide*[31] noting that "78% of U.S. imports from Canada are raw materials, parts and components, and services used to make other goods and services in the United States."

THE PROBLEM WITH A BORDER THICKENING: INTEGRATED SUPPLY CHAINS

To provide a more detailed picture of trade dependence between Ontario and the GLS8, the broad approach of the analysis is to distinguish between final, intermediary, and capital goods trade. The new economic reality of increased trade and globalization means that exports today are more likely to include intermediary goods and services sourced from other countries, as opposed to both intermediate and final production all happening within one exporting country. The rise of global value chains—namely,

[31] Trade Partnership Worldwide, op. cit.

production sharing, fragmentation of production, and outsourcing—is therefore making the analytical distinctions between trade of different types of goods more important.[32]

More precisely, the analysis builds on standardized economical classifications in order to match the Harmonized System (HS) trade commodities to goods classification. The main purpose of the international product classification system Broad Economic Categories (BEC) is to categorize products by broad end-use categories for the analysis of trade statistics. The BEC system includes all of the HS commodities. With the BEC, is it also possible to classify each category by the three basic end-use classes in the System of National Accounts: capital goods, intermediate goods, and consumption goods. Therefore, we can link HS commodities to the three basic end-use classes. However, as explained in the "Assumptions and Limitations" section of this report, because the HS four-digit level commodities are related to multiple BEC classifications, this matching is not perfect. To learn more about the methodology behind the analysis, please refer to the appendix.

Ontario – Great Lakes Region

Trade in Final Goods

Ontario's Exports of Final Goods to the GLS8

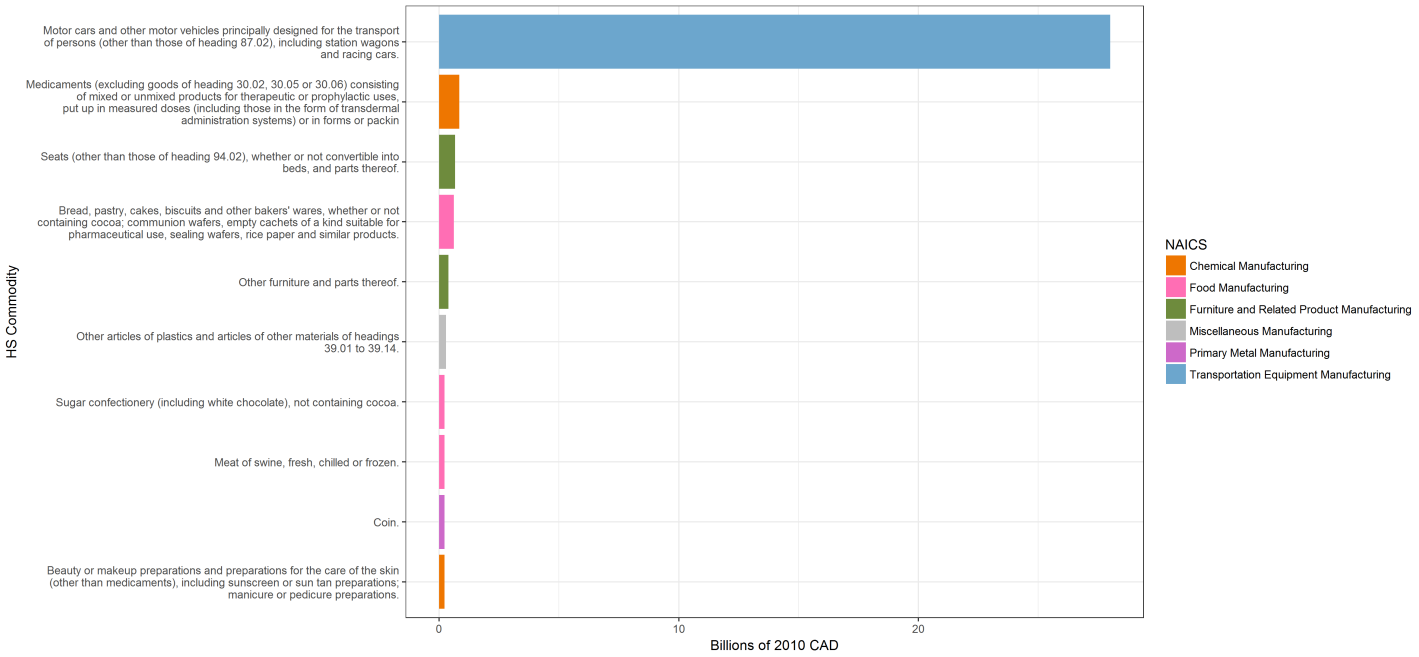
Unsurprisingly, cars[33] dominate the list of final goods exports to the GLS8, with a value of CA$28 billion in 2013. No other final goods category cracked $1 billion, with medicaments (HS 3004)[34] being the next-largest category at CA$800 million of exports.

[32] UN Trade Statistics, "5th Revision of the Classification by Broad Economic Categories (BEC)" (2016): http://unstats.un.org/unsd/tradekb/Knowledgebase/50671/5th-revision-of-the-Classification-by-Broad-Economic-Categories-BEC. Accessed on January 17, 2017.

[33] Or more specifically, HS 8703, "Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 87.02), including station wagons and racing cars."

[34] Medicaments (excluding goods of heading 30.02, 30.05, or 30.06) consisting of mixed or unmixed products for therapeutic or prophylactic uses, put up in measured doses (including those in the form of transdermal administration systems) or in forms or packings for retail sale.

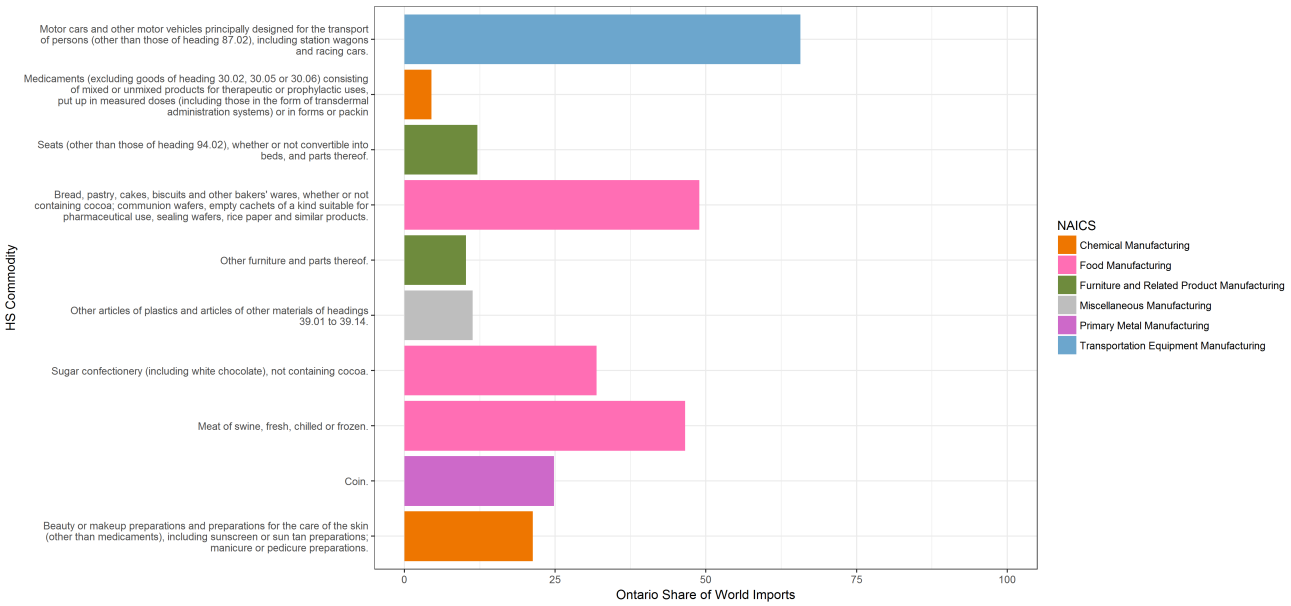
FIGURE 1: TOP 10 FINAL GOODS EXPORTS FROM ONTARIO TO THE GLS8 IN BILLIONS 2010 CA$



Ontario-assembled cars have a 65.7% market share of all exported cars to the GLS8. The next highest market shares in top 10 export categories are in bread and pastries[35] (48.9%), meat of swine[36] (46.6%), and sugar confectionary[37] (31.9%); for our purposes these are classified as final goods, although a significant portion of all three are likely intermediate goods. Consumers in the GLS8 can expect to pay more for these goods should there be a thickening of the border.

FIGURE 2: TOP 10 FINAL GOODS EXPORTS FROM ONTARION TO THE GLS8 AS A SHARE OF WORLD (2013)

[35] HS 1905: Bread, pastry, cakes, biscuits, and other bakers' wares, whether or not containing cocoa; communion wafers, empty cachets of a kind suitable for pharmaceutical use, sealing wafers, rice paper, and similar products.
[36] HS 203: Meat of swine, fresh, chilled, or frozen.
[37] HS 1704: Sugar confectionery (including white chocolate), not containing cocoa.



Ontario's Imports of Final Goods from the GLS8

Similar to Ontario's exports of final goods to the GLS8, the province's largest import category from the GLS8 is automobiles[38] ($6.09 billion; 30% of the GLS8's exports of vehicles). Ontario also imports high levels of sanitary towels, tampons, and diapers[39] (CA$382 million; 86.9% of the GLS8's exports of these products), toilet paper and tissues[40] (CA$341 million; 79.4% export share), and newspapers and magazines[41] (CA$331 million; 75.8% export share). If there is a thickening of the Canada-U.S. border, Ontario consumers can expect to pay more for these products, and producers in the GLS8 will see reduced exports.

[38] HS 8703: Motor cars and other motor vehicles principally designed for the transport of persons (other than those of heading 87.02), including station wagons and racing cars.
[39] HS 9619: Sanitary towels (pads) and tampons, napkins, and napkin liners for babies and similar articles, of any material.
[40] HS 4818: Toilet paper and similar paper, cellulose wadding or webs of cellulose fibres, of a kind used for household or sanitary purposes, in rolls of a width not exceeding 36 cm, or cut to size or shape.
[41] HS 4902: Newspapers, journals, and periodicals, whether or not illustrated or containing advertising material.

FIGURE 3: TOP 10 FINAL GOODS IMPORTS TO ONTARIO FROM THE GLS8, IN BILLIONS OF 2010 CA$

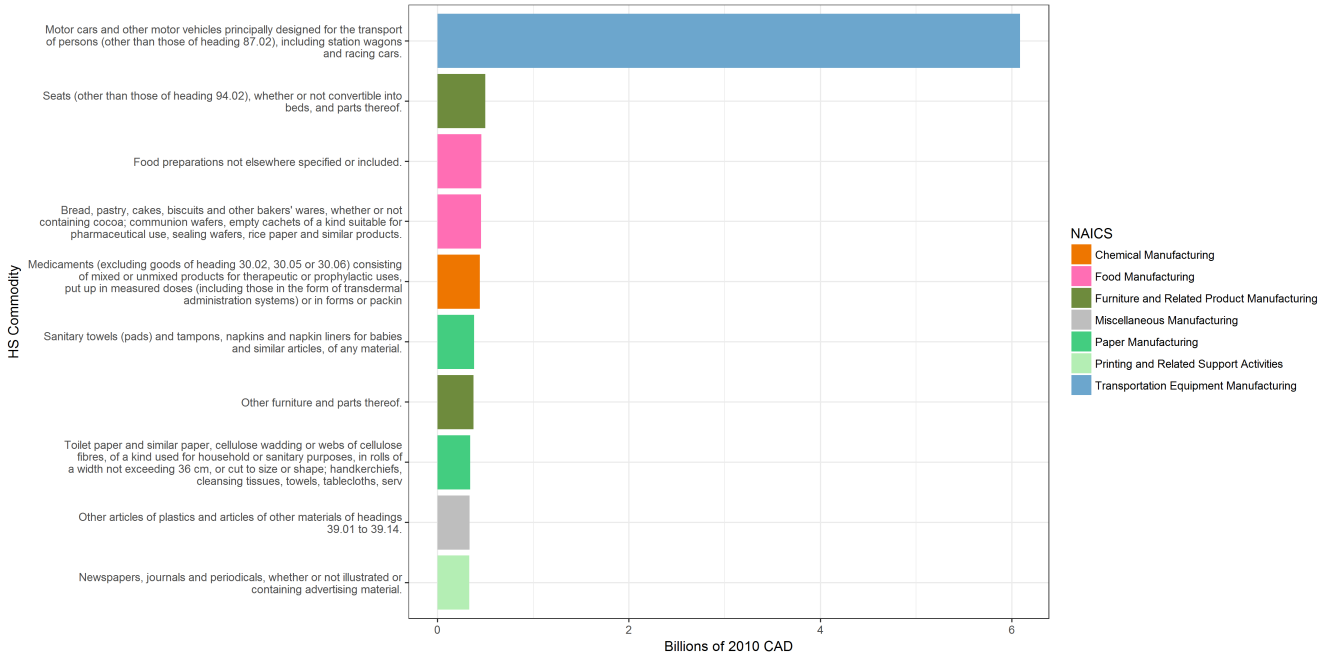
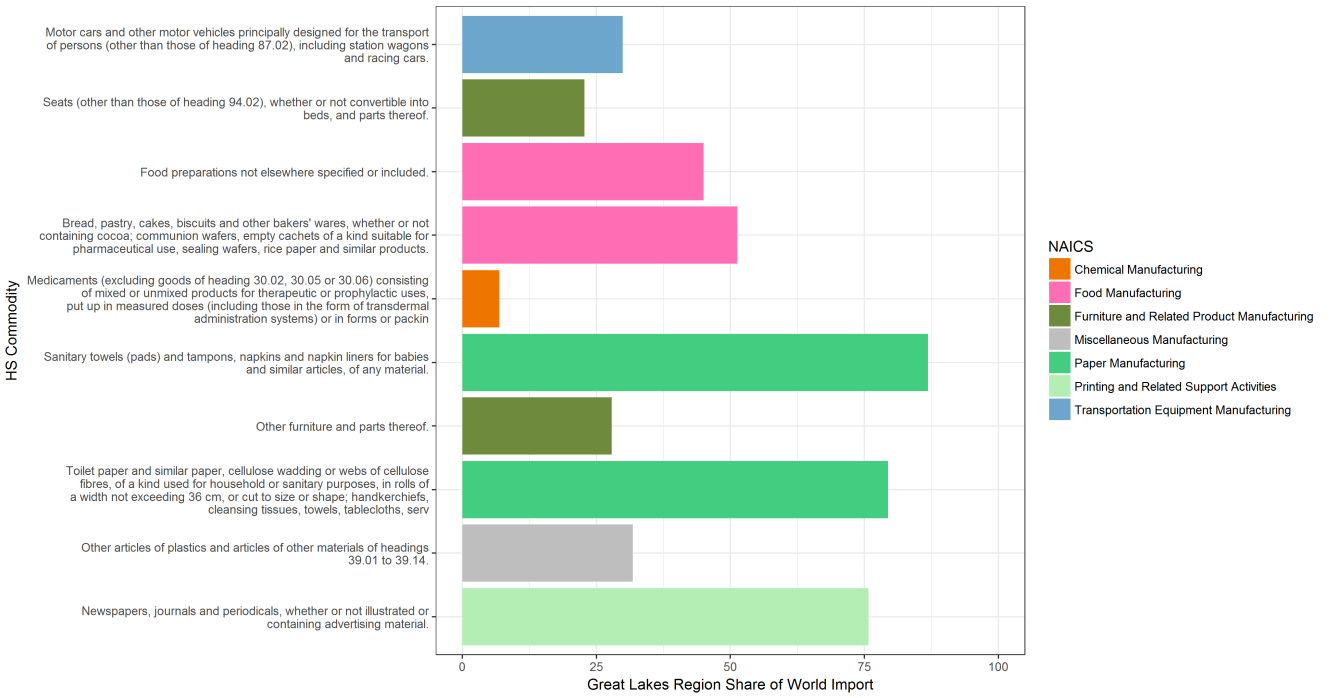


FIGURE 4: TOP 10 FINAL GOODS IMPORTS TO ONTARIO FROM THE GLS8 AS A SHARE OF WOLRD (2013)

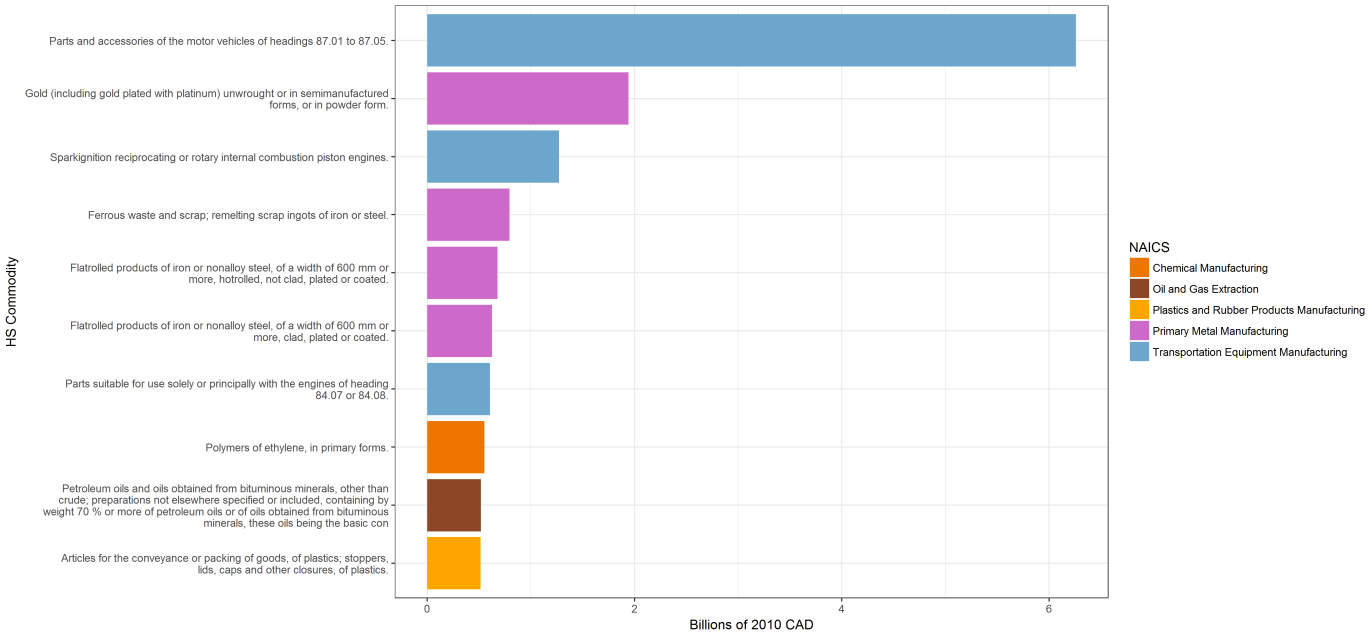


Trade in Intermediate Goods

Ontario's Exports of Intermediate Goods to the GLS8

The GLS8 purchase significant amounts of intermediate goods from Ontario, with 10 different product classes experiencing sales of over CA$500 million (each) in 2013; these include auto parts[42] (CA$6.26 billion), gold[43] (CA$$1.94 billion), and engines[44] (CA$1.27 billion).

FIGURE 5: TOP 10 INTERMEDIARY GOOD EXPORTS FROM ONTARIO TO THE GLS8 IN BILLIONS OF 2010 CAD (2013)



In four of these categories, Ontario has a market share of 50% or more of all imports to the GLS8: ferrous waste[45] (81.2%), gold[46] (77.0%), and two different categories of flat-rolled products of iron or non-alloy steel[47] (71.0% and 57.4%, respectively). Automotive assemblers in the GLS8 are also highly dependent on auto parts from Ontario, with the province having import market shares of 28.8% in engines,[48] and 24.9% in auto parts.[49] Should there be a significant thickening of the border, U.S. plants requiring these inputs may have a difficult time sourcing them from other jurisdictions, putting U.S. assembly jobs at risk.

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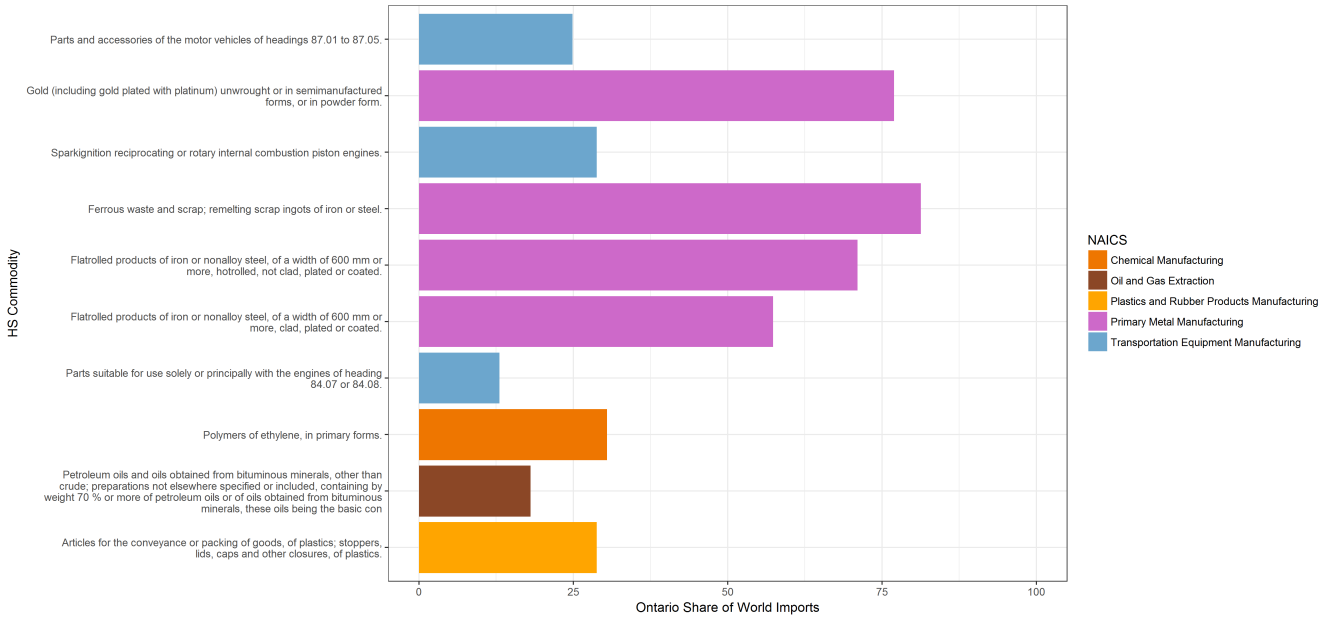
[42] HS 8708: Parts and accessories of the motor vehicles of headings 87.01 to 87.05.
[43] HS 7108: Gold (including gold plated with platinum) unwrought or in semi-manufactured forms, or in powder form.
[44] HS 8407: Spark-ignition reciprocating or rotary internal combustion piston engines.
[45] HS 7204: Ferrous waste and scrap; re-melting scrap ingots of iron or steel.
[46] HS 7108: Gold (including gold plated with platinum) unwrought or in semi-manufactured forms, or in powder form.
[47] HS 7208: Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, hot-rolled, not clad, plated, or coated, and HS 7210: Flat-rolled products of iron or non-alloy steel, of a width of 600 mm or more, clad, plated, or coated.
[48] HS 8407: Spark-ignition reciprocating or rotary internal combustion piston engines.
[49] HS 8708: Parts and accessories of the motor vehicles of headings 87.01 to 87.05

FIGURE 6: TOP 10 INTERMEDIARY GOOD EXPORTS FROM ONTARIO TO THE GLS8 AS A SHARE OF WORLD (2013)



Ontario's Imports of Intermediate Goods from the GLS8

There are 10 product classes where Ontario exports more than CA$600 million worth of intermediate goods each year, including auto parts[50] (CA$10.11 billion), engines[51] (CA$2.17 billion), and petroleum gases (CA$1.04 billion).[52] For nine of the 10 product classes, the GLS8 obtain more than 50% of their imports from Ontario, with engine parts[53] (CA$665 million; 45.7% import share) just missing the cut. Any border thickening would impose significant difficulties on both the Ontario exporters of these products and the U.S. manufacturers that rely on them for inputs.

[50] HS 8708: Parts and accessories of the motor vehicles of headings 87.01 to 87.05.
[51] HS 8407: Spark-ignition reciprocating or rotary internal combustion piston engines.
[52] HS 2711: Petroleum gases and other gaseous hydrocarbons.
[53] HS 4809: Parts suitable for use solely or principally with the engines of heading 84.07 or 84.08.

FIGURE 7: TOP 10 INTERMEDIARY GOODS IMPORTS TO ONTARIO FROM THE GLS8 IN BILLIONS OF 2010 CAD (2013)

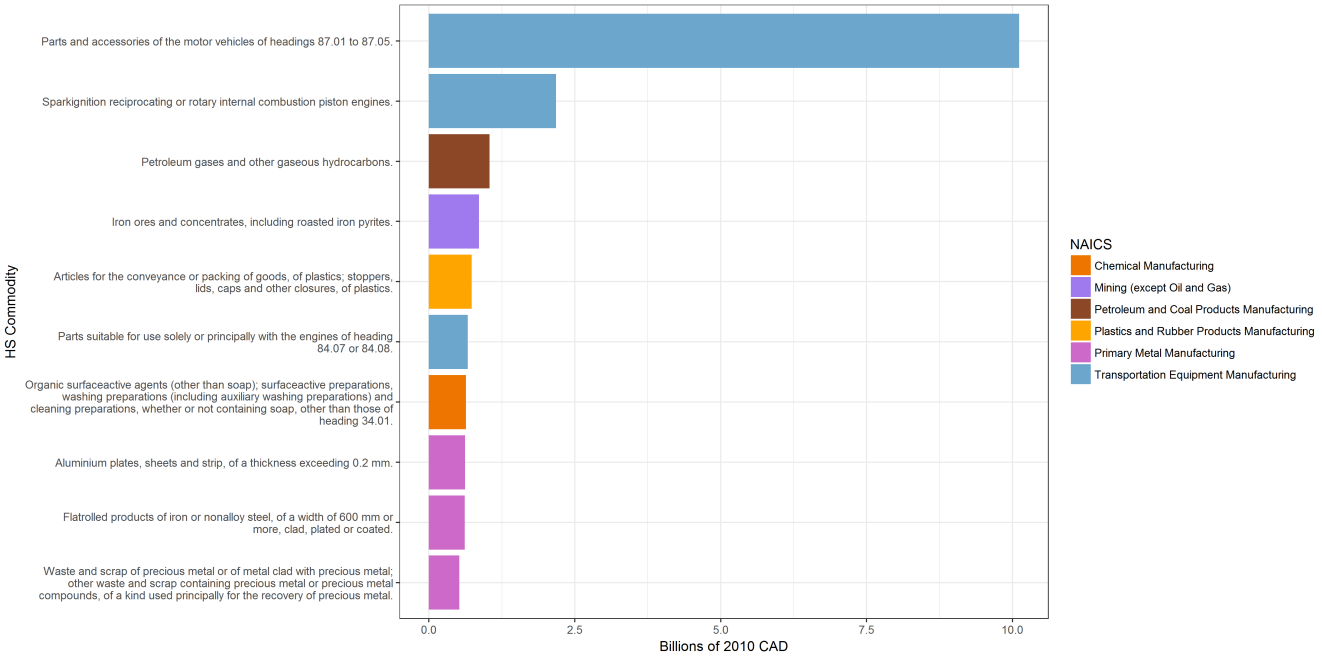
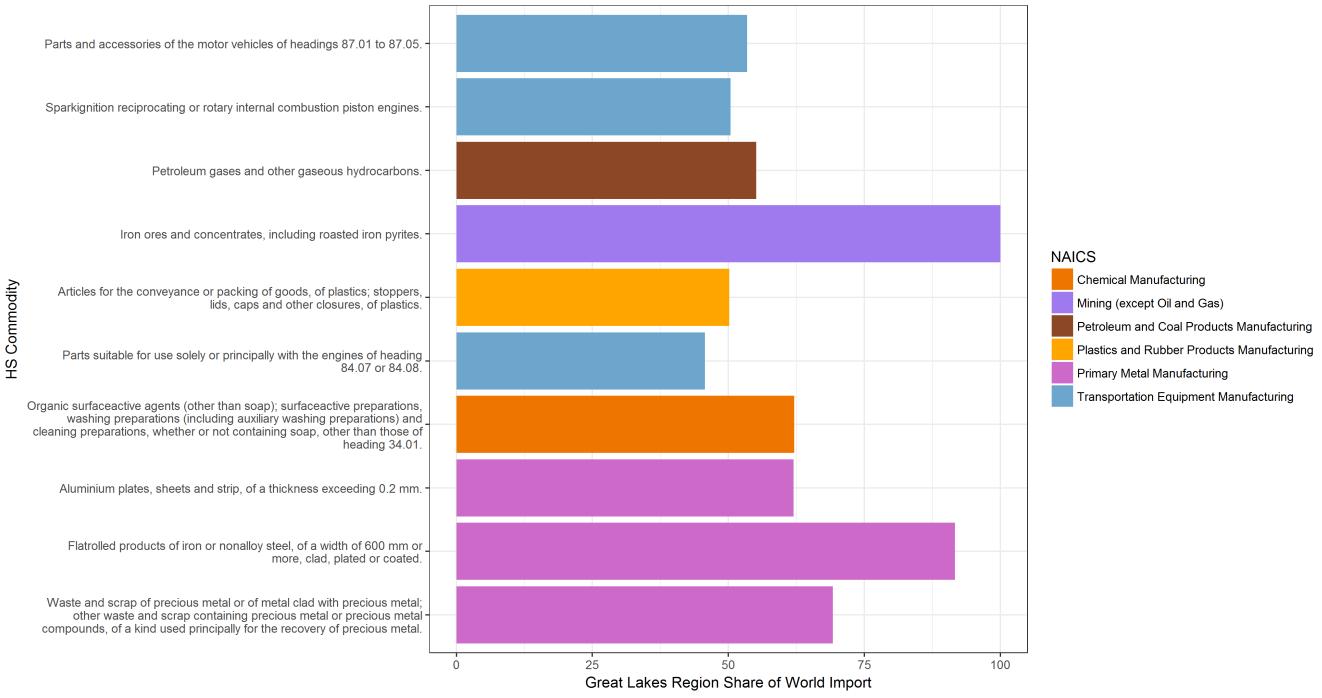


FIGURE 8: TOP 10 INTERMEDIARY GOOD IMPORTS TO ONTARIO FROM THE GLS8 AS A SHARE OF WORLD (2013)

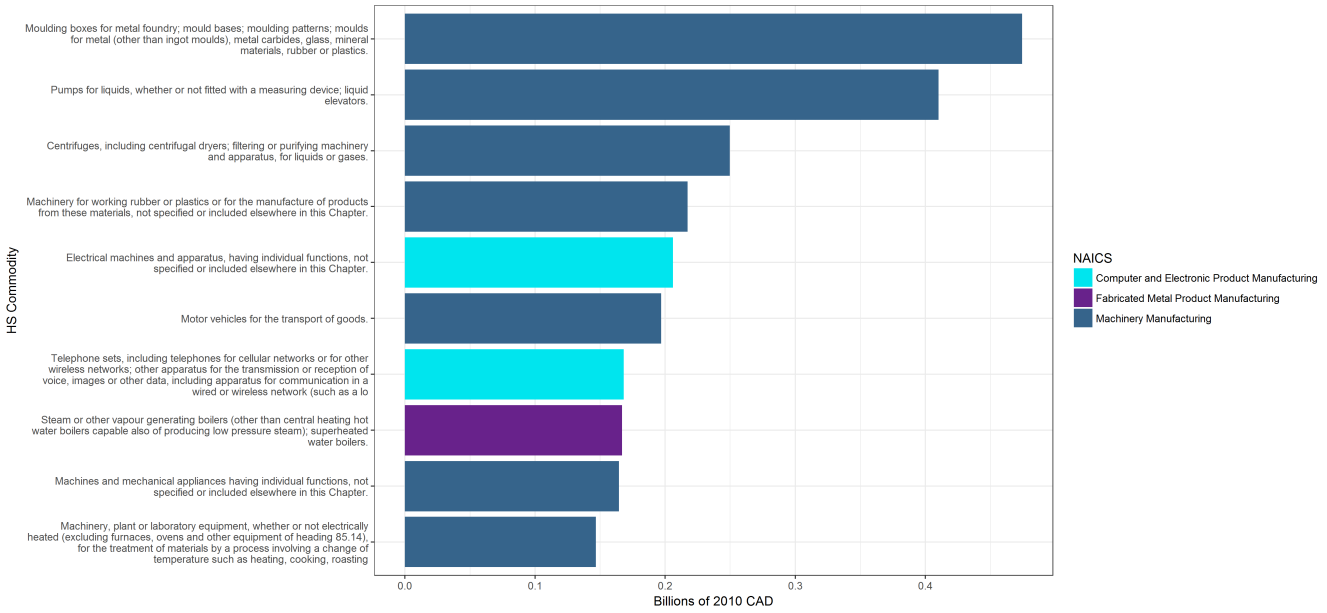


Trade in Capital Goods

Ontario's Exports of Capital Goods to the GLS8

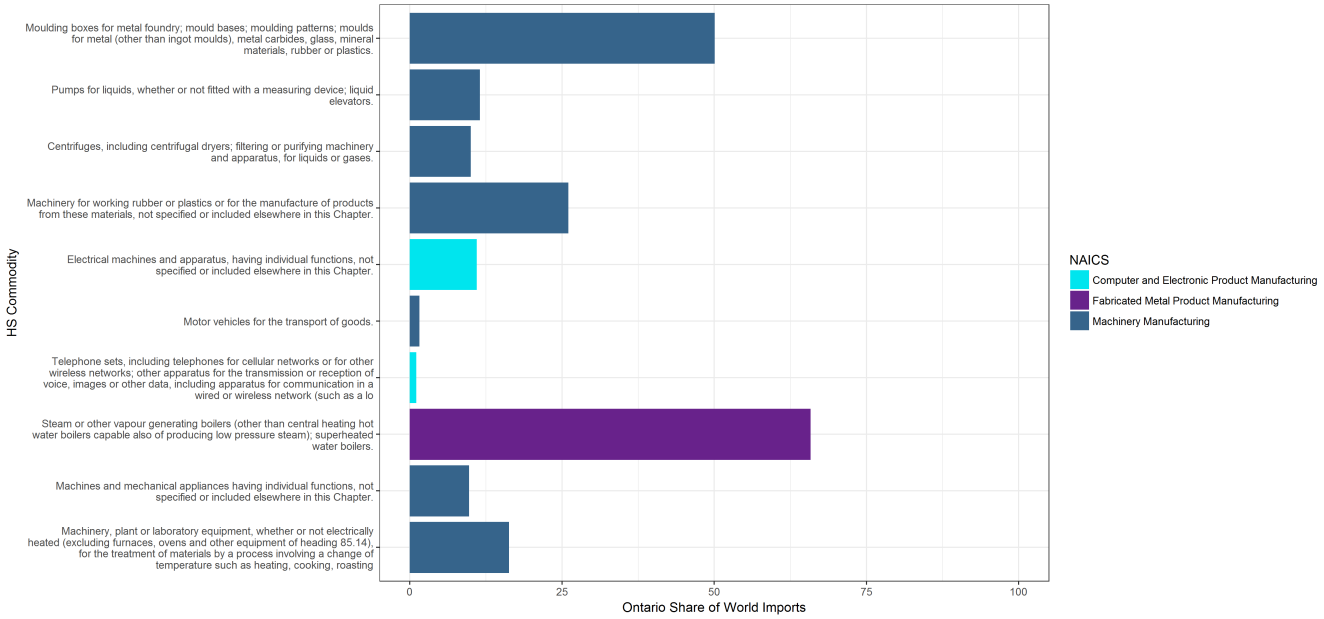
Ontario's exports of capital goods are dwarfed by exports in final and intermediate goods, though there are two product categories where GLS8 companies are highly dependent on imports from Ontario: steam boilers[54] (CA$167 million; 65.8% share of imports) and moulding boxes[55] (CA$474 million; 50.0% market share). A thickening of the border will increase the costs of American firms requiring these capital goods.

FIGURE 9: TOP 10 CAPTIAL GOODS EXPORTS FROM ONTARIO TO THE GLS8 IN BILLIONS OF 2010 CAD (2013)



[54] HS 8402: Steam or other vapour-generating boilers (other than central heating hot water boilers capable also of producing low-pressure steam); superheated water boilers.
[55] HS 8480: Moulding boxes for metal foundry; mould bases; moulding patterns; moulds for metal (other than ingot moulds), metal carbides, glass, mineral materials, rubber, or plastics.

FIGURE 10: TOP 10 CAPITAL GOODS EXPORTS FROM ONTARIO TO THE GLS8 AS A SHARE OF WORLD (2013)



Ontario's Imports of Capital Goods from the GLS8

Ontario's imports of "motor vehicles for the transport of goods"[56] make up over half the exports of these products from the GLS8, for a cash value of CA$5.78 billion. While classified as a capital good, it is likely that the majority of these are purchased by consumers; this may also be the case for some of the other categories of "capital" products, including trailers (CA$977 million; 68.6% export share), centrifugal dryers (CA$606 million; 43.7% export share), and air conditioners (CA$374 million; 37.5% export share). All of the top 10 product categories for Ontario's imports of capital goods are either in machinery manufacturing or computer and electronic product manufacturing, illustrating the importance of Ontario as an export market for goods manufactured in America.

[56] HS 8704: Motor vehicles for the transport of goods.

FIGURE 11: TOP 10 CAPITAL GOODS IMPORTS TO ONTARIO FROM THE GLS8 IN BILLIONS OF 2010 CAD (2013)

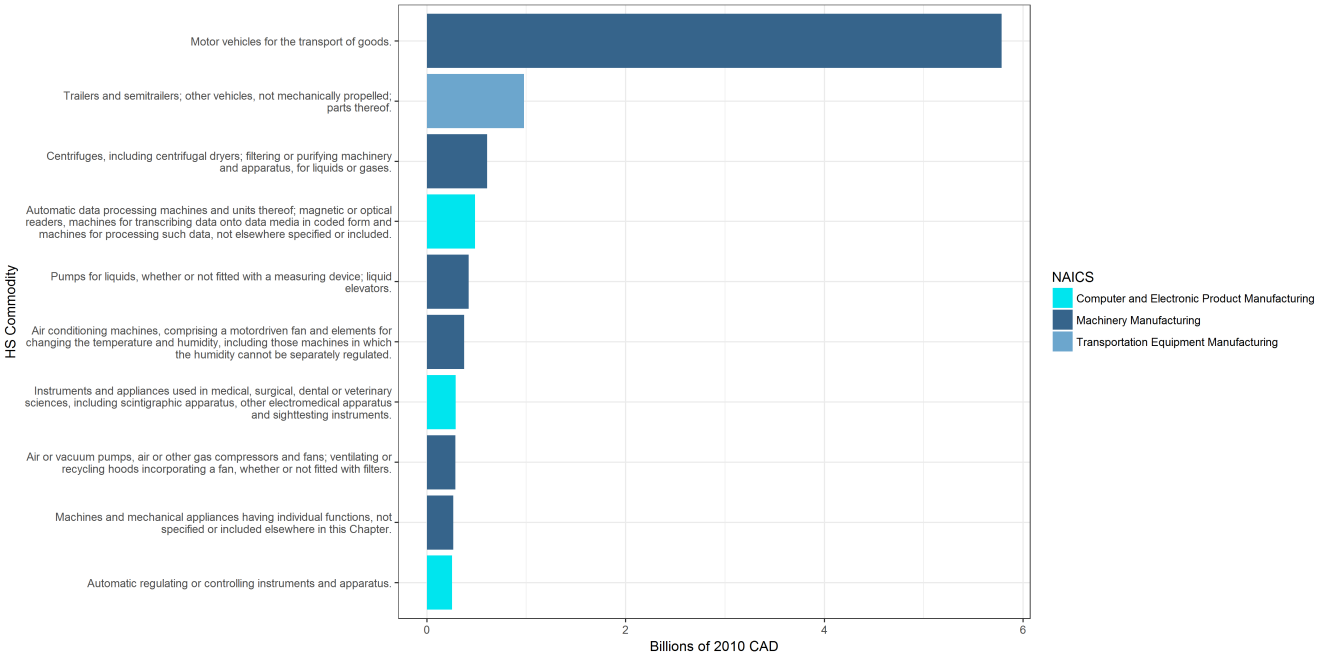
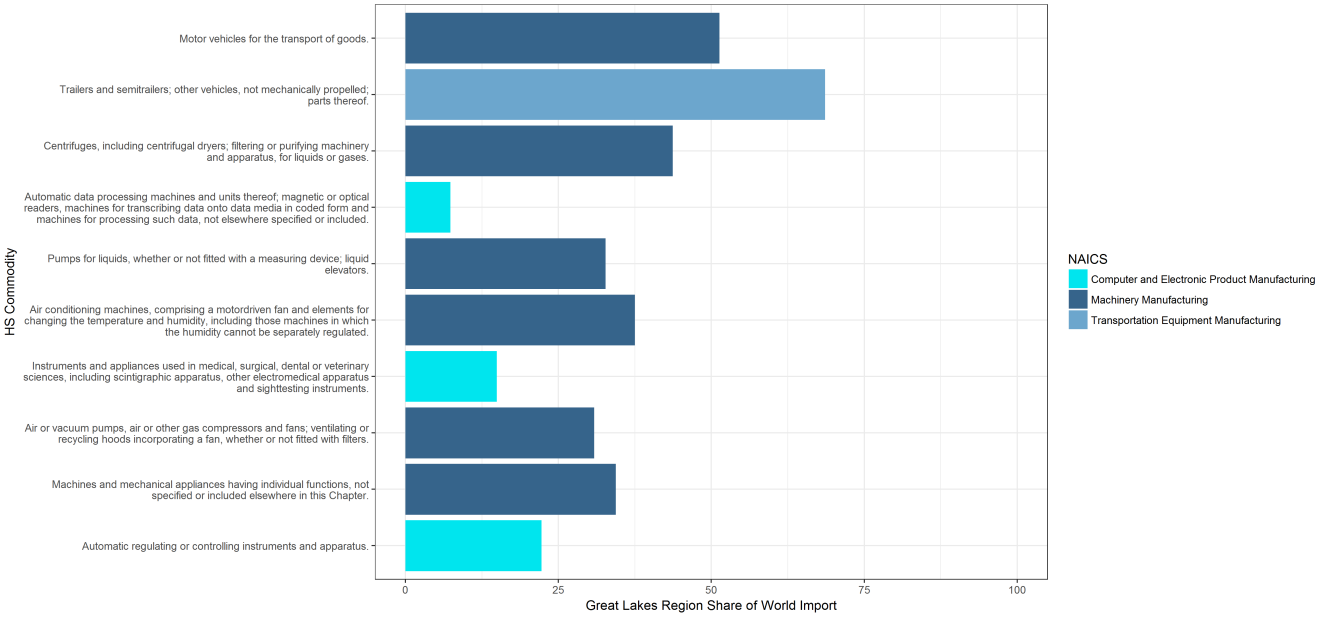


FIGURE 12: TOP 10 CAPTIAL GOODS IMPORTS TO ONTARIO FROM THE GLS8 AS A SHARE OF WORLD (2013)



To better understand the relationship between intermediate good suppliers in one country and final product assemblers in the other, it is useful to examine real-life supply chains. Supply chains in the agri-food and automotive markets are particularly important for production in Ontario and the GLS8, so we examine these in greater detail.

CASE 1: AGRI-FOOD

Agriculture and food trade in Ontario and the Great Lakes Region

Trade in agriculture and food is crucial for the United States and Canada. For every US$1 billion in U.S. agriculture and food exports, 7,580 American jobs are created, along with US$1.2 billion in economic activity.[57] Agricultural commodities, intermediates, and finished goods move freely—and, for the most part, without tariffs[58]—across the Canada-U.S. border. U.S. Census data reported that total two-way trade between Canada and the United States in agriculture and agri-food products was US$47 billion in 2015. The U.S. exported US$25 billion to Canada, and Canada exported just less (US$22 billion) to the United States. Trade agreements have proven important in the flow of agriculture and food across the Canada-U.S. border, with bilateral trade tripling under NAFTA.[59]

Canada trades, in varying amounts, with all 50 states, but is the top export market for 29 states. For the purposes of this report, we have highlighted trade with the GLS8. For these eight states, Canada is the top export market for all but one, Illinois, which exports more to China than it does to Canada (ranked second in this regard). Table 4 reports state-level trade with Canada as well as the percentage of state exports destined for Canada (including Canada's rank); it also reports the number of jobs created in each state as a result of trade and investment with Canada.

The region as a whole is responsible for US$17.3 billion of two-way trade in agriculture and food with Canada, 36.8% of the national total. This scale of trade created 2,461,500 jobs across the GLS8 in 2015.[60]

TABLE 4: GLS8 TRADE WITH CANADA (2015)

State	Trade Balance with Canada	State Imports from Canada (USD)	State Exports to Canada (USD)	% State Exports to Canada (rank)	Jobs Created in State from Trade with Canada
New York	-	$1.5 B	$985 M	45% (1)	680,900
Michigan	+	$957 M	$1.1 B	60% (1)	259,000
Illinois	-	$1.7 B	$1.3 B	19% (2)	344,300
Indiana	-	$522 M	$399 M	31% (1)	189,800
Pennsylvania	-	$1.7 B	$1.3 B	53% (1)	346,600
Wisconsin	+	$761 M	$1.4 B	48% (1)	158,000
Ohio	+	$941 M	$1.2 B	35% (1)	308,700
Minnesota	-	$799 M	$750 M	30% (1)	174,200

[57] Agriculture and Agri-food Canada, 2015. United States and Canada – a strong partnership in agriculture. http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/agriculture-and-food-market-information-by-region/united-states-and-mexico/canada-united-states-bilateral-trade/the-united-states-and-canada-a-strong-partnership-in-agriculture/?id=1386858939266 Accessed January 3, 2017.

[58] Limited market access and tariffs exist for U.S. exports into Canada in supply managed sectors (milk, poultry, eggs) and for Canadian exports to the U.S. in peanuts and peanut products, dairy and sugar.

[59] Agriculture and Agri-food Canada, op. cit. 52

[60] Agriculture and Agri-food Canada, 2015. Trade data and analysis United States and Mexico. http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/agriculture-and-food-market-information-by-region/united-states-and-mexico/trade-data-and-analysis/?id=1453922296633 Accessed January 3, 2017

Regional Total	**-**	**$8.9 B**	**$8.4 B**		**2,461,500**

Source: Agriculture and Agri-food Canada/U.S. Census Bureau.

Table 5 presents the top three exports from each of the GLS8 to Canada. These numbers reflect sizable Canadian markets for companies in these sectors. Of particular note is the US$305 million market for chocolate and cocoa products in Canada for companies in Pennsylvania, and the US$324 million market for ethanol coming from Minnesota and Wisconsin.[61]

TABLE 5: TOP THREE AGRICULTURE AND FOOD EXPORTS TO CANADA BY STATE IN 2015

State	**USD**	
New York	$132 M	Prepared vegetable, fruit, nuts
	$131 M	Beverages
	$83 M	Coffee
Michigan	$173 M	Vegetables
	$117 M	Fresh, frozen chicken meat
	$106 M	Prepared cereal grains
Illinois	$157 M	Food preparations
	$131 M	Baked goods
	$100 M	Fats and oils
Indiana	$60 M	Infant formula
	$48 M	Prepared vegetable, fruit, nuts
	$47 M	Beverages
Pennsylvania	$305 M	Chocolate and cocoa products
	$142 M	Coffee
	$98 M	Baked goods
Wisconsin	$205 M	Ethanol
	$157 M	Fur skins
	$117 M	Food preparations
Ohio	$100 M	Animal feed
	$88 M	Prepared pork
	$82 M	Chicken eggs
Minnesota	$125 M	Animal feed
	$124 M	Ethanol
	$83 M	Waters (incl. mineral and flavoured)

Source: Agriculture and Agri-food Canada/U.S. Census Bureau.

[61] ibid

Case study: Maple Leaf Foods

Maple Leaf Foods (MLF) is a consumer packaged meats company, headquartered in Mississauga, Ontario. The firm's business is divided into two major groups; the Agri-business Group which is responsible for hog production, and the Meat Products Group (supplied by the former group), which produces prepared meats and meals, as well as fresh pork, poultry, and turkey products. MLF markets its products under leading brands, including Maple Leaf®, Maple Leaf Prime®, Maple Leaf Natural Selections®, Schneiders®, Schneiders Country Naturals®, and Mina™. MLF has operations across Canada and exports products to more than 20 global markets, including the U.S. and Asia

Canada-U.S. integrated hog production

Hog production and pork processing is big business in North America, and the presence of a free trade agreement facilitates the scale, scope, and competitiveness of this industry.

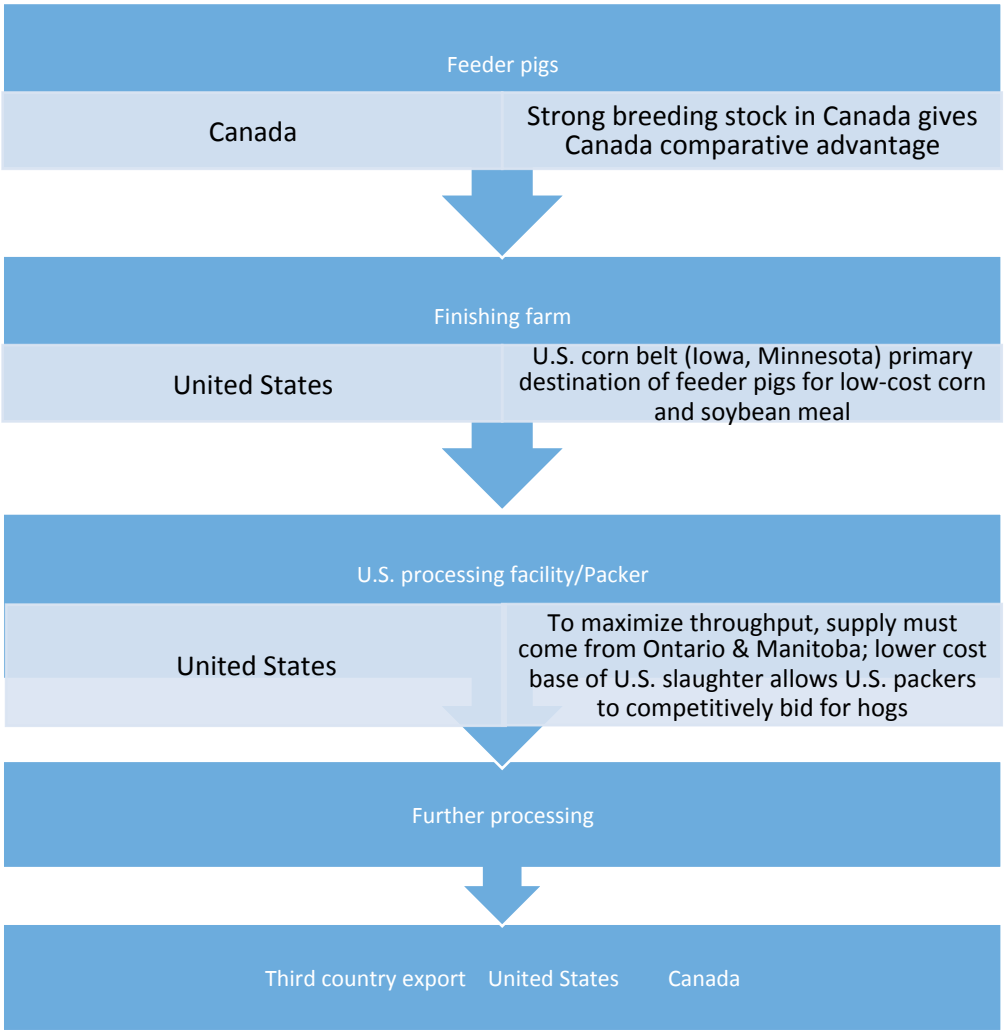
In the United States, 110 million pigs are marketed annually; generating a value of US$23.4 billion and supporting 550,000 jobs, ranging from pork producers and meat processors, to transport and supporting services.[62] In Canada, 25 million hogs are marketed annually, worth CA$4.1 billion at the farm gate. The total economic activity or output of direct, indirect, and induced jobs (numbering 103,000) generates CA$23.8 billion when farms, inputs, processing, and pork exports are all considered.[63]

In 2015, Canada was the third most important export market for U.S. pork (after Japan and Mexico), and the U.S. was the most important export market for Canada.[64] The integrated nature of the pork supply chain creates scale, and maximizes efficiencies across the chain and the across borders. Figure 13 illustrates the flow of feeder pigs from Canadian farms (Ontario and Manitoba, most notably) into finishing farms in the Midwestern United States (primarily Iowa and Minnesota), where pigs are finished on lower-cost U.S. corn and soybean meal, before being passed on to processors and packers for processing in a number of U.S. states. To maximize the throughput of U.S. processing facilities, processors will bid up prices for hogs during times of heavy slaughter to ensure supply of Canadian pigs. The lower cost base of the U.S. slaughter industry, relative to Canada, allows U.S. processors to compete aggressively for hogs, and acts as a driver of live hog imports from Canada.[65]

> ***NAFTA WAS GOOD FOR THE INDUSTRY ON BOTH SIDES OF THE BORDER BECAUSE IT CREATED A MORE INTEGRATED MARKETPLACE AND MORE EFFICIENT SUPPLY CHAINS FOR PIG PRODUCTION AND MEAT PROCESSING. THE FREE MOVEMENT OF PROFESSIONAL LABOUR, CAPITAL INVESTMENT, GOODS AND SERVICES (EQUIPMENT AND PACKAGING), AND ANIMAL GENETICS IS ALSO VERY GOOD FOR OUR INDUSTRY. "***
>
> ***MAPLE LEAF FOODS***

[62] National Pork Producers Council (NPCC), 2017. http://nppc.org/pork-facts/ Accessed on January 11, 2017.
[63] Canadian Pork Council (CPC) Annual Report, 2016. http://www.cpc-ccp.com/documents/CPC_Annual_Newsletter_ENGLISH_final.pdf *Accessed on January 12, 2017.*
[64] Global Trade Atlas, 2015 *In*: Agriculture and Agri-food Canada http://www.agr.gc.ca/eng/industry-markets-and-trade/statistics-and-market-information/agriculture-and-food-market-information-by-region/united-states-and-mexico/trade-data-and-analysis/competitive-trade-analysis-united-states/?id=1441897108056#d Accessed December 29, 2016.
[65] Haley, M., 2005. U.S. Canadian hog trade market integration at work. https://www.ers.usda.gov/amber-waves/2005/february/us-canadian-hog-trade-market-integration-at-work/ Accessed on January 11, 2017

FIGURE 13: REPRESENTATION OF INTEGRATED PORK SUPPLY CHAIN (Agri-food@Ivey, interpretation of Haley, M, 2005).



The business of food

MLF's business plan includes the sale of live pigs and, processed pork for furthering processing, as well as direct-to-retail sales. Primary markets for the company's products are Canada and U.S., though MLF has sales to an additional 28 markets. MLF is a major player in the integrated North American hog industry and like the auto-sector, MLF products will originate in Canada, be exported to the U.S. for further processing, and return to Canada in a value-added form. MLF also co-manufactures in the United States.

In 2015, MLF exported 44.7 million kilograms of fresh or frozen pork to U.S. customers, worth CA$147 million.[66] The majority of pork sold by MLF and other Canadian exporters is subject to value adding and in turn, creates jobs in the United States. U.S. buyers use the pork products to manufacture consumer products such as hams, sausage, and other processed meat products, which feed the domestic U.S.

[66] Information shared during interview with MLF.

marketplace as well as third country export demand. Canadian waste products (kill credits) find value in the U.S. as inputs to industrial and pharmaceutical sectors.

Canada and the U.S. trade in live pigs and pork provides mutual benefit to producers, processors, and consumers across many regions and rural communities.

U.S. farmers make a profitable business of buying duty-free, high-health-status Canadian pigs for finishing and sale to U.S packers. In turn, many Canadian hog farmers (Manitoba and Ontario being the top producers) have received good, consistent value shipping live hogs to the U.S. This demand is expected to increase when three new U.S. pork plants begin operations (two in Iowa and one in Minnesota), although some older U.S. plants could be closed.[57]

Presently, MLF exports all live sows and boars (breeding animals) into the U.S. for further processing. These sows and boars are received at a number of processing facilities in the northern U.S. including Minnesota. The shortage of federal slaughter facilities in Canada means this trade of live sows and boars returns value to Canadian hog farmers who otherwise might just send hogs to rendering, and at the same time, creates a lower-cost ingredient for the U.S. brand Johnsonville Sausage (see side bar). These products are made in the U.S with low-cost sow meat, some of it coming from Canadian sows. Trade restrictions would impact the flow of goods in both directions and impose considerable price increases for both the processor (Johnsonville Sausage) and the end consumer. In 2015, Canada imported CA$263-million worth of pork sausages from the United States.[67]

Johnsonville Sausage

Johnsonville Sausage LLC. is a producer of fresh, pre-cooked, and smoked sausage products. The company markets its products under Johnsonville and Johnsonville Deli Bites brands to 30 countries, including the U.S., Japan, France, Mexico, and Canada. Johnsonville Sausage is headquartered in Sheboygan Falls, Wisconsin. The company produces more than 100 million pounds of sausage each year, and has four processing plants: three in Wisconsin and the fourth in Momence, Illinois, employing 1,300 people in total. Johnsonville Sausages has an integrated business, receiving live pigs for processing through to retail, wholesale, and food service sales. It also partners with McDonald's for the sale of Johnsonville branded sausages at select McDonald's locations in the United States. While the company is a family-run, private company, and revenue information is difficult to find, it is estimated that sales are above $200 million annually.

Source: Woodward, A. *International Directory of Company Histories*

The integration of the Canadian and U.S. markets, in the absence of tariffs and trade barriers, allows for the free flow of goods and services, as well as partnership, co-ventures, and investment across borders.

[67] Canadian International Merchandise Trade Database (CIMT), 2017 HS code 160100 http://www5.statcan.gc.ca/cimt-cicm/topNCountries-pays?lang=eng&sectionId=0&dataTransformation=0&refYr=2015&refMonth=12&freq=12&countryId=0&usaState=0&provId=1&retrieve=Retrieve&save=null&country=null&tradeType=3&topNDefault=10&monthStr=null&chapterId=16&arrayId=0&sectionLabel=&scaleValue=0&scaleQuantity=0&commodityId=160100 *Accessed January 12, 2017*

In addition to the movement of products into the U.S., MLF also co-manufactures in the U.S. to make items where it lacks sufficient capacity in Canada. One example is cooked bacon, which is made by Sugar Creek, near Dayton, Ohio, for MLF. Sugar Creek is a contract manufacturer with six manufacturing facilities and 2,000 employees. In the absence of a trade agreement, or a "thickening" of the Canada-U.S. border, MLF would not be able to maintain this relationship and would have to find another partner to meet its product specifications.[68]

Better Together

The simple fact of the matter is that Canada and the United States need each other to supply their respective citizens with affordable, safe, nutritious food. Policy makers in the U.S. need to be aware of the devastating results should the incoming administration begin to impose tariffs or close the border to goods coming from Canada. Under President Obama's Country of Origin Labelling (COOL) legislation, the livestock industry experienced—with frightening speed—the impact of trade barriers. COOL was a bad idea in an integrated market, as it added costs and did not improve the price to processors or producers. The legislation was opposed by the vast majority of U.S. livestock growing and meat processing companies because they recognized the importance of imports from Canada to the overall competitiveness of the industry. It is speculated that the billions of dollars that COOL cost farmers, processors, and consumers on both sides of the border would be dwarfed by the costs of "ripping up" NAFTA.

> ***BENEFITS ACROSS THE VALUE CHAIN AND ACROSS BORDERS COME WHEN CANADA AND THE U.S. EXPORT MORE PORK OUT OF THE NORTH AMERICAN MARKET. TO ACHIEVE THIS COMMON GOAL, CANADA AND THE U.S. SHOULD NOT LOSE SIGHT OF THEIR SHARED INTEREST IN ENSURING A LOW-COST, BARRIER-FREE, AND SUSTAINABLE NORTH AMERICAN BUSINESS CLIMATE AS A COMPETITIVE ADVANTAGE FOR BOTH COUNTRIES IN THIRD COUNTRY MARKETS."***
>
> ***MAPLE LEAF FOODS***

NAFTA impacts agriculture and food across many sectors. By and large, agricultural commodities, food and grain ethanol, move freely across our shared border. A study conducted by the Centre of Policy Studies at Victoria University in 2015 suggests that trade cessation between Canada and the U.S. would have a profoundly negative impact on employment and economic output in the United States. Dixon and Rimmer[69] posit that should the U.S. cease trade with Canada, the U.S. GDP would fall by 6.47%, or a value of US$1,085 billion, and employment would drop by 4.54%, or a loss of 8.27 million jobs. At the industry level, 437 of the 533 commodities investigated would be hurt by ceasing trade with Canada. The remaining 96 commodities saw a positive or zero gain. Agriculture and food in the U.S. is not immune to this trend. Table 7 outlines selected agriculture and food commodities that would experience economic contraction should trade with Canada cease. Of the 87 agriculture and food commodities studied by Dixon and Rimmer, 64 would contract while the other 23 would see positive or net zero gains.

[68] Comments from interview with MLF.
[69] Dixon and Rimmer, M.T., 2014. The Dependence of U.S. Employment on Canada, 2013. http://www.copsmodels.com/pdf/canada_trade_2013.pdf *Accessed on January 10, 2017.*

TABLE 7: COMMODITY OUTPUT EFFECTS OF CESSATION OF CANADA-U.S. TRADE FOR SELECT AGRICULTURE AND FOOD COMMODITIES

Selected Commodity	Commodity output effects (%) of Canada-U.S. trade cessation
Dairy farm product	-2.82
Poultry eggs	-1.48
Fruits	-6.83
Vegetables	-8.22
Sausages	-7.08
Butter	-3.95
Cheese	-3.97
Chocolate	-4.76
Corn ethanol	-5.47

Rather than targeting trade agreements that have a proven history of delivering equal benefits to both partners, Canada and the U.S. have a shared interest in removing remaining barriers to bi-lateral trade in order to open their markets, improve regional competitiveness and advance their efforts in streamlining regulatory policies. Should NAFTA come under review and negotiations begin, Canada needs to be prepared to tackle the unthinkable. Supply-managed sectors are certain to be a target of the incoming administration. The livestock industry has also been mentioned. Areas that will require strong negotiating include new disciplines on the use of trade remedies (countervail and anti-dump) on bilateral trade, and an end to border re-inspection of Canadian meat products (retail ready and for further processing) entering the United States. Finally, Canada and the U.S. need to recognize the value of establishing of a Joint Food Standards Agency. In addition to setting common food safety standards (e.g., for meat hygiene and inspection), such an agency could advance regulatory harmonization in animal and plant health.

With a borderless approach to business, the North American region will become a powerhouse, feeding a thriving domestic market as well as third country export demand.

Case 2: Automotive

The State of the Regional Industry

The automotive industry is extremely important for both the Canadian and American economies. As the industry became highly globally integrated, nearshoring within NAFTA resulted in shared, interconnected supply chains in the United States, Canada, and Mexico that continue to create and support employment within the three nations.[70] Auto parts produced and assembled in the U.S., Canada and Mexico cross the NAFTA countries' borders, on average, eight times before being installed in a final assembly plant in one of the three partner countries.[71] For Canada, its strong trade relationship has helped bolster revenue in recent years.

As the United States rebounded from the 2008 economic downturn, U.S. consumers experienced greater disposable income, falling unemployment, and easier access to financing. All of these factors encouraged many U.S. consumers to increase demand for purchases of new cars. This strong demand flowed through to Canadian automobile production, causing industry revenue to increase during this period. According to BMI Research's *2016 Canadian Auto Industry Report*, Canada is one of six countries that poses a low risk but high rewards in the automotive space. The remaining members of NAFTA were also classified on the top end of low-risk, high-reward nations for automotive manufacturing, which highlights NAFTA's effectiveness in creating a distinct competitive advantage for the trading bloc.[72]

Overall, profit margins are quite low. However, since Canada is not as capital intensive when it comes to auto manufacturing, this provides a cost advantage for American firms that assemble and produce their products in Canada. Today, the industry is dominated by manufacturers that drive sales through leveraging brand awareness and established relationships with key supply chain partners to guarantee the supply of parts.

> ***OTTAWA AND WASHINGTON TALK ABOUT THE WORLD'S LARGEST BILATERAL TRADING RELATIONSHIP. BUT WE REALLY DON'T TRADE WITH EACH OTHER, NOT IN THE CLASSIC SENSE OF ONE INDEPENDENT COMPANY SENDING FINISHED GOODS TO ANOTHER. INSTEAD WE MAKE THINGS TOGETHER."***
>
> ***STEPHEN BLANK***

[70] Dziczek, Swiecki, Chen, Brugeman, Schultz and Andrea. "NAFTA Briefing: Trade benefits to the automotive industry and potential consequences of withdrawal from the agreement." CAR Research Publications | Center for Automotive Research (2017): <http://www.cargroup.org/?module=Publications&event=View&pubID=148>. Accessed January 13, 2017.

[71] Wilson, C. "*Working Together: Economic Ties Between The United States and Mexico*." Woodrow Wilson International Center for Scholars (November 2011): <https://www.wilsoncenter.org/sites/default/files/Working%20Together%20Full%20Document.pdf>. *Accessed January 13, 2017.*

[72] "*Canada Autos Report - Q1 2017*." BMI Research (November 2016): BMI Research <http://store.bmiresearch.com/canada-autos-report.html#marketo-pdf-download>. *Accessed January 13, 2017.*

Key Benefits of NAFTA

NAFTA provides best cost production and lower supply chain risk to automakers which keeps production in North America. Without NAFTA, low-wage countries in Asia, Eastern Europe, or South America would prove to be attractive alternative manufacturing hubs.[73] NAFTA also allows U.S. based multinational firms to maximize their investments and be more competitive globally while anchoring the engineering, research and development in the region—largely within the United States.

Consequences of U.S. Withdrawal from NAFTA

If trade ceased between Canada and the U.S., the auto parts industry would contract significantly and could undermine U.S. employment by encouraging more distant offshoring, and thereby reducing dependence on U.S. value-add of intermediate goods and service producers. With Canada ranked as the largest export market for U.S. automotive, disruption to the automotive supply chain would be significant, and cannot be ignored.

As the heart of the U.S. automotive industry, Michigan's Metro Detroit area would be hit particularly hard in the event of the United States' withdrawal from NAFTA. Transportation was Detroit's top export category in 2015. Michigan's automotive-related employment could be at risk if production relocates outside of the NAFTA region.

Case Study: We Make Things Together

Martinrea International Inc.

Martinrea International Inc. (Martinrea) is a leading Canadian tier one supplier of automotive parts, assemblies, and modules. It employs over 15,000 people at 54 facilities (including plants, offices, and testing centres) around the world.

Headquartered in Vaughan, Ontario, Martinrea is part of an integrated North American auto sector that includes the United States and Mexico. Of its 36 manufacturing plants, 14 are located in the United States (the majority in the Great Lakes region), 12 are in Ontario, Canada, and 10 are in Mexico.[74] Roughly 32% of Martinrea's workers are employed in the United States, 30% are in Mexico, and 15% are in Canada. About 80% of the company's CA$2.9 billion in annual sales is international, with 40% in the United States and 20% in Mexico.[75]

Martinrea is a global supplier of auto parts in three key areas: the development and production of quality metal parts, assemblies, and modules; fluid management systems; and complex aluminum products, focused primarily on the automotive sector. The company is a leading competitor in all three lines of business in North America, and the third-largest Canadian auto parts supplier, after Magna International and Linamar Corp., as measured by annual revenue. Other key competitors include Cooper-Standard Automotive, TI Automotive, and Tower Automotive, all of which are headquartered in the United States.

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[73] Porter, "*NAFTA May Have Saved Many Autoworkers' Jobs."* The New York Times (March 2016): <https://www.nytimes.com/2016/03/30/business/economy/nafta-may-have-saved-many-autoworkers-jobs.html?_r=0>. *Accessed January 13, 2017.*

[74] Martinrea has additional locations in Brazil and Slovakia, and two locations in each of Germany, Spain, and China.

[75] European sales account for 16% and sales in the rest of the world account for 4%. Martinrea International Inc. Management Discussion and Analysis of Operating Results and Financial Position for the Three and Nine Months Ended September 30, 2016. http://www.martinrea.com/Public/Page/Files/26_MDA_Q3_2016_November_2016.pdf.

Martinrea is a business-to-business supplier whose customers include virtually all major global assemblers. The combination of parts and systems produced by Martinrea within its three lines of business allows it to offer “one-stop shopping” for clients purchasing large, complex assemblies such as an engine block, the components of which are produced and assembled by Martinrea, close to the customer.[76]

In lean, “just-in-time” (JIT) supply manufacturing, the proximity of parts manufacturers to assemblers is key. Given the size and complexity of the products in Martinrea’s first two lines of business, being close to its customer base reduces logistics costs and supply chain risk, and allows for continuous technical and product development in response to its customers.

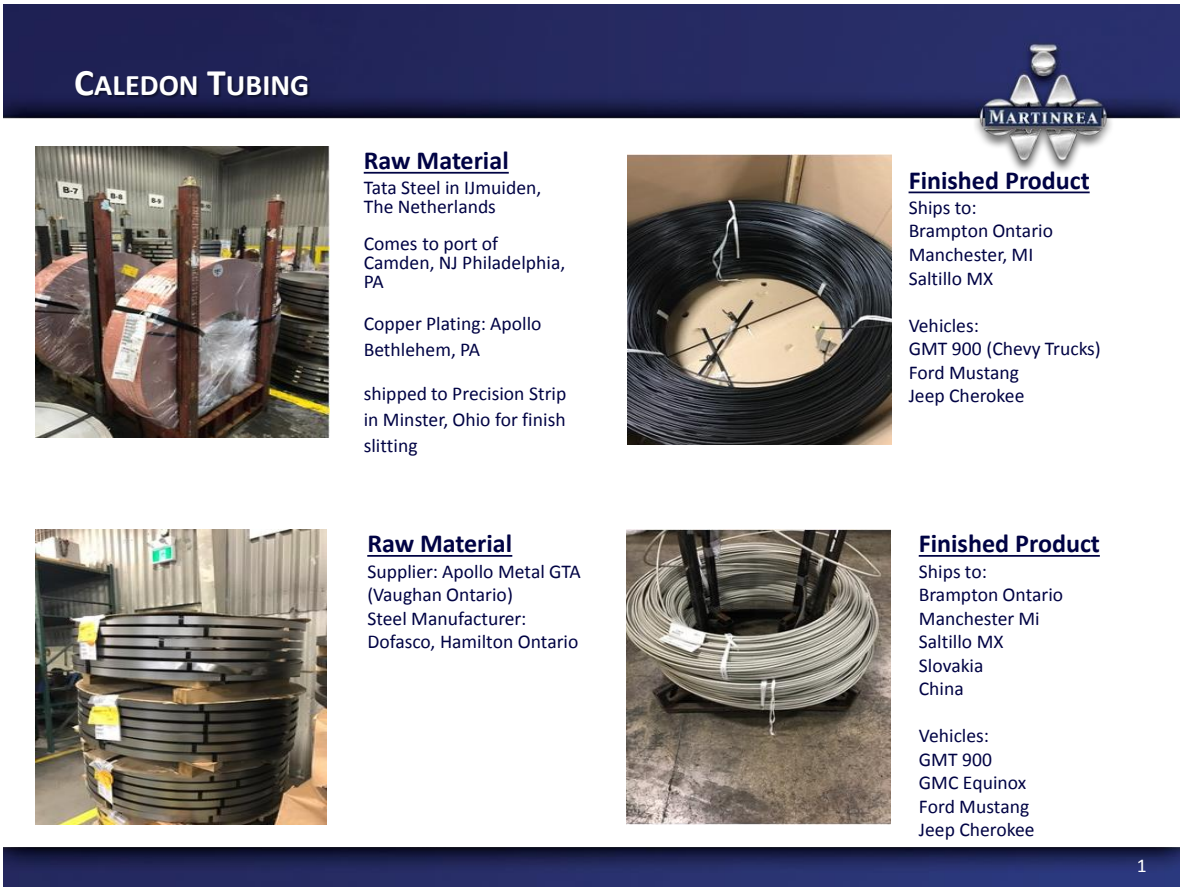
Martinrea’s complex aluminum assemblies are critical to the U.S. automotive industry; they include quality structural parts that are safe and strong, but also lightweight, in order to improve fuel economy and reduce carbon footprint. As noted in a report prepared by Trade Partnership Worldwide, “Swapping lighter aluminum for heavier steel has been a key way that American motor vehicle manufacturers have been able to meet increasingly high Corporate Average Fuel Economy (CAFE) standards, which must hit 55 miles per gallon by 2025.”[77] This uptake in volume of aluminum in U.S. motor vehicles has led to a shortage of U.S. domestic supply. The ability to rely on Canadian exports of raw and complex aluminum products, from companies such as Martinrea, has allowed for increases in U.S. manufacturing capacity and employment, while contributing to lower costs of those vehicles for American consumers. Martinrea's fluid management systems are also sourced based on “best in class” performance and sustainability.

NAFTA as a Guiding System

Martinrea’s brake and fuel line assemblies (Figure 14) and rear suspension assembly (Figure 15) illustrate how the company—and indeed, the entire industry— has come to rely on NAFTA as a guiding system. Parts are formed and incorporated into ever more complex products, through cross-border supply chains until final assembly. The Figures demonstrate the high value and share of U.S. content in Canadian assemblies and Canadian content in U.S. automobiles.

[76] Boothe, “The Future of Canadian Manufacturing: Learning from Leading Firms Canadian Auto-Parts Manufacturing”, Lawrence National Centre for Policy and Management, (June 2014). https://www.ivey.uwo.ca/cmsmedia/1066974/3-fom-canadianautoparts.pdf.
[77] Trade Partnership Worldwide, op. cit., 8.

FIGURE 14 – SUPPLY CHAIN IN BRAKE LINES AND FUEL LINES (PERMISSION FROM CALEDON TUBING)

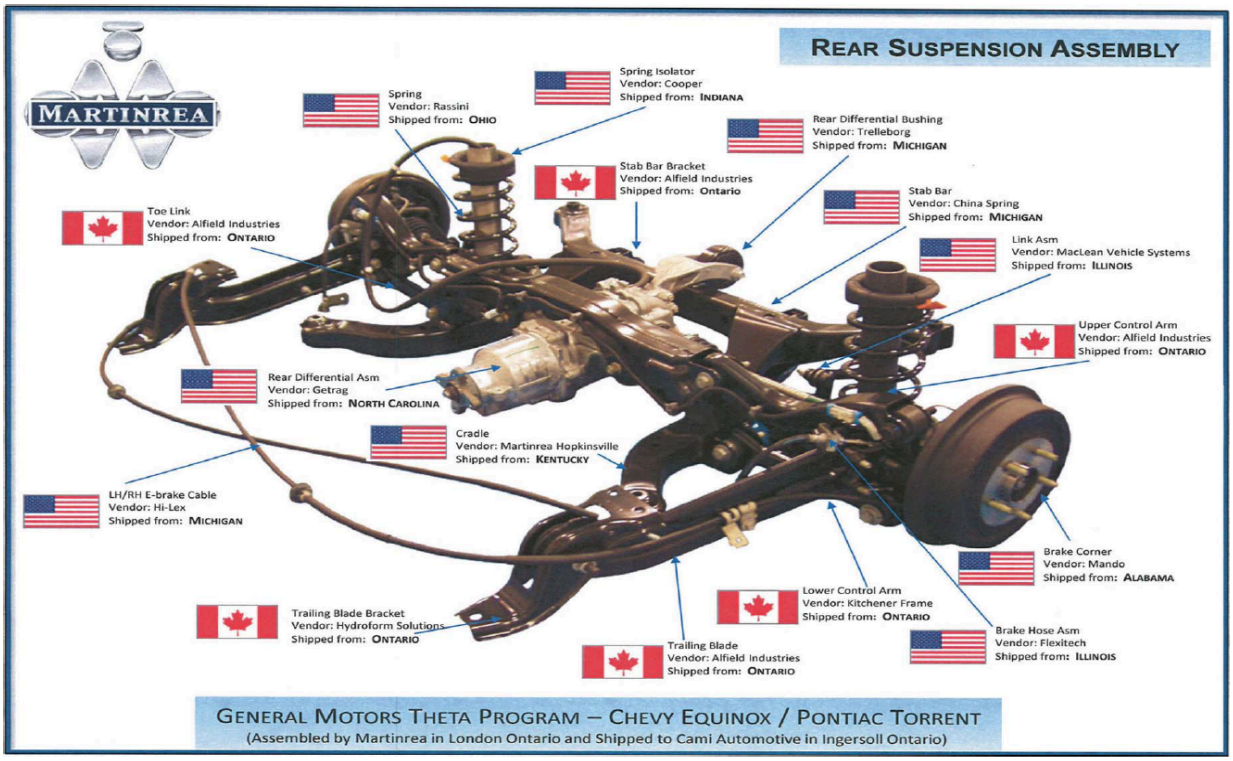


In Caledon's brake line assembly, depicted in Figure 14, steel from Tata Steel in Ijmuiden, The Netherlands (pictured top left) is imported to Philadelphia, and transported to Apollo Metals in Bethlehem, Pennsylvania to be made into copper plating. The plating is then transported to Precision Strip in Minster, Ohio for finish slitting, before being imported to Martinrea's Caledon Tubing plant in St. Mary's, Ontario, where it is formed into double-walled brake line tube (pictured top right). It is coated for corrosion protection, coiled, and put into boxes that hold roughly 11,000 metres of tubing, and transported within Ontario and across the border to Michigan and Mexico for final assembly in GMT 900 (Chevrolet truck), Ford Mustang, and Jeep Cherokee vehicles.[78]

Brake fuel lines, a second product assembled by Caledon Tubing (also depicted in Figure 14), rely on raw steel from Dofasco in Hamilton, Ontario, supplied by Apollo Metal in Vaughan (picture bottom left), to be transported to Caledon Tubing in St. Mary's, Ontario, where it is formed into brake fuel lines. The lines are then shipped within Ontario, across the border to Michigan and Mexico, and to Slovakia and China for inclusion in final assembly of the GMT 900, GMC Equinox, Ford Mustang, and Jeep Cherokee vehicles.

[78] Caledon Tubing Limited, company materials and Greg Keenan, "Auto Sector Nervously Awaits the Trump Card," Report on Business, The Globe and Mail, January 7, 2017.

FIGURE 15 – SUPPLY CHAIN IN REAR SUSPENSION ASSEMBLY (PERMISSION FROM MARTINREA)



Martinrea's rear suspension assembly relies on an extensive supply network of specific components from the Ontario-GLS8 and beyond. The assembly—developed at a Martinrea plant in London, Ontario for JIT delivery to the General Motors Cami Automotive assembly plant in Ingersoll, Ontario—was installed in the Chevrolet Equinox and Pontiac Torrent (the latter formerly offered by the Pontiac brand). In order for Martinrea to build this single module for the final vehicle, parts were assembled from 13 different tier two suppliers: three in Ontario and 10 in the U.S. (located in Illinois, Indiana, Michigan, Ohio, Alabama, Kentucky, and North Carolina).[79]

The Ontario-based tier two suppliers to Martinrea are wholly owned subsidiaries of the company (Alfield Industries, Kitchener Frame, ThyssenKrupp Budd, and Hydroform Solutions). Of the 10 firms that supply Martinrea in the U.S., nine are independent plants, and eight of the nine independent plants have parent firms located in another country. Little is known about these firms, their relative size, where they source from, and how much material used in the parts they ship to Martinrea is sourced in the U.S., or within NAFTA.[80]

[79] U.S.-owned companies of the largest suppliers have declined in recent years. Less than half of the parts delivered to U.S. assembly plants are made in the U.S. by U.S.-based companies; roughly 25% of the parts are imported, and over 25% are made in the U.S. by foreign-owned companies. Stephen Blank, "Building Autos: How North America Works and Why Canadian Studies Should be Interested," in The American Review of Canadian Studies, December 2011, 332.
[80] Ibid., 337.

FIGURE 16: REAR SUSPENSION ASSEMBLY SUPPLIERS IN THE U.S. AND THEIR PARENT COMPANY LOCATIONS

Supplier in the U.S.	U.S. Location	Parent Firm and Location
China Spring	Michigan	Shanghai Auto Industrial Group, Shanghai, China
Cooper Standard Automotive	Michigan	Michigan
Flexitech	Illinois	Mitsubishi Corp, and Meiji Flow Systems, Japan
Getrag	North Carolina	Germany
Hi-Lex Cable Systems	Michigan	Japan
MacLean Vehicle Systems	Illinois	MacLean-Fogg, China
Mando America Corp	Alabama	South Korea
Rassini	Various	Mexico City, Mexico
Trelleborg Automotive	Various	Trelleborg Group, Sweden

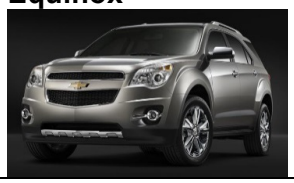
While it is hard to gain a complete understanding of Martinrea's rear suspension assembly (for instance, Figure 15 does not indicate how the sites are connected, how the parts arrive at their destinations, nor the sequence of the parts in assembly), what is clear is that this production system depends on efficient logistics and transportation for the delivery of these parts from multiple suppliers in various locations to the plant in London, Ontario. For U.S. suppliers, this means crossing the Canada–U.S. border, by bridge or tunnel, on rigorous JIT schedules.[81]

In North America, the elimination of customs tariffs, made possible through NAFTA, has allowed auto suppliers and assemblers to locate supply chain operations in best-cost locations throughout the continent, and to compete with the major auto producing regions that are self-contained within single jurisdictions with no internal borders: Japan, the EU, and South Korea.[82] The supply chain operations of the Ontario-GLS8 automotive cluster benefit from reduced transportation costs and risks (typically faced by overseas competitors shipping finished vehicles and fragile components to assemblers). Nonetheless, the successful integration of North American supply chains across multiple jurisdictions means that every border crossing must comply with all regulatory and security requirements imposed by governments.

In recent years, any thickening of the border—resulting from inadequate transportation infrastructure, lack of regulatory harmonization, increased inspections/border security/congestion, or any combination thereof—has led to costly delays. The addition of punitive policy initiatives applied through taxes, tariffs, or COOL will serve to exacerbate regulatory compliance measures and red tape at the border, and may lead to chronic clogs in the supply chains of these JIT cross-border production systems.

[81] Together, the Windsor Ambassador Bridge and the Sarnia Peace Bridge account for almost 50% of total traffic in auto production. Blank, op. cit., 332.
[82] Wilson, C., op. cit.

FIGURE 17: COMPARION OF DOMESTIC AND IMPORTED VEHICLES AND THEIR ASSEMBLY/TRANSPORT FOR MARKET (adapted from M. Wilson, presentation to Canadian Vehicle Manufacturers' Association, 2010)

Vehicle	**Domestic – Chevrolet Equinox** 	**Imported – Hyundai Tucson** 
Assembly Location	Ingersoll, Ontario	South Korea
Major components assembly location	U.S. and Mexico	South Korea
Export volume	7 at a time via truck	Roughly 4,500 at a time via ship
Border crossings to get 4,500 vehicles to market	27,000	1

Kicking the Hornet's Nest

In the case of tariffs, just how and where in the process they might be applied bears consideration. The impact of a tariff can be multiplied many times depending on how often the part crosses the border—whether in the sub-assembly, assembly, and/or the finished automobile. The direct costs of taxes or tariffs borne by parts assemblers, coupled with indirect costs of a thickened border, has the potential to turn "just in time" strategies into "just in case" strategies, where assemblers are forced to rebuild expensive inventories and re-examine their sourcing options.[83]

Policies based on COOL raise similar concerns. The question arises as to how to properly distinguish between U.S. and Canadian parts in assessing the source of a car's components. At present, the source of the product traded is identified as the place in which it underwent its last substantial transformation, and is currently combined into "U.S./Canadian content."[84] The cases posed by Martinrea provide a sense of how difficult this classification might be to unpack.

> ***"AN AUTOMOBILE MAY CONTAIN COMPONENTS THAT HAVE CROSSED THE BORDER 18 TIMES BEFORE THE FINISHED PRODUCT REACHES THE CAR LOT ON EITHER SIDE OF IT. THE ROUGHLY 13 MILLION CROSS-BORDER JOURNEYS A YEAR ARE LARGELY INTRA-FIRM, AND THE REMAINDER ARE WITHIN GLOBAL VALUE CHAINS RATHER THAN TRADITIONAL EXPORTS OR IMPORTS. IT'S NOT JUST A DOMESTIC INDUSTRY."***
>
> ***ROB WILDEBOER***

[83] Blank, op. cit., 334.
[84] Trade Partnership Worldwide, op. cit., 3.

Related "Buy American" policies based on COOL limit the participation of Canadian companies in projects that support U.S. output. In the current decentralized yet integrated market, such policies serve to restrict manufacturers' sourcing options, and impede their potential growth. Jobs are consequently threatened in both countries—at U.S. firms that are unable to source domestic supplies of specialized manufacturing products, in Canadian firms not eligible to bid on contracts, and at companies with multiple cross-border facilities located close to their customer bases that are unwilling to duplicate inventories for custom machinery based on small production runs. Canadian and U.S. firms may ultimately hold back from bidding on contracts for which they are eligible.

EVEN DISCUSSION ON THIS TOPIC IS BAD BECAUSE A PLANT MANAGER STARTS TO THINK HE SHOULD BE BUYING FROM THE U.S. WE'RE TRYING TO SAY, 'WE'RE THE SAME AS YOU'.

BEN WHITNEY, CEO, ARMOTOOL LTD., ONTARIO

As expressed by Bill Bashant, Director of Global Sourcing at Environment One Corp. in New York, "Our challenge is not a lack of interest in buying local. We sometimes cannot get parts from American suppliers at costs that allow us to compete. Take away the globally sourced components and we do not have a competitive product to sell".[85] The introduction of such protectionist measures will divert resources and focus away from JIT delivery, and efficiencies in continuous product improvement towards compliance with domestic content rules. In this way, these measures will threaten the competitiveness of the U.S. relative to its competitors, and the overall competitiveness of the North American trade in autos.

If the hallmark of NAFTA is efficiency, any attempt to force North American supply chains to conform to national boundaries decreases efficiency and increases costs at U.S. and Canadian plants, limiting their long-term growth potential. International tier two and tier three suppliers that have built capacity in the U.S. based on an integrated NAFTA market, such as those noted in Martinrea's rear suspension assembly supply chain, may shift production elsewhere if the U.S. cost and risk structure were to change. As stated in the Centre for Automotive Research report, "Each global automotive region is comprised of globally-competitive automakers and supported by extensive supply chains. If the United States ceases participation in NAFTA, global manufacturers will undoubtedly fill the void that is created."[86] In failing to recognize the integrated nature of Canada-U.S. goods and services production, public policy initiatives can negatively impact Canadian and U.S. companies.

"ANY DISRUPTION AT THE BORDER TO THE EXPORT OF BRAKE LINE TUBING MADE AT THE CALEDON PLANT MEANS THAT NO BRAKE LINES WOULD BE MADE IN MEXICO. IT TAKES SIX WEEKS TO DO A CHANGEOVER AT THE PLANTS. EVEN IF SUPPLIERS GO BANKRUPT, CUSTOMERS WILL FUND THEM, AS THEY HAVE NO OTHER SOURCE."

ROB WILDEBOER, EXECUTIVE CHAIRMAN, MARTINREA

[85] Trade Partnership Worldwide, op. cit., 15.
[86] CAR, op. cit., 12.

Conclusion

NAFTA has created an incredible competitive advantage for the North American automotive sector. However, if NAFTA is scrapped, global manufacturers are more than willing to fill the void that would be created. With the removal of NAFTA and the possible introduction of a 35% tariff on light vehicles imported from Mexico, the Centre for Automotive Research report projects that sales would fall by 450,000 units in the U.S., implying a loss of almost 6,700 North American assembly jobs and at least 31,000 U.S. automotive and parts jobs.[87] These changes will result in higher costs to producers, lower returns for investors, fewer choices for consumers, and a less competitive U.S. automotive and supplier industry. These effects have already begun to materialize. With 2017 light vehicles sales projected to decline by 1.8%, as well as a 6% decline in the passenger car segment, automakers are being forced to reduce production and adjust their inventories to match slower demand.[88] General Motors already plans to idle four plants and eliminate a production line (one shift) at its Detroit-Hamtramck plant to reduce excess inventories, causing a loss of 1,300 jobs by March 2017.[89]

BY THE NUMBERS: MICHIGAN-ONTARIO TRADE

Michigan and Ontario have very integrated supply chains in automotive, with billions of dollars of auto parts crossing the border each year. Dixon and Rimmer estimate that a cessation of trade between Michigan and Canada would cost the state 233,200 jobs.

TABLE 8: TOP-10 MICHIGAN INTERMEDIATE GOODS EXPORTS TO ONTARIO

HS	Description	2013 Exports to Ontario in CAD	Michigan's Share of Ontario's Imports
8708	Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	$5,000,777,200	26.42%
8407	Sparkignition reciprocating or rotary internal combustion piston engines.	$898,596,348	20.80%
2601	Iron ores and concentrates, including roasted iron pyrites.	$574,087,660	67.08%
2711	Petroleum gases and other gaseous hydrocarbons.	$570,089,724	30.20%
8409	Parts suitable for use solely or principally with the engines of heading 84.07 or 84.08.	$279,892,448	19.23%
7208	Flatrolled products of iron or nonalloy steel, of a width of 600 mm or more, hotrolled, not clad, plated or coated.	$270,375,966	40.34%
7210	Flatrolled products of iron or nonalloy steel, of a width of 600 mm or more, clad, plated or coated.	$204,583,768	30.41%
8512	Electrical lighting or signalling equipment (excluding articles of heading 85.39), windscreen wipers, defrosters and demisters, of a kind used for cycles or motor vehicles.	$198,403,806	21.11%
7318	Screws, bolts, nuts, coach screws, screw	$177,765,653	18.34%

[87] Ibid.
[88] BMI, 2016.
[89] Ibid.

	hooks, rivets, cotters, cotterpins, washers (including spring washers) and similar articles, of iron or steel.		
7009	Glass mirrors, whether or not framed, including rearview mirrors.	$138,719,483	51.86%

TABLE 9: TOP-10 ONTARIO INTERMEDIATE GOOD EXPORTS TO MICHIGAN

HS	Description	2013 Exports to Michigan in CAD	Michigan's Share of Ontario's Exports
8708	Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	$3,232,956,400	27.95%
8407	Sparkignition reciprocating or rotary internal combustion piston engines.	$767,684,402	27.86%
8409	Parts suitable for use solely or principally with the engines of heading 84.07 or 84.08.	$343,808,475	15.69%
8302	Base metal mountings, fittings and similar articles suitable for furniture, doors, staircases, windows, blinds, coachwork, saddlery, trunks, chests, caskets or the like; base metal hatracks, hatpegs, brackets and similar fixtures; castors with mountings	$190,397,804	34.81%
2716	Electrical energy. (optional heading)	$184,043,223	98.87%
7210	Flatrolled products of iron or nonalloy steel, of a width of 600 mm or more, clad, plated or coated.	$181,519,559	91.20%
7208	Flatrolled products of iron or nonalloy steel, of a width of 600 mm or more, hotrolled, not clad, plated or coated.	$180,990,530	89.90%
2711	Petroleum gases and other gaseous hydrocarbons.	$149,968,946	14.62%
7306	Other tubes, pipes and hollow profiles (for example, open seam or welded, riveted or similarly closed), of iron or steel.	$147,794,023	81.17%
8483	Transmission shafts (including cam shafts and crank shafts) and cranks; bearing housings and plain shaft bearings; gears and gearing; ball or roller screws; gear boxes and other speed changers	$133,950,893	18.27%

FIGURE 18: MICHIGAN-ONTARIO FOREIGN DIRECT INVESTMENT[90]

Ontario Firms in Michigan	Michigan Firms in Ontario
504 Locations	311 Locations
22,756 Employees Average 45/Location	27,628 Employees Average 89/Location
Average Sales: $81.4m	Average Sales: $63.7m
Average Age of Establishment: 19 Years Oldest: 1949 Youngest: 2016	Average Age of Establishment: 27 Years Oldest: 1861 Youngest: 2016
Top 5 Metros: Detroit Troy Southfield Grand Rapids Lansing	Top 5 Metros: Windsor Mississauga London Brampton Oakville

TABLE 10: ESTIMATED JOB LOSS IN MICHIGAN DUE TO A CESSATION OF CANADA/U.S. TRADE[91]

District	Representative	Job Loss	% of Total Jobs
1st	Jack Bergman – R	12,800	3.96%
2nd	Bill Huizenga – R	14,700	4.12%
3rd	Justin Amash – R	15,300	4.21%
4th	John Moolenaar – R	14,000	4.38%
5th	Dan Kildee – D	13,500	4.45%
6th	Freed Upton – R	13,200	4.21%
7th	Tim Walberg – R	14,700	4.49%
8th	Mike Bishop – R	17,100	4.42%
9th	Sander Levin – D	21,300	4.34%
10th	Paul Mitchell – R	17,600	4.34%
11th	David Trott – R	24,800	4.46%
12th	Debbie Dingell – D	20,600	4.66%
13th	John Conyers – D	16,000	4.75%
14th	Brenda Lawrence – D	17,800	4.60%

[90] Source: dun & bradstreet. Reprinted with permission.
[91] Dixon and Rimmer, op. cit.

BY THE NUMBERS: OHIO-ONTARIO

Ontario is a key export market for Ohio companies, with Ontario firms purchasing almost all of the state's exports of finishing agents. Similar to Michigan, Ohio would experience a 4.34% drop in employment from a closure of the Canadian-U.S. border, for a total job loss of 289,100 positions.

TABLE 11: TOP-10 OHIO INTERMEDIATE GOOD EXPORTS TO ONTARIO

HS	Description	2013 Exports to Ontario in CAD	Ohio's Share of Ontario's Imports
8708	Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	$1,899,597,169	10.04%
8407	Sparkignition reciprocating or rotary internal combustion piston engines.	$1,155,361,404	26.74%
3402	Organic surfaceactive agents (other than soap); surfaceactive preparations, washing preparations (including auxiliary washing preparations) and cleaning preparations, whether or not containing soap, other than those of heading 34.01.	$462,197,710	45.12%
4011	New pneumatic tyres, of rubber.	$196,709,371	14.24%
7210	Flatrolled products of iron or nonalloy steel, of a width of 600 mm or more, clad, plated or coated.	$178,311,521	26.51%
8803	Parts of goods of heading 88.01 or 88.02.	$173,492,323	17.59%
3923	Articles for the conveyance or packing of goods, of plastics; stoppers, lids, caps and other closures, of plastics.	$172,378,545	11.77%
2601	Iron ores and concentrates, including roasted iron pyrites.	$128,171,452	14.98%
7326	Other articles of iron or steel.	$124,037,016	16.10%
8309	Stoppers, caps and lids (including crown corks, screw caps and pouring stoppers), capsules for bottles, threaded bungs, bung covers, seals and other packing accessories, of base metal.	$115,993,253	50.02%

TABLE 12: TOP-10 ONTARIO INTERMEDIATE GOODS EXPORTS TO OHIO

HS	Description	2013 Exports to Ohio in CAD	Ohio's Share of Ontario's Exports
8708	Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	$1,210,520,116	24.01%
8407	Sparkignition reciprocating or rotary internal combustion piston engines.	$204,197,012	44.85%
3901	Polymers of ethylene, in primary forms.	$182,099,110	40.36%
7210	Flatrolled products of iron or nonalloy steel, of a width of 600 mm or more, clad, plated or coated.	$171,679,632	96.15%
3809	Finishing agents, dye carriers to accelerate the dyeing or fixing of dyestuffs and other products and preparations (for example, dressings and mordants), of a kind used in the textile, paper, leather or like industries, not elsewhere specified or included	$137,571,390	99.48%
8483	Transmission shafts (including cam shafts and crank shafts) and cranks; bearing housings and plain shaft bearings; gears and gearing; ball or roller screws; gear boxes and other speed changers, including torque converters; flywheels and pulleys, including	$131,344,703	25.84%
7204	Ferrous waste and scrap; remelting scrap ingots of iron or steel.	$124,054,493	51.46%
7208	Flatrolled products of iron or nonalloy steel, of a width of 600 mm or more, hotrolled, not clad, plated or coated.	$110,768,761	79.03%
4011	New pneumatic tyres, of rubber.	$109,999,863	14.71%
8409	Parts suitable for use solely or principally with the engines of heading 84.07 or 84.08.	$100,411,043	13.89%

FIGURE 19: OHIO-ONTARIO FOREIGN DIRECT INVESTMENT[92]

Ontario Firms in Ohio	Ohio Firms in Ontario
347 Locations	630 Locations*
15,628 Employees Average 45/Location	37,389 Employees* Average 59/Location
Average Sales: $45.7m	Average Sales: $27.9m*
Average Age of Establishment: 16 Years Oldest: 1965 Youngest: 2016	Average Age of Establishment: 28 Years Oldest: 1842 Youngest: 2016
Top 5 Metros: Columbus Cleveland Cincinnati Dayton Canton	Top 5 Metros: Mississauga Toronto London North York Brampton

* Two Large Retail Chains

TABLE 13: ESTIMATED JOB LOSS IN OHIO DUE TO A CESSATION OF CANADA/U.S. TRADE[93]

District	Representative	Job Loss	% of Total Jobs
1st	Steve Chabot – R	17,300	4.42%
2nd	Brad Wenstrup – R	17,000	4.38%
3rd	Joyce Beatty – D	18,000	4.37%
4th	Jim Jordan – R	17,100	4.59%
5th	Bob Latta – R	17,500	4.48%
6th	Bill Johnson – R	15,100	4.25%
7th	Bob Gibbs – R	14,700	3.94%
8th	Warren Davidson – R	17,400	4.37%
9th	Marcy Kaptur – D	18,000	4.59%
10th	Mike Turner – R	19,100	4.59%
11th	Marcia Fudge – D	27,200	4.45%
12th	Pat Tiberi – R	18,900	4.15%
13th	Tim Ryan – D	16,200	4.21%
14th	David Joyce – R	18,800	4.21%
15th	Steve Stivers – R	17,800	4.38%
16th	Jim Renacci – R	19,000	4.05%

[92] Source: dun & bradstreet. Reprinted with permission.
[93] Dixon and Rimmer, op. cit.

BY THE NUMBERS: INDIANA-ONTARIO TRADE

By one measure Indiana is more reliant on trade with Ontario than Michigan and Ohio are, with a closing of the US/Canadian border causing an estimated employment reduction of 4.73 percent, for a total of 174,300 jobs.

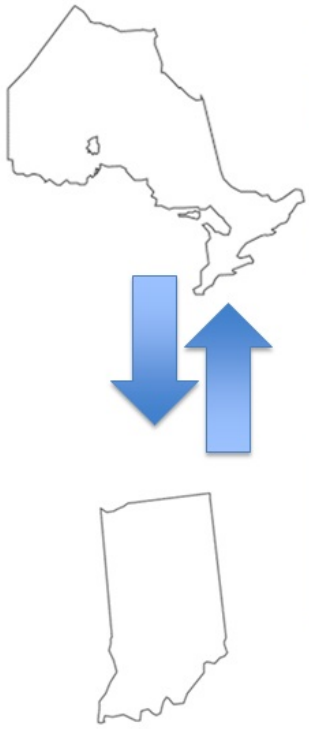
TABLE 14: TOP-10 INDIANA INTERMEDIATE GOOD EXPORTS TO ONTARIO

HS	Description	2013 Exports to Ontario in CAD	Ohio's Share of Ontario's Imports
8708	Parts and accessories of the motor vehicles of headings 87.01 to 87.05.	$1,997,802,044	10.56%
7210	Flatrolled products of iron or nonalloy steel, of a width of 600 mm or more, clad, plated or coated.	$134,319,283	19.97%
8544	Insulated (including enamelled or anodised) wire, cable (including coaxial cable) and other insulated electric conductors, whether or not fitted with connectors; optical fibre cables, made up of individually sheathed fibres, whether or not assembled with	$120,585,344	5.06%
8512	Electrical lighting or signalling equipment (excluding articles of heading 85.39), windscreen wipers, defrosters and demisters, of a kind used for cycles or motor vehicles.	$90,292,365	9.61%
8483	Transmission shafts (including cam shafts and crank shafts) and cranks; bearing housings and plain shaft bearings; gears and gearing; ball or roller screws; gear boxes and other speed changers, including torque converters; flywheels and pulleys, including	$88,188,681	7.63%
3923	Articles for the conveyance or packing of goods, of plastics; stoppers, lids, caps and other closures, of plastics.	$79,309,845	5.41%
7326	Other articles of iron or steel.	$76,436,213	9.92%
7318	Screws, bolts, nuts, coach screws, screw hooks, rivets, cotters, cotterpins, washers (including spring washers) and similar articles, of iron or steel.	$70,377,436	7.26%
6807	Articles of asphalt or of similar material (for example, petroleum bitumen or coal tar pitch).	$65,216,852	33.08%
7408	Copper wire.	$63,834,307	40.93%

TABLE 15: TOP-10 ONTARIO INTERMEDIATE GOODS EXPORTS TO INDIANA

HS	Description	2013 Exports to Indiana in CAD	Indiana's Share of Ontario's Exports
8454	Converters, ladles, ingot moulds and casting machines, of a kind used in metallurgy or in metal foundries.	$51,142,442	51.34%
8480	Moulding boxes for metal foundry; mould bases; moulding patterns; moulds for metal (other than ingot moulds), metal carbides, glass, mineral materials, rubber or plastics.	$34,893,028	36.37%
7612	Aluminium casks, drums, cans, boxes and similar containers (including rigid or collapsible tubular containers), for any material (other than compressed or liquefied gas), of a capacity not exceeding 300 l, whether or not lined or heatinsulated, but not f	$30,121,192	100.00%
8413	Pumps for liquids, whether or not fitted with a measuring device; liquid elevators.	$28,746,947	7.93%
8479	Machines and mechanical appliances having individual functions, not specified or included elsewhere in this Chapter.	$16,131,657	6.55%
8477	Machinery for working rubber or plastics or for the manufacture of products from these materials, not specified or included elsewhere in this Chapter.	$15,473,566	20.72%
8415	Air conditioning machines, comprising a motordriven fan and elements for changing the temperature and humidity, including those machines in which the humidity cannot be separately regulated.	$14,143,281	10.13%
7310	Tanks, casks, drums, cans, boxes and similar containers, for any material (other than compressed or liquefied gas), of iron or steel, of a capacity not exceeding 300 l, whether or not lined or heat insulated, but not fitted with mechanical or thermal equ	$12,741,633	67.09%
8428	Other lifting, handling, loading or unloading machinery (for example, lifts, escalators, conveyors, teleferics).	$8,667,535	14.01%
8421	Centrifuges, including centrifugal dryers; filtering or purifying machinery and apparatus, for liquids or gases.	$8,647,992	3.67%

FIGURE 20: INDIANA-ONTARIO FOREIGN DIRECT INVESTMENT[94]



Ontario Firms in Indiana
193 Locations
6,624 Employees Average 34/Location
Average Sales: $25.9m
Average Age of Establishment: 13 Years Oldest: 1980 Youngest: 2016
Top 3 Metros: Indianapolis Fort Wayne Evansville

Indiana Firms in Ontario
64 Locations
2,894 Employees Average 45/Location
Average Sales: $40.8m
Average Age of Establishment: 30 Years Oldest: 1909 Youngest: 2014
Top 4 Metros: Mississauga Oakville Brampton Etobicoke

TABLE 16: ESTIMATED JOB LOSS IN INDIANA DUE TO A CESSATION OF CANADA/U.S. TRADE[95]

District	Representative	Job Loss	% of Total Jobs
1st	Pete Visclosky – D	17,300	4.69%
2nd	Jackie Walorski – R	20,000	4.92%
3rd	Jim Banks – R	18,300	4.67%
4th	Todd Rokita – R	18,400	4.93%
5th	Susan Brooks – R	21,900	4.66%
6th	Luke Messer – R	18,900	5.12%
7th	Andre Carson – D	19,800	4.60%
8th	Larry Bucshon – R	18,700	4.30%
9th	Trey Hollingsworth - R	21,000	4.80%

[94] Source: dun & bradstreet. Reprinted with permission.
[95] Dixon and Rimmer, op. cit.

FINAL THOUGHTS

> ***OTTAWA AND WASHINGTON TALK ABOUT THE WORLD'S LARGEST BILATERAL TRADING RELATIONSHIP. BUT WE REALLY DON'T TRADE WITH EACH OTHER, NOT IN THE CLASSIC SENSE OF ONE INDEPENDENT COMPANY SENDING FINISHED GOODS TO ANOTHER... INSTEAD WE MAKE THINGS TOGETHER.***
>
> ***STEPHEN BLANK***

In industries as diverse as automotive to agrifood, the Great Lakes region comprises a supercluster with highly integrated supply chains. Once again we return to the words of Stephen Blank:

It is tempting to treat employment in the Great Lakes region as zero-sum; if a new plant opens up in Ohio, that is one fewer plant that can open in Ontario. However, this assumption cannot be further from the truth, as a new plant in Ohio creates jobs in the region, on both sides of the border, through their purchases of input goods and services.

In an increasingly globalized world, the Great Lakes supercluster competes with other superclusters across the world. In order to remain competitive, this cluster must operate as efficiently as possible, minimizing red tape and transaction costs. The manufacturing plants that “win” through a thickening of the Canada-U.S. border are not in North America; rather, they are in Europe and Asia, as Great Lakes firms are now burdened with higher costs.

These costs would be better understood if policy analysts and policy makers had more information on the intricacies of our supply chains, and the relative comparative advantages of each part of the Great Lakes region. In our view, governments must make more effort to understand the networks and processes that are clearly vital to local economies.

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APPENDIX: SUPPLY CHAIN ANALYSIS METHODOLOGY

Data Sources

The main data source is Statistics Canada's Canadian International Merchandise Trade Data (CIMT), pulled from University of Toronto's CHASS's Trade Analyzer.[96] The variables of interest from the CIMT are the value, in CAD, of imports and exports between Ontario and the eight states in the Great Lakes region (the GLS8: Wisconsin, Minnesota, Michigan, Ohio, Pennsylvania, New York, Indiana, and Illinois). Total world imports to Ontario is also aggregated from the raw CIMT.

Total world imports in USD to the GLS8 is provided by the United States' Census Bureau's USA Trade Online tool.[97]

The commodities from both sources are classified according to the Harmonized System (HS). The HS's purpose is to classify goods by what they are, and not according to their stage of fabrication. The matching between HS commodities to goods classification is provided by the United Nations Statistics Division's conversion tables.[98] Also, the mapping of HS commodities to the North American Industry Classification System (NAICS) code is made possible by the "concordance" package for the R statistics software.[99]

Consumer Price Indexes for Ontario and the U.S. come from CANSIM table 326-002[100] and the Federal Bank of St. Louis,[101] respectively. The USD-CAD exchange rate is provided by the Bank of Canada.[102]

For conciseness, aggregations of the data were performed. While the CIMT spans 1988 to 2013 at a monthly frequency, the variables where summed at the yearly level and restricted to 2013. Also, while export and import HS commodities are available at the eight- and 10-digit levels, respectively, they were aggregated to the four-digit level. Yearly and HS four-digit level aggregation were also performed for the U.S. trade data.

All values presented are in 2010 CAD. For the USD denominated values, they are first deflated to 2010 USD, and then converted to CAD.

Approach

HS commodities are matched to the NAICS code to provide visual indicators of the prevailing industries taking part in the trade flows of different goods classes. This matching is provided by the R package "concordance" from MIT political science professor In Song Kim. As explored in the following section, this matching is imperfect.

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Assumptions and Limitations

Classification of goods

The classification of thousands of commodities into three basic goods classes is a broad simplification. It makes the graphical analysis more accessible, but it come with trade-offs as the classes of certain commodities are more sensitive to who is purchasing them; this explains why this document also provides not only the intermediate goods figures, but also the final and capital. For example, all fruits, vegetables, and food products are included in the final consumption category. While this is correct for these products when they are purchased by a consumer, it is most likely the case that these goods are being traded also for use in the food and restaurant industries.

Another explicit choice that was made was to classify passenger motor vehicles as a final consumption good as opposed to a capital good. The underlying assumption is that most passenger vehicles are purchased by individuals as opposed to firms. The BEC does not apply any class to this good (it is “not applicable”).

As mentioned earlier, at the four-digit level, HS commodities do not match perfectly with goods classification. Within an HS four-digit good, there might be more than one type of goods class. For this exercise, we assigned the most prevalent goods class to each HS commodity.

Matching HS Commodities to NAICS

As with goods class matching, many HS commodities at the four-digit level are matched to multiple three-digit level NAICS. While we also assigned the most prevalent NAICS to each commodity, this did not always make intuitive sense. We manually edited a number of matches in order to provide sensible and consistent NAICS codes between figures. So while this matching of HS to NAICS is most likely imperfect (e.g., the right industry might be textile manufacturing as opposed to apparel manufacturing), it is adequate for our purposes.