# A Tale of Two Cities: The Canada-U.S. Free Trade Agreement and Commodity Trans-shipments through Buffalo and Detroit

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Although the potential economic impacts of the 1988 Canada-U.S. Free Trade Agreement (FTA) have received considerable scrutiny on a national scale (for example, Department of External Affairs 1987; Magun et al. 1987, 1988; Brown and Stern 1989; Muller and Williams 1989), relatively little attention has been directed toward the specific effects in local areas, in part because national econometric models generally lack the sufficient geographic detail (Melvin [1988] studied Atlantic Canada but not empirically). The sectoral and spatial impacts of the FTA will be highly uneven. It will generate flows of inputs (via investments) as well as increases in cross-border flows of outputs (via trade). Buffalo, New York, and Detroit, Michigan, are likely to be heavily affected, for they are the principal gateways through which the bulk of U.S.-Canada trade passes.

In this article we investigate the short-run effects of the FTA on commodity trans-shipments through the customs districts of Buffalo and Detroit. Identification of the most significant commodities trans-shipped through each city is followed by an examination of American

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and Canadian trade barriers to various goods. We then estimate FTA-induced changes in national and local commodity flows, including the price and income elasticities of demand in both nations. This article is not concerned with the impacts of FTA-induced changes on investment or production ("general equilibrium" impacts), nor does it address the impacts of loading and unloading commodities.

Changes in the volume and commodity mix of trade flows have several economic repercussions for local areas. Federal funding of individual customs districts, for example, is tied heavily to their volumes of trans-shipments. Trade flows affect the demand for transportation services (particularly trucking and railroads, given that 80 percent of U.S.-Canada trade is moved over land), stimulating a secondary round of change in the demand for fuel, food, and other inputs, as well as elevating the tax revenues paid by transportation firms. Finally, commodity trans-shipments have intangible impacts on local infrastructures, air quality, and congestion levels.

## Buffalo, Detroit, and U.S.-Canada Trade

Buffalo and Detroit together account for a commanding share of the passage of total U.S.-Canada trade (Table 1). Indeed, two-thirds of U.S. exports to Canada and 60 percent of U.S. imports from Canada pass through these two gateways. Despite much of the attention devoted to the impacts of the FTA on Buffalo, Detroit is the more important trans-shipment centre; it accounts for almost one-half of U.S. exports to Canada and 40 percent of U.S. imports from Canada. On the basis of magnitude of local trade flows alone, therefore, one might suspect that Detroit would be affected more heavily by the FTA.

**TABLE 1 Percent of Total U.S.-Canada Commodities Trade Trans-shipped through Buffalo and Detroit, 1988**

| | Buffalo | Detroit | Total |
|---|---|---|---|
| U.S. exports to Canada | 18.1 | 48.0 | 66.1 |
| U.S. imports from Canada | 20.9 | 40.0 | 60.9 |
| Total U.S.-Canada trade | 19.7 | 43.3 | 63.0 |

Source: Computed by the authors from U.S. Department of Commerce data.

Figure 1 shows selected U.S. commodity exports and imports for which these two cities served as highly significant trans-shipment centres in 1988. Detroit's prominence as a trans-shipment centre rests on its location at the heart of North America's automobile industry. Among U.S. exports to Canada in 1988, 80 percent of natural gas and road vehicles and 50 percent of rubber products, power machinery, and

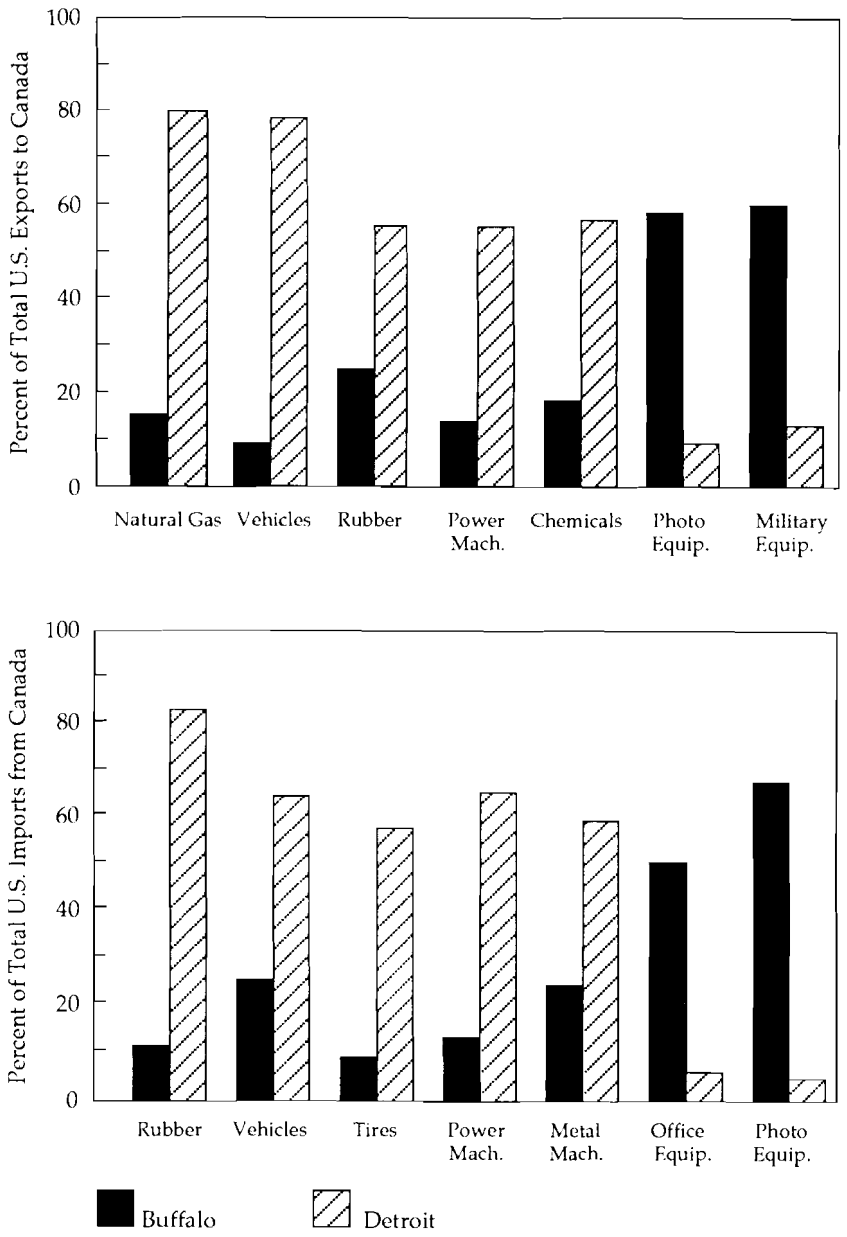


**FIGURE 1 Percent of selected U.S. exports to and imports from Canada trans-shipped through Buffalo and Detroit, 1988 (Source: U.S. Department of Commerce data.)**

chemicals passed through Detroit; among U.S. imports from Canada, more than 80 percent of rubber products and roughly 60 percent of road vehicles, tires, power-generating machinery, and metal-working machinery also passed through Detroit. Buffalo, in contrast, is an important trans-shipment centre for U.S. exports of photographic and military equipment to Canada (roughly 60 percent) and U.S. imports of office and photographic equipment, much of which is produced in southern Ontario and headed for the large service-based conurbations on the U.S. East Coast. Since the initiation of the FTA in 1988, however, U.S.-Canada trade has changed. In particular, the 10.5 percent fall of the U.S. dollar relative to the Canadian dollar between December 1987 and July 1990 led to a reduction in U.S. imports from Canada and an increase in U.S. exports.

## Methodology

Estimates of the impacts of the Free Trade Agreement on commodity flows through Buffalo and Detroit were calculated using a commodity-specific analysis of tariffs and the multilateral elasticities of demand between imports and domestically produced goods in the United States and Canada (see Brown and Stern 1986; Magun et al. 1987; Muller and Williams 1989). The impacts of the FTA on local cross-border commodity trans-shipments are a function of: (1) the mix of commodities through a particular city, (2) the tariffs and non-tariff barriers imposed on these goods, and (3) the price and income elasticities of demand that affect the volume of imports once the elimination of tariffs effectively reduces their price. The analysis differentiates goods by type and nation of origin.

While a considerable portion of U.S.-Canada trade is already barrier-free, trade in many commodities is hampered by tariff and non-tariff barriers (Table 2). Non-tariff barriers (NTBs) are calculated in terms of a tariff equivalent—the tariff rate that, were it to replace the NTB, would restrict imports by the same amount. Typically, NTBs include quotas, voluntary export restraints, price supports, licencing and inspection requirements, domestic content rules, health and safety standards, discretionary customs valuations, and countervailing duties. On average, Canadian tariffs and NTBs are slightly higher (4.8 percent) than those imposed by the United States (4.1 percent). Some goods—such as clothing, tobacco products, foods and beverages, and agricultural products—suffer relatively high tariffs on both sides of the border. Other commodities—such as fish, mineral fuels, transportation equipment, and petroleum—have very low tariff rates. Notably, tariffs on automobiles are zero, a product of the 1965



Auto Pact (but certain domestic content rules still apply). Although the FTA will gradually reduce these remaining tariffs and non-tariff barriers to zero over the next 10 years, our analysis assumed they would be eliminated instantaneously.

**TABLE 2 Canadian and U.S. Tariff Rates and Non-tariff Barrier Equivalents, 1988**

| | Canada | | | United States | | |
|---|---|---|---|---|---|---|
| Industry | Tariff | NTB | Total | Tariff | NTB | Total |
| Agriculture | 2.2 | 11.9 | 14.1 | 2.2 | 6.9 | 9.1 |
| Forestry | 0.0 | 0.1 | 0.1 | 0.2 | 0.2 | 0.4 |
| Fish | 0.2 | 0.0 | 0.2 | 1.4 | 0.0 | 1.4 |
| Mineral fuels | 0.4 | 0.0 | 0.4 | 0.3 | 0.0 | 0.3 |
| Foods and beverages | 4.2 | 9.0 | 13.2 | 3.5 | 8.5 | 12.0 |
| Tobacco | 16.0 | 0.0 | 16.0 | 10.1 | 0.6 | 10.7 |
| Rubber and plastics | 8.9 | 0.0 | 8.9 | 8.4 | 0.4 | 8.8 |
| Leather products | 12.0 | 4.2 | 16.2 | 7.9 | 0.0 | 7.9 |
| Textiles | 8.9 | 0.0 | 8.9 | 7.3 | 0.4 | 7.7 |
| Clothing | 17.2 | 0.0 | 17.2 | 10.7 | 0.4 | 11.1 |
| Wood products | 2.7 | 0.0 | 2.7 | 1.4 | 12.9 | 14.3 |
| Furniture | 12.6 | 0.0 | 12.6 | 3.0 | 0.8 | 3.8 |
| Paper products | 4.0 | 0.0 | 4.0 | 0.9 | 0.3 | 1.2 |
| Printing/publishing | 1.4 | 0.8 | 2.2 | 0.5 | 0.2 | 0.7 |
| Metals | 4.0 | 1.3 | 5.3 | 2.2 | 4.2 | 6.4 |
| Metal fabricating | 6.8 | 0.9 | 7.8 | 3.2 | 1.0 | 4.2 |
| Machinery | 4.7 | 0.9 | 5.6 | 2.5 | 3.0 | 5.5 |
| Transport equip. | 2.3 | 0.0 | 2.3 | 0.5 | 0.0 | 0.5 |
| Electrical products | 6.1 | 0.9 | 7.0 | 3.7 | 0.1 | 3.8 |
| Non-metallic minerals | 3.4 | 0.0 | 3.4 | 2.9 | 0.0 | 2.9 |
| Petroleum and coal | 0.5 | 0.0 | 0.5 | 0.4 | 0.0 | 0.4 |
| Chemicals and pdts. | 5.6 | 0.0 | 5.6 | 2.2 | 1.2 | 3.4 |
| Misc. manufacturing | 6.2 | 0.9 | 7.1 | 3.5 | 0.2 | 3.7 |
| Weighted average | 3.8 | 1.0 | 4.8 | 2.3 | 1.8 | 4.1 |

Source: D. Brown and R. Stern. 1989. "Computable General Equilibrium Estimates of the Gains from US-Canadian Trade Liberalisation". In D. Greenaway, T. Hyclak, and R. Thornton (eds.), *Economic Aspects of Regional Trading Arrangements*. New York: New York University Press, p. 70. Reproduced by permission of New York University Press.

The degree to which the elimination of trade tariffs increases the demand for imports is a function of the price elasticity of substitution between imports and domestic goods and their respective income elasticities. This analysis incorporated price and income elasticities separately. Estimates of Canadian price elasticities were obtained from Letourneau and Lester (1988), who used log-linear import demand equations and the ordinary least-squares method for data between 1961 and 1981. Their estimates ranged from -11.9 for metalliferous ores to -0.59 for specialized industrial machinery. U.S. estimates of price elasticities were obtained from Inforum (1989), which used log-linear import demand equations and produced estimates ranging from -0.25 for agricultural products to -3.4 for miscellaneous manufactured goods.

Overall, these price elasticities are similar to those computed by Shiells et al. (1986). In general, Canadian price elasticities were higher than those for the United States, which may reflect structural differences between the two economies (including import dependency, oligopolies, and consumer preferences) or different levels of sectoral aggregation in the trade data used to calculate estimates. This analysis assumed that the elimination of tariffs and NTBs are reflected in lower import prices. It is also assumed that the price elasticities of demand between domestically produced goods and imports from the United States or Canada were identical to the price elasticities between domestic goods and all imports.

The income effects of the FTA are likely to be small. Empirical estimates by Brown and Stern (1986) indicate Canadian real incomes will rise by 2.5 percent while those in the United States will increase by 0.1 percent. Income effects include both changes in real incomes and income elasticities of demand, which vary among sectors. In the Canadian case, the analysis was based on the work of Letourneau and Lester (1988), in which the estimated import demand function implicitly assumes a unitary elasticity. For the U.S. case, the analysis utilized the work of Shiells et al. (1986), in which income elasticities averaged 1.3 and ranged from 0.3 for leather products to 6.7 for oil and gas. Notably, some goods had negative elasticities, indicating potential declines in demand as their relative incomes increased in response to the FTA.

Given the approach outlined above, a reduction in the price equivalent to the tariff $t_i$ plus non-tariff barrier $ntb_i$, an import price elasticity of $e_i$, an income rise y, and an income elasticity $a_i$, the relative increase in demand for import i ($\Delta d_i$) can be expressed as

$$\Delta d_i = -(t_i + ntb_i)\ (-e_i) + y\,a_i \qquad (1)$$

The total absolute expected annual future demand for commodity i is therefore equal to $d_i + \Delta d_i$, where $d_i$ is the volume of imports (in value terms) in 1988.

## Results

On the basis of the above computations, U.S. exports to Canada will increase by 9.3 percent (from $52.3 billion to $57.1 billion annually) while U.S. imports from Canada will increase by 4.3 percent (from $74.8 billion to $78.0 billion annually). Because U.S. and Canadian trade barriers and import demand elasticities are assumed to be spatially invariant, changes in their relative shares of total trade are purely a function of the mix of commodities trans-shipped. Since



Buffalo and Detroit account for such large proportions of total U.S.-Canada trade, the mix of commodities trans-shipped through these cities strongly resembled that of total U.S. trade, and the total volumes of trade through the two cities increased at rates similar to national trade growth rates. Consequently, their shares of total trade changed only marginally: among total U.S. exports to Canada, Buffalo's share rose from 18.0 to 18.3 percent, and Detroit's share declined from 47.9 to 46.8 percent. Among total U.S. imports from Canada, Buffalo's share rose from 20.9 to 21.0 percent of the total, and Detroit's share decreased from 40.0 to 39.8 percent. Thus, it is unlikely that in the short run the FTA will have disproportionately large impacts on the two gateways.

Among individual commodity groups, however, relatively significant variations in changes of trade volume are evident. Among U.S. exports to Canada, a dramatic increase will occur in leather products (73.2 percent) both because the Canadian tariff and NTB are high (for a total of –16.2 percent) and because the price elasticity is high (–4.37). Other U.S. exports rising rapidly will be rubber products (28.5 percent), agricultural goods (28.4 percent), and foods and beverages (22.9 percent), all of which have suffered relatively high tariffs or NTBs (Table 3). Total U.S. imports from Canada will increase less rapidly than U.S. exports, in large part because of relatively lower U.S. tariffs and NTBs imposed on them and higher Canadian price elasticities. Among U.S. imports, the most rapid increases will occur in textiles and footwear (12.6 percent), miscellaneous manufactured goods (12.3 percent), and metal ores and products (11.6 percent)—see Table 4. As these imports compete with domestically produced goods in both nations, they are likely to create secondary rounds of effects in terms of investment and employment, increasing competition for less-efficient producers, and increasing sales for more efficient exporters.

## Conclusion

Although the FTA will undoubtedly increase trade flows between Canada and the United States by removing the last barriers to trade—further integrating the economies of the world's two largest trading partners—it will probably not have disproportionately significant impacts on the two gateways, Buffalo and Detroit, through which flows the majority of imports and exports between the two nations. Indeed, for this reason it is likely that the investment effects of the FTA will outweigh the trade effects. Following the elimination of the remaining trade barriers by the FTA, increases in the demand for imported commodities will be a function of the level of the tariffs and

**TABLE 3 U.S. Exports to Canada, 1988 and Estimated Post-Free Trade Agreement (million dollars)**

| | Buffalo | | Detroit | | |
|---|---|---|---|---|---|
| | 1988 | Post-FTA | 1988 | Post-FTA | % Change |
| Agriculture | 142.1 | 188.6 | 434.8 | 556.8 | 28.4 |
| Foods and beverages | 173.1 | 210.6 | 234.1 | 289.8 | 22.9 |
| Chemicals | 433.1 | 482.8 | 880.1 | 982.4 | 11.6 |
| Fertilizers | 27.3 | 30.1 | 155.0 | 171.2 | 10.4 |
| Oil, gas, and coal | 83.3 | 86.1 | 228.3 | 236.0 | 3.4 |
| Wood products | 118.4 | 143.8 | 246.3 | 301.7 | 22.1 |
| Gold | 49.1 | 50.3 | 14.7 | 15.1 | 2.5 |
| Leather products | 37.4 | 64.7 | 74.8 | 129.6 | 73.2 |
| Paper products | 248.3 | 280.3 | 287.4 | 326.5 | 13.3 |
| Metal ores/pdts. | 714.2 | 844.5 | 1,318.8 | 1,613.4 | 20.9 |
| Non-elec. mach. | 1,432.6 | 1,551.4 | 3,715.9 | 4,018.9 | 8.2 |
| Elec. machinery | 2,652.4 | 3,107.0 | 2,298.2 | 2,704.3 | 17.4 |
| Non-metallic minerals | 166.8 | 171.0 | 421.9 | 432.4 | 2.5 |
| Textiles and footwear | 251.4 | 285.8 | 195.5 | 219.0 | 12.9 |
| Road vehicles | 1,679.4 | 1,721.4 | 12,892.1 | 13,214.4 | 2.5 |
| Other transport equip. | 108.0 | 110.7 | 184.5 | 189.1 | 2.5 |
| Rubber products | 435.2 | 559.2 | 624.8 | 803.3 | 28.5 |
| Household products[a] | 139.2 | 165.8 | 125.3 | 147.6 | 18.5 |
| Misc. manuf. | 558.0 | 572.0 | 767.6 | 786.8 | 2.5 |
| Total | 9,449.2 | 10,625.8 | 25,099.9 | 27,137.8 | 9.3 |

Source: Computed by the authors.

a. Includes tobacco, luggage, medicinals, and perfumes and soaps.

**TABLE 4 U.S. Imports from Canada, 1988 and Estimated Post-Free Trade Agreement (million dollars)**

| | Buffalo | | Detroit | | |
|---|---|---|---|---|---|
| | 1988 | Post-FTA | 1988 | Post-FTA | % Change |
| Agriculture | 161.9 | 168.5 | 146.6 | 153.3 | 4.3 |
| Food and beverage | 332.2 | 365.3 | 546.5 | 600.9 | 10.0 |
| Chemicals | 370.2 | 385.2 | 859.3 | 894.0 | 4.0 |
| Fertilizers | 39.9 | 41.7 | 74.6 | 78.1 | 4.7 |
| Oil, gas, and coal | 511.5 | 516.2 | 441.2 | 445.5 | 1.0 |
| Wood products | 559.6 | 613.0 | 1,054.6 | 1,137.2 | 8.4 |
| Gold | 67.7 | 67.8 | 0.7 | 0.7 | 0.1 |
| Leather products | 26.6 | 27.2 | 7.9 | 8.1 | 2.5 |
| Paper products | 648.7 | 654.0 | 1,849.7 | 1,864.8 | 0.8 |
| Metal ores/pdts. | 2,631.5 | 2,928.5 | 2,987.3 | 3,339.5 | 11.6 |
| Non-elec. machinery | 1,547.7 | 1,703.5 | 3,715.7 | 4,135.7 | 10.9 |
| Elec. machinery | 1,175.5 | 1,233.0 | 258.9 | 269.4 | 4.7 |
| Non-metallic minerals | 195.8 | 210.1 | 276.7 | 297.0 | 7.3 |
| Textiles and footwear | 151.8 | 169.8 | 179.1 | 202.9 | 12.6 |
| Road vehicles | 6,308.1 | 6,328.1 | 16,124.7 | 16,176.1 | 0.3 |
| Other transport equip. | 213.0 | 215.1 | 269.3 | 271.9 | 1.0 |
| Rubber products | 161.8 | 179.2 | 574.5 | 636.9 | 10.8 |
| Household products[a] | 76.8 | 81.0 | 54.4 | 57.1 | 5.3 |
| Misc. manuf. | 487.9 | 549.4 | 506.3 | 570.0 | 12.3 |
| Total | 15,668.1 | 16,436.6 | 29,928.1 | 31,139.2 | 4.3 |

Source: Computed by the authors.

a. Includes tobacco, luggage, medicinals, and perfumes and soaps.



non-tariff barriers and of their respective price and income elasticities. The analysis offered here indicates that, exclusive of its impacts on services and investment, the FTA will increase U.S. exports to Canada by 9.3 percent and raise U.S. imports from Canada by 4.3 percent. The aggregate bilateral trade volume will rise by roughly 6.0 percent. As these flows improve the U.S. trade deficit with Canada, Buffalo and Detroit will witness larger increases in their export volumes than in their import volumes. Because together Buffalo and Detroit trans-ship almost two-thirds of total U.S.-Canada trade, the changes in the trading patterns and volumes of these two cities will closely mimic the national trade patterns. The trade volumes of certain commodity groups, including U.S. exports of leather and rubber products and agricultural goods and U.S. imports of manufactured goods, textiles, and metal ores, will increase rapidly.

As the local impacts of the FTA become increasingly important to policy makers, disaggregated geographic analyses will assume a greater relevance. This article demonstrates the large degree of similarity between U.S.-Canada trade flows through Buffalo and Detroit and those between the two nations as a whole. Further investigations of this kind are needed to address the specific local impacts of these trade flows, including the impacts of factor inputs and their multiplier effects.

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