

Canada - U.S. Interregional Trade, 1989 - 2001*

Martin A. Andresen
School of Criminology
Simon Fraser University
8888 University Drive
Burnab, BC V5A 1S6

Introduction

The geographer Tony Hoare (1993) states that “a little-explored facet of the global economy is the way regions within nations and different parts of the international community interact through trade flows. ... Given the well-established tendency for any one country to trade more with some overseas nations than with others we should expect at least as much and probably more trading-partner specialization on the part of that country's constituent localities” (Hoare 1993: 701). Curiously, most of the attention geographers pay to international trade is at the nation-nation scale (see Dicken 2003; Gaile and Grant 1989; Hanick 1987, 1988, 1989; Michalak and Gibb 1997; Nierop and De Vos 1988; and Poon et al 2000). Sub-national studies do exist, but they are not commonplace, particularly for Canadian trade.

The presence of this relatively unexplored research area is curious given the theoretical developments in recent years that highlight the importance of regional economies. A geographical theory of international trade generated from new trade theory is new economic geography (Krugman 1991), that predicts changes in the costs of trade impact the agglomeration of production through firm migration across the border: the agglomeration of firms occurs in the larger economy and goods are exported to the smaller economy (Fujita et al 1999). Hanink and Cromley (2005) develop and simulate a regionally-based model of comparative

* I would like to thank Trevor J. Barnes, Eric Beauregard, Stephen T. Easton, and David W. Edgington for comments on earlier drafts of this paper. I would also like to thank two anonymous reviewers for their comments.

advantage finding that high national tariffs generate interregional trade and regions closer to the border are affected more than regions distant to the border when free trade is established.

In the context of Canadian trade under the Canada – U.S. Free Trade Agreement (CUFTA) and the North American Free Trade Agreement (NAFTA) there has been a substitution from interregional trade to international trade (Courchene 2003). Though this general trend is known and well-documented within the international trade literature, the specific nature of this trend is under-researched. This paper builds on previous research analyzing the trading patterns of Canadian provinces. Using trade volumes, shares, and economic dependence through trade, the general trading patterns of the Canadian provinces are presented.

Past Research On Canada – U.S. Interregional Trade

Coughlin and Wall (2003), Erickson and Haywood (1991), Gazel and Schwen (1998), Hayward and Erickson (1995), Sawchuk and Sydor (2003), and Warf and Cox (1993) are representative of studies investigating the exports of U.S. states and/or their regional groupings. These studies are concerned with sub-national regions of the U.S. with other countries and the “rest of the world” rather than with other sub-national regions. As such, little can be learned from these studies about Canadian regional trade. There are, however, a small number of region-specific studies that focus on Canadian trade (viz. Calzonetti (1991), Hayter and Holmes (1999), McConnell and MacPherson (1991), Melvin (1988) and Warf and Cox (1990)), but these articles consider the effects of the CUFTA and/or the NAFTA on regions, cities, and/or specific industries. There is, however, some research that deals with all of Canada’s regions and their respective trading patterns.

Breaking Canada – U.S. trade into three regions (Atlantic Canada – New England, Ontario – Great Lakes, and Cascadia), Brown (1998) finds the composition of Canada – U.S. trade varies geographically: Atlantic Canada dominantly trades natural resources; Ontario has a broad-based composition of trade dominated by manufacturing, particularly the automotive industry; and Cascadia’s trade consists of both manufactured goods and natural resources. Norcliffe (1996), measuring the destinations and origins of Canadian regions’ exports and imports at the national level, finds that Ontario and the Prairies import the greatest proportion of trade from the U.S. (72.2 and 84.5 % of imports in 1993, respectively), whereas Ontario exports the greatest proportion of trade to the U.S. (89.5 %), largely due to the automotive industry – Quebec and the Prairies are also high at 78.9 and 75.3 %, respectively. Turning to Canadian regional trade outside of the U.S., Quebec and the Atlantic provinces have the strongest ties to Europe, and British Columbia has the strongest ties to Japan (British Columbia and the Territories have the weakest ties to the U.S.). Quite clearly, geographical proximity, colonial ties back to Europe, and the regional importance of the automotive industry play important roles in determining the spatial distribution of Canadian regional trade.

Brown and Anderson (1999) separate Canada into five regions and the U.S. into nine regions, finding similar regional ties as Brown (1998) and Norcliffe

(1996). Using export trade as a percentage of GDP to measure economic dependence, Brown and Anderson (1999) reinforce the finding that geographically close regions are the most integrated. All Canadian regions exported more than 10 percent of their GDP to the U.S. in 1992. The largest proportions of that economic dependence is tied to their respective U.S. border regions.

The primary limitation of the above studies is their lack of a temporal component to investigate the spatial distribution of Canada – U.S. trade. Polèse (2000) was the first to fill this gap in the literature. Asking whether or not Quebec is special with regard to North American integration, Polèse (2000) finds that Quebec is more integrated with the rest of Canada than Ontario, whereas Ontario is the most integrated with the U.S. Furthermore, since 1993 the percentage of Canadian regional GDP exported to the U.S. essentially doubled by 1997. The addition of the temporal component by Polèse (2000) only exemplifies the importance of the U.S. economy to Canada found by Brown and Anderson (1999). Finally, Acharya et al (2003), using four U.S. and five Canadian regions, analyze Canada – U.S. interregional trade, 1980 – 2000. They find Canadian exports to New England and the Midwest have fallen while the Northwest has remained constant and imports for all of three regions have remained relatively constant in terms of the interregional distribution of trade. The most striking result is the large increases in imports and exports with the U.S. South. This phenomenon is common across all five Canadian regions ranging from small increases (Ontario exports) to large increases (Ontario imports). Other Canadian regions increased their share of trade as much as 10 %, but the sheer volume of Ontario's trade makes any increases in Ontario's trade the most significant of all the provinces.

Data and Methodology

Interregional trade data for Canada and the U.S. is from Statistics Canada, using the years 1989 and 2001. Statistics Canada (1998; 2000; 2004; 2005) provides both interprovincial and international trade flow data at the province¹ and state level. Data for provincial GDP is obtained through Statistics Canada (2005), and data for U.S. state GSP (gross state product) is obtained through the U.S. Bureau of Economic Analysis.

Using these data, this paper presents an analysis of Canada – U.S. interregional trade. First, the volume of provincial exports and imports are calculated for each province with each province and state. Second, the shares of trade for exports and imports at the province-province and province-state levels are calculated. The purpose of this analysis is to show the changing provincial focus (if any) of interregional trade since the establishment of the CUFTA and the NAFTA. Third, the economic dependence of each province on each state and

1. The use of the term province is used in the present analysis to represent all Canadian regions, including the Territories. Though the Territories are not provinces, this terminology is used to simplify explication.

province is calculated to investigate changes in economic dependence since the establishment of the CUFTA and NAFTA. Lastly, an analysis of the patterns found is undertaken using Ontario's international trade with the U.S. states in the automotive industrial sector.

Canada – U.S. Interregional Trade, 1989 – 2001

The Volumes of Interregional Trade

The interprovincial and international exports for all provinces except the Territories increased faster than GDP from 1989 to 2001 – the Territories increased their real levels of exports by 21 %, but their economy grew by 61 %.² Interprovincial and international imports, however, increased slower than GDP for all provinces except Alberta, Saskatchewan, Manitoba, and Ontario. None of Canada's provinces decreased their real levels of imports from 1989 to 2001, but the export orientation of Canadian provinces has increased since the establishment of the free trade agreements. For most provinces, the vast majority of U.S. states have undergone above average increases in exports from Canadian provinces, with the largest increases typically related to geographic proximity and the economic size of the export destination. Interprovincial trade has increased since the establishment of a free trade agreement in 1989, but those increases have been much lower than the increases in trade between Canadian provinces and U.S. states. The geography of the increases in interprovincial trade varies significantly from province to province and is vastly different from the experience of U.S. states.

Import trade volumes exhibit a different pattern of change. As with exports, most Canadian provinces increased their imports from the U.S. states, with the largest increases being related to geographic proximity and economic size. However, Quebec, the Atlantic provinces and the Territories all decreased their import trade volumes from many U.S. states, particularly those of Nova Scotia, Prince Edward Island, Newfoundland, and the Territories. Additionally, a large number of these decreases in import trade volumes do not appear to be motivated by geographical proximity. Curiously, the opposite pattern manifests itself when considering interprovincial import trade volumes. Though there are some notable increases in interprovincial import trade volumes based on geographical proximity, the western provinces and Ontario undergo many significant decreases in interprovincial imports and relatively few above average increases. Conversely, Quebec, the Maritime provinces, Newfoundland, and the Territories have many above average increases in interprovincial imports and relatively few decreases in interprovincial trade volumes.

Overall, aside from Newfoundland, the export trade volumes of the Canadian provinces have shifted toward the U.S. states. Most provincial destinations of

2. Detailed tables are available from the author.

exports either decreased or had below average increases. Import trade volumes, however, have undergone a change that is much more geographical than export trade volumes. The western provinces and Ontario are reorientating their imports away from other provinces and toward the U.S. states. In contrast, Quebec, the Atlantic provinces, and the Territories, though increasing imports from many U.S. states, are reorientating the sourcing of their imports to originate from Canadian provinces.

Much of this finding is consistent with Wall (2003). Wall (2003) found that the NAFTA has had a negative impact on trade in eastern Canada, a positive impact on trade in central Canada, and an insignificant impact on trade in western Canada. The weaker spatial reorientation of eastern Canada's export trade volumes to the U.S. states and the spatial reorientation of eastern Canada's import trade volumes to Canadian provinces are consistent with Wall's (2003) findings with respect to the NAFTA. Additionally, if Ontario's spatial reorientation of import and export trade volumes dominate those of Quebec's due to their relative sizes, central Canada's effect on trade from the NAFTA found in the present analysis is also consistent with that found by Wall (2003). Western Canada, however, is more problematic. With the exceptions of Saskatchewan (exports) and Manitoba (imports), western provinces appear to be undergoing a spatial reorientation toward the U.S. states. That said, there may be enough variation within the western provinces to make one believe that the NAFTA has had an insignificant impact on trade—the conflicting effects of the NAFTA may be washing out.

The Shares of Interregional Trade

The analysis of trade shares provides a much clearer representation of the changing spatial distribution of provincial exports and imports. All of the Canadian provinces except Newfoundland and the Territories increased their share of exports to the U.S. by approximately 50 % from 1989 to 2001 – provinces that already exported large shares of their trade to the U.S. states in 1989, such as British Columbia and Ontario, did not exhibit such high magnitudes of change. The Territories maintained their very low share (4 %) of exports to the U.S., whereas Newfoundland's export share fell by more than 30 %, from 70 to 48 %. Despite the fact that most Canadian provinces send 50 – 70 % of their exports to the U.S., these numbers are still disproportionately low. Of the 61 spatial units (Canadian provinces and U.S. states) in the present analysis, over 80 % are in the U.S. Even if one does not consider the economic size of the U.S. states Canadian provinces still export disproportionately less with the U.S. The same relationship also holds for imports, aside from Ontario.

The import shares of the Canadian provinces from U.S. states are lower, on average, than that of exports (Ontario is the primary exception). However, the majority of provinces increased their shares of imports from the U.S. states by approximately 50 %, similar to that of export shares. Prince Edward Island, not Newfoundland, was the exception, in this case decreasing its import share from the U.S. However, Prince Edward Island, Newfoundland, and the Territories obtain

a very small share of their imports from the U.S.

The majority of changes in export and import shares are moderate. There may have been significant changes in export and import trade volumes to the U.S., but the large increases in most of the provinces' export and import shares to the U.S. appear to be a result of the cumulative effect of small changes favouring that country. In other words, the relative spatial distribution of provincial exports and imports is changing in favour of the U.S. states, but that change is gradual.

Given that the U.S. has increased both its export and import shares to and from Canadian provinces, interprovincial export and import shares must have fallen – the shares presented in this paper reflect the shares of exports and imports only within Canada and the U.S. However, given the variation in the export and import trade volumes, it was expected that there be a similar variation in the export and import trade shares. If one ignores Newfoundland and the Territories, the overwhelming change in interprovincial export and import shares is negative. There are a few moderate increases, dominantly related to geographic proximity, and a number of export and import trade shares that have essentially remained the same, but the dominant direction of change is negative. Even Ontario, maintaining the largest export and import trade shares for almost all provinces, exhibits large magnitude changes in those shares in all provinces except Newfoundland and the Territories.

The direction of change is clear. Canadian provinces are decreasing their exports and imports with other Canadian provinces and increasing their imports and exports with U.S. states. In the case of changes for the U.S. states, exports and imports are generally changing gradually. However, much of the change in exports and imports involving other Canadian provinces is abrupt. Therefore, Canadian provinces are substituting their interprovincial trade for interregional trade with the U.S. states. This substitution involves sharp decreases for a small number of Canadian provinces coupled with moderate increases to many U.S. states. In other words, the sharp decreases in interprovincial trade did not correspond with sharp increases in international trade. Early in the study period, the Canada – U.S. border posed a barrier to trade except for those province-state combinations that were already significantly integrated. A consequence of this barrier is much lower export and import shares than would be expected given the geographic and economic size of the U.S. However, as the tariff barriers decreased – all tariffs were “officially” zero by 1998 – Canadian provinces began to export relatively more to the U.S. and relatively less to other Canadian provinces. At this point, it is likely that interprovincial barriers began to supersede national barriers fostering international trade at the expense of interprovincial trade. So by 2001, there had been dramatic increases in not only the export and import trade volumes between provinces and states but also in export and import trade shares. The trade shares of Canadian provinces with U.S. states are still not near what would be expected, particularly for imports, the eastern provinces, and the Territories. However, because of the decreases in trade barriers, those trade shares are now much closer to any *a priori* expectations given market size. As a result of increased volumes and increased shares of trade with U.S. states the economic dependence of Canadian provinces on U.S. states has increased.

Economic Dependence and Interregional Trade

Following Brown and Anderson (1999) and Polèse (2000), the economic dependence of a Canadian province either on another Canadian province or a U.S. state is measured using the export value to GDP ratio. Though not a perfect measure of economic dependence, the share of a province's GDP that is exported to another province or U.S. states does provide a good indicator of the importance of that export destination to the local economy.

From 1989 to 2001, all Canadian provinces except the Territories increased their economic dependence on the U.S. This result is expected given that exports are growing faster than GDP over this study period. In fact, increasing economic dependence through trade is a well-established fact for most countries of the world (Dicken 2003; International Monetary Fund 2005a, 2005b). And similar to export and import trade shares, most Canadian provinces have increased their economic dependence on Canada and the U.S. through trade by approximately 50 percent.

As expected, because of the greater market access resulting from the establishment of free trade agreements, Canadian provinces have increased their economic dependence with the U.S. Furthermore, the geography of this economic dependence is quite apparent. Most provinces, in 1989, have an economic dependence with the U.S. ranging from 10 to 15 % – the Territories' economic dependence is notably low, and has markedly decreased with its closest U.S. neighbour, Alaska. Ontario is the exception in this year with over 20 % of its GDP exported to the U.S. Given the long established relationship between Ontario and Michigan of free trade in automotive products, this is expected. By 2001, most Canadian provinces doubled their economic dependence through trade with the U.S. Some provinces more than doubled their economic dependence, with Prince Edward Island tripling its economic dependence. Consequently, most provinces now have more than 20 percent of their economy tied to the U.S., with some close to 40 %. Somewhat unexpectedly, Ontario no longer has the greatest degree of economic dependence. Though Ontario's economic dependence is still high, 35.94 %, Alberta tops the list at 38.43 %, with New Brunswick following closely behind Ontario at 35.24 %.

Once again, the results for interprovincial trade are significantly different. In 1989, most provinces had a greater degree of economic dependence through trade with other Canadian provinces than with the U.S. states – British Columbia, Ontario, and Newfoundland were the exceptions. This pattern reversed by 2001 for all provinces except Saskatchewan, Prince Edward Island, Newfoundland, and the Territories (the case of the former three provinces, economic dependence on Canada and the U.S. through trade is approximately equal). In the western (except Saskatchewan) and Maritime provinces, national economic dependence has either increased or decreased marginally, exhibiting very little change over this 12 year study period. Ontario, Quebec, and the Territories, however, exhibit significant drops in their economic dependence on Canada through trade. Only Saskatchewan and Newfoundland have experienced notable increases in their economic dependence – Saskatchewan's economic dependence increased by 39 % and Newfoundland's economic dependence more than tripled.

The overall pattern of change with regard to economic dependence through trade is that western and central Canada increased its economic dependence with the U.S. states at the expense of Canadian provinces. The Maritime provinces and Newfoundland increased their economic dependence with the U.S. states but also increased their economic dependence with geographically close Canadian provinces. The Territories are decreasing their economic dependence with all regions in Canada and the U.S. except with British Columbia and Ontario. The analysis on the economic dependence is the most geographically related with the changes in economic dependence following much more of a geographical proximity relationship than the analysis of trade volumes in particular, but also trade shares. Similar to that of trade shares, the increases in provincial economic dependence on U.S. states, aside from the noted moderate increases, dominantly come from the cumulative effect of small changes across the entire study region. Therefore, economic dependence is a dimension that changes slowly as economies adjust to their new economic geographical environment with free trade agreements.

Proximity and Economic Size

In the previous sub-sections, proximity and economic size are alluded to as the potential drivers of change in the provincial interregional trade patterns. With regard to proximity, I have stated that geographically close trading partners (particularly in the U.S.) have experienced greater increases in their trade to and from Canadian provinces than geographically distant trading partners, and that the large economic size of the U.S. has distributed the increases in interregional trade such that Canadian provinces have had sharp decreases in their trade with each other, but the U.S. states have generally had much more modest change over the study period because there are more U.S. states to absorb the corresponding decreases in interprovincial trade. However, at this point of the analysis, these claims have not been substantiated.

Table 1 shows the trading partners with each of the Canadian provinces that have undergone substantial increases in economic dependence. Economic dependence is used for this analysis because its geographical pattern is the most pronounced. Substantial increases are considered those increases that are more than two standard deviations greater than the average increase in economic dependence, and bolded states and provinces are those trading partners that are geographically close. Two conclusions can be drawn from the information in this table: first, geographically close trading partners are highly represented in this set of substantial increases in economic dependence; and second, there are some trading partners that are not geographically close that have also undergone substantial increases in economic dependence. Therefore, proximity alone, though clearly an important factor in the process of change taking place within Canada and the U.S., cannot be considered the driving force of change now that barriers to trade between Canada and the U.S. have been officially eliminated.

When considering the shares of interregional trade, access to the larger U.S.

TABLE 1 Changing Interregional Patterns

	Notable Increases
British Columbia	California , Illinois, Oregon , Texas, Washington , Alberta
Alberta	California , Iowa, Illinois, Kansas, Michigan, New York, Ohio, Pennsylvania, Tennessee, Texas, Washington , Wyoming
Saskatchewan	Illinois, Kansas, Montana , Oregon , Pennsylvania, Texas, Washington , Wisconsin, Alberta , Manitoba , Ontario
Manitoba	California, Florida, Iowa, Michigan, Minnesota , Montana , Nebraska , North Dakota , Pennsylvania, Texas, Washington, Wisconsin , Alberta
Ontario	California, Indiana , Michigan , New Jersey, Ohio , Pennsylvania , Texas
Quebec	Arizona, California, Florida, Georgia, Illinois , Indiana , Kentucky, Massachusetts , Minnesota, North Carolina, New Jersey , New York , Ohio , Pennsylvania , Tennessee, Texas, Utah, Vermont , Virginia
New Brunswick	Massachusetts , Maine , New Hampshire , New Jersey , Texas, Virginia, Quebec
Nova Scotia	Connecticut , Massachusetts , Oregon, South Carolina, Ontario
Prince Edward Island	California, Connecticut , Florida, Massachusetts , Maine , North Carolina, New Jersey , New York , Ohio, Manitoba
Newfoundland	Connecticut , Florida, Maine , New Jersey , New York , Virginia, Ontario, Quebec , New Brunswick , Nova Scotia
Territories	British Columbia , Ontario

Note. 1. U.S. states and Canadian provinces considered geographically close are reported in bold.

market is important for understanding the degree of change in interregional trade: sharp decreases for interprovincial trade and moderate increases in U.S. interregional trade. However, the individual market sizes of the U.S. states also appear to be important in identifying those trading partners that experienced significant increases in economic dependence. The prime example shown in Table 1 is Texas. Though Texas is not geographically close to any Canadian province, Texas has had significant increases in economic dependence for all western and central provinces, as well as New Brunswick. A similar result is found with California.

In order to assess this possible relationship to explain the pattern of spatial change in Canada – U.S. interregional trade, a regression analysis is undertaken. Using the economic dependence of a Canadian province on each trading partner as the dependent variable, the natural logarithm of the geographic distance between trading partners and the natural logarithm of the economic size (gross

TABLE 2 Proximity and Economic Sizes Regression Output

	Distance Coefficient	Economic Size Coefficient	Adjusted-R ²
British Columbia	-0.815 (< 0.0001)	0.246 (0.006)	0.447
Alberta	-1.171 (0.008)	0.483 (0.008)	0.217
Saskatchewan	-0.36 (0.15)	-0.021 (0.815)	0.004
Manitoba	-0.142 (0.583)	0.14 (0.161)	0.009
Ontario	0.048 (0.916)	0.691 (0.011)	0.096
Quebec	0.043 (0.710)	0.273 (0.002)	0.165
New Brunswick	-0.457 (0.231)	0.075 (0.758)	-0.01
Nova Scotia	-0.208 (0.403)	0.151 (0.312)	-0.007
Prince Edward Is.	-0.15 (0.040)	0.122 (0.204)	0.005
Newfoundland	-0.212 (0.413)	0.126 (0.275)	-0.004
Territories	0.001 (0.882)	0.004 (0.069)	0.3

Note: 1. P-values are in parentheses, coefficients significant at the 5 percent level are reported in bold.

domestic product) of trading partners are estimated to test the hypothesis of proximity and economic size in determining the pattern of change in economic dependence. If this hypothesis is correct, the estimated coefficient for geographic distance will be negative and the estimated coefficient for economic size will be positive. However, the Adjusted- R^2 values are of particular interest, not the signs of the estimated coefficients. The magnitudes of the Adjusted- R^2 values will show how much of the variation in economic dependence is explained by these two variables.³ The results are presented in Table 2.

Almost all of the estimated coefficients correspond to their expectations, with all statistically significant coefficients corresponding to their expectations. Curiously, only the statistical models for British Columbia and Alberta exhibit the expected signs on the estimated parameters and have reasonably high Adjusted- R^2 values. Though the results for economic size do fare better than those for geographic distance, there is still much to be explained in understanding the changing spatial pattern of economic dependence. Even in the cases of British Columbia and Alberta, the Adjusted- R^2 is quite low, indicating that a more comprehensive analysis is necessary.

Regional Industrial Structure

At this point of the analysis the patterns of interregional trade have only been described, rather than being explained. Therefore, in order to understand what is driving these patterns a more detailed analysis is necessary. However, with the

3. Only considering two independent variables most likely imposes bias on the estimated coefficients, but this bias does not affect the Adjusted- R^2 values.

large number of province-state and province-province trading partners, not to mention the large number of industrial sectors involved in the trade for each of these trading partners, only a limited analysis can be undertaken here. Fortunately, there has been a substantial volume of research on one industry that is extremely geographically concentrated within Canada: the automotive industry in Ontario. Therefore, the focus now turns to that province and industrial sector.

Because of the high degree of geographic concentration in the automotive industry, there is a regional industrial structure than can be inferred. A large portion of Ontario's international trade with the U.S. is within the automotive industry: 39 and 36 % in 1989 and 2001, respectively. This large percentage of Ontario's international trade is enough to dominate Ontario's overall trading patterns. Therefore, major changes in the spatial patterns of Ontario's international trade with the U.S. that do not follow geographic proximity and economic size may be explained through its regional industrial structure, focussed on the automotive industry.

As discussed in Dicken (2003) and Holmes (1996), the North American automotive industry has undergone substantial change due to increased competition from Asian automotive manufacturers and internal productivity constraints. Consequently, both the internal operations and spatial distribution of automotive manufacturing plants has been altered significantly since the mid-1980s. It is the changed spatial distribution of these manufacturing plants that sheds some light on Ontario's changing pattern of interregional trade.

Because of the desire for changed internal operations of automotive manufacturing, automotive manufacturers have sought out labour markets that are outside of the traditional automotive manufacturing sites of Michigan, Ontario, and Ohio to mitigate any resistance to this change (Holmes 1996). Rather than the traditional sites, automotive manufacturing has recently emerged in what Dicken (2003: 392) calls the "transplant corridor" that (dominantly) extends to Kentucky and Tennessee, with some automotive assembly and parts manufacturing extending as far as Georgia, Louisiana, Oklahoma, and Texas. This is precisely where Ontario's interregional trade expansions have been taking place: Ontario's economic dependence increased significantly with Michigan, Ohio, and Indiana, the traditional automotive manufacturing sites. However, returning to the volumes of interregional exports and imports, Ontario has had some of its largest increases with Kentucky and Tennessee.

Using industry level data for Ontario's automotive industry international trade, this pattern is confirmed, and shown in Table 3. California has undergone an incredible expansion of automotive trade with Ontario (an increase of a factor of 19) likely tied back to the establishment of a Toyota – General Motors production plant in that state (Dicken 2003). Additionally, the primary transplant corridor states of Kentucky and Tennessee have increased their automotive trade with Ontario by factors of 4.65 and 4.39, respectively. Both increases are extremely large given that Ontario's growth in automotive trade with the U.S. as a whole was only 100 %. Clearly, Ontario's interregional trade in the automotive industry are geographically focussed and that geography is not only based on proximity and economic size opportunities opened to Ontario as a result of the free

TABLE 3 Increase Factors for Ontario's Automotive Trade

18.84	California	1.93	Ohio
12.92	Utah	1.91	Delaware
7.19	Idaho	1.91	Louisiana
6.67	Kansas	1.77	Texas
6.24	Maine	1.76	Virginia
5.06	Montana	1.73	North Carolina
4.9	Dist. of Columbia	1.60	Connecticut
4.65	Kentucky	1.49	New Hampshire
4.62	South Carolina	1.42	New Jersey
4.39	Tennessee	1.41	Florida
3.79	Arizona	1.34	Minnesota
3.19	Indiana	1.31	Wisconsin
2.98	Arkansas	1.21	Colorado
2.89	Alabama	1.20	Illinois
2.74	Georgia	1.00	Nevada
2.65	North Dakota	0.89	Pennsylvania
2.49	Massachusetts	0.88	Oklahoma
2.35	Missouri	0.83	Wyoming
2.35	West Virginia	0.76	South Dakota
2.35	Iowa	0.69	New Mexico
2.31	Oregon	0.51	Maryland
2.2	Rhode Island	0.47	New York
2.11	Alaska	0.33	Mississippi
2.08	Michigan	0.25	Vermont
2.01	Nebraska	0.08	Washington

trade agreements, but related to Ontario's regional industrial structure.

Confounding the understanding of Ontario's changing patterns of trade is the structural adjustment that the automotive industry has undertaken that began before the inception of the free trade agreements between Canada and the U.S. Therefore, analyzing international or interregional trade only considering economic and/or social variables expected to be related to the establishment of free trade agreements may lead to curious, or incorrect, inference. Only through an understanding of the pre-existing geography of production (and its dynamics independent of the free trade agreements) can the understanding of the effects of free trade agreements be investigated. Otherwise, one may falsely attribute the changing patterns of international or interregional trade exclusively to the initiatives contained within the free trade agreements themselves.

Conclusion

This paper has analyzed Canada – U.S. interregional trade at the province-province and province-state level of analysis. This present analysis builds on the current literature studying the regional impacts of the free trade agreements by use of a finer geographical scale of analysis (the province and state rather than aggregated regions) and by extending the temporal dimension of previous studies. This finer geographical scale of analysis has proven fruitful in describing the changing patterns of interregional trade and the affiliated consequences for Canadian provinces by showing that the patterns of provinces within previously aggregated regions show substantial internal variation.

The export and import trade volumes, export and import trade shares, and the economic dependence of Canadian provinces on all other Canadian provinces and U.S. states provides a deeper understanding of the changing pattern of Canada – U.S. interregional trade because it allows for the regional differences of the free trade agreements to become manifest. All three analyses exhibited clear geographical patterns in interregional trade. However, those geographical patterns became clearest when the analysis moved to economic dependence. Most Canadian provinces have reoriented their spatial distributions of both exports and imports to and from the U.S., resulting from greater market access through reduced tariff and non-tariff barriers. Preceding the establishment of free trade agreements, interprovincial trade barriers, though present and significant, were less than the international barriers between Canada and the U.S. As such, despite some exceptions, primarily Ontario, Canadian provinces pursued trade with other provinces. The trade volumes to the U.S. were still very large in magnitude, but disproportionately low when one considers both economic size and the number of potential trading partners in the U.S. With the establishment of free trade agreements and the corresponding decreases in both tariff and non-tariff barriers to trade, the international barriers between Canada and the U.S. likely became relatively less than the interprovincial barriers to trade within Canada. Subsequently, Canadian provinces have begun to change their spatial distribution of trade within Canada and the U.S., favouring the U.S.

This spatial distribution, however, is not toward all U.S. states equally. There are three dominant factors defining the new geography of interregional trade within Canada and the U.S.: economic size, geographical proximity, and regional industrial structure. With regard to economic size, the larger U.S. states have undergone large increases in interregional trade with Canadian provinces irrespective of their proximity to Canada. California and Texas are prime examples, both having large increases in their trade volumes, trade shares, and economic dependence with Canadian provinces.

Geographical proximity now plays a stronger role in the geography of interregional trade in Canada and the U.S., though is not an all determining factor. As the barriers to international trade fell with the establishment of the free trade agreements, more “natural” trading relationships were able to manifest themselves. Prior to any significant decreases in international trade barriers, most Canadian provinces dominantly used Ontario as both an export destination and import origin

despite its great distance from most provinces. This has changed significantly over the study period. Aside from a few cases, Ontario has decreased its importance to all other Canadian provinces as is has decreased the importance of other Canadian provinces to itself.

Regional industrial structure has changed remarkably in North America over the same time period as the establishment of free trade agreements between Canada and the U.S. This changed regional economic structure has had an impact on the geography of production that affects the trading patterns of Canadian provinces that are dominant in particular industries. Consequently, without knowledge of this changing industrial structure, the changing patterns of Ontario's interregional trade may be attributed to the free trade agreements. For example, though Ontario still has strong economic ties to Michigan through automotive products trade, the establishment of significant automotive manufacturing further to the U.S. south has significantly increased Ontario's trading relationships with those U.S. states. Therefore, the importance of understanding context is critical in any numerical analysis.

References

- Acharya, R., P. Sharma, and S. Rao. 2003. "Canada – U.S. Trade and Foreign Direct Investment Patterns", in R.G. Harris (ed.). *North American Linkages: Opportunities and Challenges for Canada*. Calgary, AB: University of Calgary Press, 13-88.
- Brown, W.M. 1998. "Regional Trade Policy and the Integration of the American and Canadian Economies". *Canadian Journal of Regional Science*, 21: 295-317.
- Brown, W.M. and W.P. Anderson. 1999. "The Influence of Industrial and Spatial Structure on Canada – U.S. Regional Trade". *Growth and Change*, 30: 23-47.
- Calzonetti, F.J. 1991. "Canada-U.S. Electricity Trade and the Free Trade Agreement: Perspectives from Appalachia". *Canadian Journal of Regional Science*, 13: 171-178.
- Coughlin, C.C. and H.J. Wall. 2003. "NAFTA and the Changing Pattern of State Exports". *Papers in Regional Science*, 82: 427-450.
- Courchene, T.J. 2003. "FTA at 15, NAFTA at 10: A Canadian Perspective on North American Integration". *North American Journal of Economics and Finance*, 14: 263-285.
- Dicken, P. 2003. *Global Shift: Reshaping the Global Economic Map in the 21st Century*. New York, NY: The Guilford Press.
- Erickson, R.A. and D.J. Hayward. 1991. "The International Flows of Industrial Exports from US Regions". *Annals of the Association of American Geographers*, 81: 371-390.
- Fujita, M., P. Krugman, and A.J. Venables. 1999. *The Spatial Economy: Cities, Regions and International Trade*. Cambridge, MA: MIT Press.
- Gaile, G.L. and R. Grant. 1989. "Trade, Power, and Location: The Spatial

- Dynamics of the Relationship between Exchange and Political-Economic Strength”. *Economic Geography*, 65: 329-337.
- Gazel, R.C. and R.K. Schwer. 1998. “Growth of International Exports Among the States: Can A Modified Shift-Share Analysis Explain It?”. *International Regional Science Review*, 21: 185-204.
- Hanink, D.M. 1987. “A Comparative Analysis of the Competitive Geographical Performances of the USA, FRG, and Japan: The Markets and Marketers Hypothesis”. *Economic Geography*, 63: 293-305.
- _____. 1988. “An Extended Linder Model of International Trade”. *Economic Geography*, 64: 322-334.
- _____. 1989. “A Geographical Product Differentiation Model of Trade Competition in Third Markets”. *Geographical Analysis*, 21: 122-133.
- Hanink, D.M. and R.G. Cromley. 2005. “Geographic Change with Trade Based on Comparative Advantage”. *Annals of the Association of American Geographers*, 95: 511-524.
- Hayter, R. and J. Holmes. 1999. “Continentalization in an Era of globalization: A Perspective from Canada’s Resource Periphery”, in T. Barnes and M. Gertler (eds.). *Institutions and the Space Economy*. London: Routledge.
- Hayward, D.J. and R.A. Erickson. 1995. “The North American Trade of U.S. States: A Comparative Analysis of Industrial Shipments, 1983-91”. *International Regional Science Review*, 18: 1-31.
- Hoare, A.G. 1993. “Domestic Regions, Overseas Nations, and their Interactions through Trade: The Case of the United Kingdom”. *Environment and Planning, A* 25: 701-722.
- Holmes, J. 1996. “Restructuring in A Continental Production System”, in J.N.H. Britton (ed.). *Canada and the Global Economy: The Geography of Structural and Technological Change*. Montreal and Kingston: McGill-Queen’s University Press.
- International Monetary Fund. 2005a. *International Financial Statistics*. Washington, DC: International Monetary Fund.
- _____. 2005b. *Direction of Trade Statistics*. Washington, DC: International Monetary Fund.
- Krugman, P.R. 1991. “Increasing Returns and Economic Geography”. *Journal of Political Economy*, 99: 483-499.
- McConnell, J.E. and A.D. MacPherson. 1991. “Canadian Establishments in Western New York: Some Preliminary Findings”. *Canadian Journal of Regional Science*, 13: 189-204.
- Melvin, J. 1988. “The Consequences of Free Trade for Atlantic Canada”. *Canadian Journal of Regional Science*, 11: 227-244.
- Michalak, W. and R. Gibb. 1997. “Trading Blocs and Multilateralism in the world Economy”. *Annals of the Association of American Geographers*, 87: 264-279.
- Nierop, T. and S. De Vos. 1988. “Of Shrinking Empires and Changing Roles: World Trade Patterns in the Postwar Period”. *Tijdschrift voor Economische en Sociale Geografie*, 79: 343-364.
- Norcliffe, G. 1996. “Foreign Trade in Goods and Services”, in J.N.H. Britton

- (ed.). *Canada and the Global Economy: The Geography of Structural and Technological Change*. Montreal & Kingston: McGill-Queen's University Press, 25-47.
- Polèse, M. 2000. "Is Quebec Special in the Emerging North American Economy? Analyzing the Impact of Continental Economic Integration on Canadian Regions". *Canadian Journal of Regional Science*, 23: 187-212.
- Poon, J.P.H., E.R. Thompson, and P.F. Kelly. 2000. "Myth of the Triad? The Geography of Trade and Investment 'blocs'". *Transactions of the Institute of British Geographers*, 25: 427-444.
- Sawchuk, G. and A. Sydor. 2003. "Mexico and Canada: Changing Specializations in Trade with the U.S.", in R.G. Harris (ed.). *North American Linkages: Opportunities and Challenges for Canada*. Calgary: University of Calgary Press, 117-180.
- Statistics Canada. 1998. *Interprovincial Trade in Canada, 1984-1996*. Ottawa, ON: Statistics Canada.
- _____. 2000. *Interprovincial and International Trade in Canada, 1992-1998*. Ottawa, ON: Statistics Canada.
- _____. 2004. *Canadian International Trade, 1988-2003*. Ottawa: International Trade Division, Statistics Canada.
- _____. 2005. *Canadian Socio-Economic Information Management System*.
- Wall, H.J. 2003. "NAFTA and the Geography of North American trade". *Federal Reserve Bank of St. Louis Review*, March/April: 13-26.
- Warf, B. and J. Cox. 1990. "A Tale of Two Cities: The Canada-U.S. Free Trade Agreement and Commodity Trans-Shipments through Buffalo and Detroit". *Canadian Journal of Regional Science*, 13: 179-188.
- _____. 1993. "The U.S. – Canada Free Trade Agreement and Commodity Transportation Services among U.S. States". *Growth and Change*, 24: 341-364.