

North American Integration in Agriculture: A Survey Paper

North American Agrifood Market Integration: Current Situation and Perspectives

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1. INTRODUCTION

Integration of the Canadian, US, and Mexican agricultural sectors has proceeded rapidly over the past decade and shows potential to continue apace for the foreseeable future. For some products, the significance of international borders has declined to such an extent that one North American market can be said to exist.

The word “integration,” as used in this paper, is synonymous with the term “market integration.” Market integration is the combination of two formerly separated national or regional markets. The level of integration varies greatly among trade partners, across sectors, and over time. Hence, one can think of a continuum ranging from completely segmented to perfectly integrated area markets. A perfectly integrated market consists of two or more economically interdependent but spatially separate markets in which there are no barriers that distort trade and investment activities across international borders.

In the real world, national markets are seldom so perfectly integrated, but there is definitely a sense that the agricultural markets of Canada, the US, and Mexico are more integrated than they were 10-15 years ago. Through the Canada-US Free Trade Agreement (CUSTA) and the North American Free Trade Agreement (NAFTA), the three countries have swept away numerous barriers to trade and established clear standards for the treatment of investors, among other accomplishments. As a result, economic linkages among the three economies have increased dramatically—taking the form of trade in goods and services, portfolio and direct investment, more elaborate contractual relationships, and price co-movements among national markets for identical commodities and products.

This paper surveys the economic literature about North American integration in the agri-food sector. The purpose of this survey is twofold: it summarizes the lessons learned, and it identifies areas where further research could provide valuable input into policy discussions. As the integration of North American agriculture progresses, the range of agri-food policies with strictly domestic effects becomes increasingly narrow. Thus, policymakers in North America need to consider the effects that their decisions will have on other NAFTA countries, as well as the impact that decisions by other NAFTA governments will have at home.

The paper is organized as follows. Section 2 identifies the major factors contributing to integration and comments on their relative importance. Section 3 summarizes research into the indicators of integration. These studies focus on price co-movements and trade flow data. Section 4 outlines the state of current knowledge regarding foreign direct investment in the agri-food sector, while Section 5 assesses the impact of integration on the structure and performance of the sector. Section 6 discusses opportunities for further integration in the sector, and Section 7 concludes the paper. Throughout the paper, gaps in the knowledge base are highlighted, along with suggested areas for further research.

2. FACTORS CONTRIBUTING TO INTEGRATION

Many factors are contributing to the integration of the North American agri-food sector, some of which are under the direct control of policymakers and some of which are not.

Geography and culture

Numerous gravity models have confirmed that geographic and cultural factors such as proximity, a common language, and a shared border positively influence the level of international trade among countries (Diao, Roe, and Somwaru). In the case of the NAFTA countries, trade and investment liberalization has helped them to take better advantage of their geographic proximity and cultural similarities. Although the countries of North America lack a common language, this seems to be less of an obstacle than in the past, due in part to the expanded use of Spanish in the US and of English in Mexico.

Advances in transportation, storage, and communication

Improvements in transportation, storage, and communication over the past four decades have made possible international trade in a much broader range of agricultural products, a point emphasized by Wang, Coyle, Gehlhar, and Vollrath. Examples of such improvements include: detailed, “real-time” tracking and monitoring of shipments; greater use of intermodal transportation systems, such as tractor-trailer containers that can also be shipped by rail or by sea; and developments in climate control, packing, and bioengineering that reduce the spoilage and deterioration of food products during transit. In a gravity-model analysis of U.S. agricultural exports, the authors conclude that such improvements have a commodity-specific influence, with the impact of distance on trade declining over time for certain perishable and processed products.

Macroeconomic Factors

Research shows that the GDP growth rate and the exchange rate have a larger impact on agricultural trade volumes than does the applied tariff rate (Orden, 2002; Ndayisenga, 2001). Economic growth is often the driving factor behind increased regional integration, as firms seek to take advantage of economic opportunities in neighbouring countries. Moreover, unexpected economic downturns, such as those that occurred in Mexico in late 1994 and 1995 and in the US in 2000 and 2001, can have a deleterious influence on market integration and trade, because they often wipe out investments that might have been economically profitable and reflective of greater integration over the long term. Relative exchange rates are often the most important factor determining fluctuations in trade volumes. Exchange rate variability is an impediment to economic integration, insofar as it increases the risks associated with international transactions. Research suggests that exchange rate variability has a significant negative impact on growth of agricultural trade (Cho, Sheldon, and McCorrison, 2002).

Domestic Policy Changes

Agricultural trade within North America began to increase much more rapidly than extra-regional trade in the mid-1980's (Vollrath, 2001). This predates the implementation of both CUSTA and NAFTA, which implies that other factors have helped to stimulate continental integration. Empirical evidence shows that unilateral trade reforms made by Mexico during the early 1990's greatly stimulated US agricultural exports to Mexico. Using a modified gravity

model, Zahniser, Pick, Pompelli, and Gehlhar (2002) find that these reforms accounted for an estimated 39 percent of US agricultural exports to Mexico during 1990-98.

Another action that has stimulated integration is the adoption of more market-oriented farm supports by the NAFTA countries. The 1990's featured a burst of activity in this area, with many support programs being designed so that they have minimal impacts on international trade. In 1994, Mexico started the Programme of Direct Payments to the Countryside (PROCAMPO), and it ended its system of guaranteed producer prices during the course of the 1990's. Through the Federal Agriculture Improvement and Reform Act of 1996, the US weakened the link between farm supports and commodity prices and gave producers much greater planting flexibility. The Farm Security and Rural Investment Act of 2002, which provides the legal framework for most US farm programs through FY 2007, generally retains this market orientation. Also in 1996, Canada terminated the Gross Revenue Insurance Program (GRIP) and started the Net Income Stabilization Accounts (NISA). The movement away from production- and price-linked support has helped to reduce the distorting effects of government support for agriculture, and many believe that they have favoured intra-regional trade (Diao, Roe, and Somwaru, 2001; Burfisher, Robinson, and Theifelder, 2002).

Regional Trade Agreements

CUSTA and NAFTA have eliminated numerous tariff and quantitative restrictions on agricultural and food trade among Canada, Mexico, and the US. Implementation of CUSTA's tariff-elimination schedule was completed on January 1, 1998, and just a handful of agricultural commodities in NAFTA's tariff- and quota-elimination schedule remain to be liberalized, with the transition to free trade ending on January 1, 2008. In addition, CUSTA prohibited the use of export subsidies on Canada-US trade, while NAFTA included rules which are intended to facilitate foreign direct investment in the region. Trade and investment liberalization under NAFTA serves not only to increase the volume of cross-border economic activities; it also reduces the risks associated with these activities by "locking in" a sweeping set of policy reforms in the three participating countries.

Uruguay Round Agreement on Agriculture

Of the three pillars of trade liberalization identified by the World Trade Organization (WTO)—market access, domestic support, and export subsidies—CUSTA and NAFTA focus almost exclusively on market access. Thus, it is important to consider the impact of multilateral agreements—in particular, the Uruguay Round Agreement on Agriculture (URAA) on agricultural policies and regional integration.

The URAA came into force on January 1, 1995, just one year after NAFTA. It contains binding commitments on market access, domestic support, and export subsidies that were implemented by 2001.¹ Perhaps the URAA's strongest provisions concern export subsidies. These disciplines resulted in significant changes to Canada's grain transportation and marketing policies, changes that helped to further North American integration. Internal transport subsidies that apply to exports only, such as the subsidies provided (as part of the Western Grain Transportation Act, or WGTA) to Canadian railways for the movement of grain to ocean ports, were deemed to be export subsidies and were therefore subject to reduction commitments. In response to WTO disciplines, as well as fiscal pressures at the federal level, the Canadian

¹ Developing countries, including Mexico, have an additional 4 years to implement their URAA commitments.
April 26, 2004

government repealed the WGTA in 1995. The elimination of grain transportation subsidies encouraged producers to keep more grain in the Prairies for livestock production, much of which is exported to the US, in the form of either live animals or meat. In addition, some grain producers in Western Canada responded by switching to higher-value crops, such as pulses (Doan, Paddock, and Dyer).

Another important aspect of the URAA is its classification of some farm programs as being exempt from the agreement's expenditure limitations. This has led many of the signatory countries to design programs that qualify for this exemption by having a minimal influence on production and trade. In North America, PROCAMPO, NISA, and the US direct-payment program are all examples of this effort.

3. INDICATORS OF PRODUCT-MARKET INTEGRATION

Studies that quantify the integration of North American product markets may be divided into two categories: those that are based on the value and composition of trade flows, and those that are based on price data.

Trade Data

The dramatic growth of agricultural trade within North America during the CUSTA-NAFTA period is one indication of increased market integration within the sector. Each NAFTA partner has participated in this expansion of trade (fig. 1), which has occurred across a broad range of commodities (appendix tables 1-4). Generally speaking, North American producers are devoting proportionately greater attention to the continental market (fig. 2). During 2000-02, almost two-thirds (66%) of Canada's agricultural exports were destined for North American markets, compared with just 46% during 1991-93. Similarly, North America's share of US agricultural exports rose from 20% to 29% across the same two periods, while its share of Mexican agricultural exports fell slightly from 88% to 86%. Despite North America's growing share of US exports, Canada and Mexico continue to be more dependent on neighbouring US markets than the US.

Figure 1A--Agricultural trade within the NAFTA region has grown tremendously during the CUSTA-NAFTA period

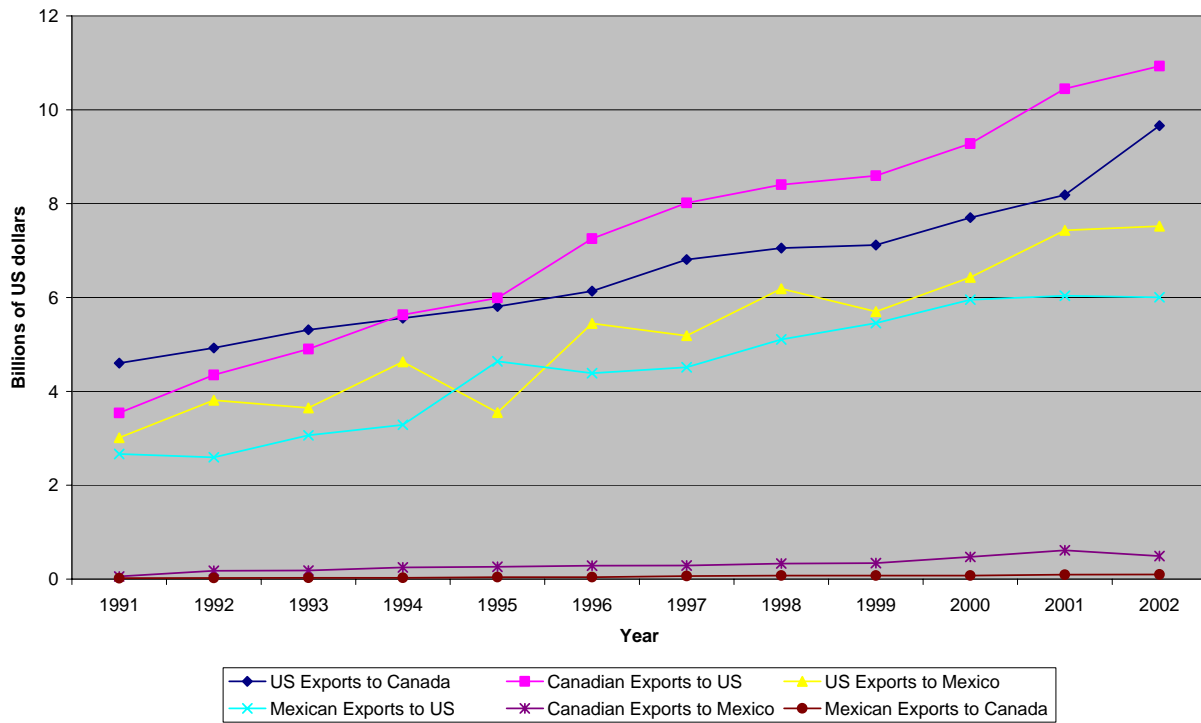
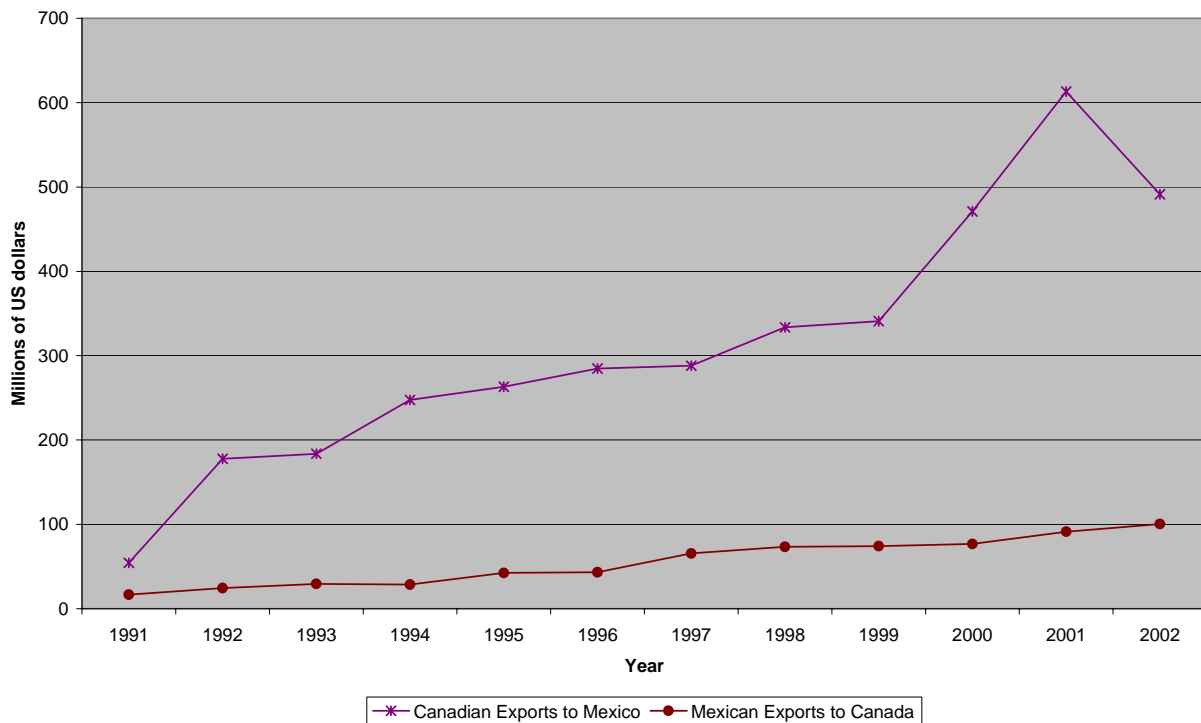
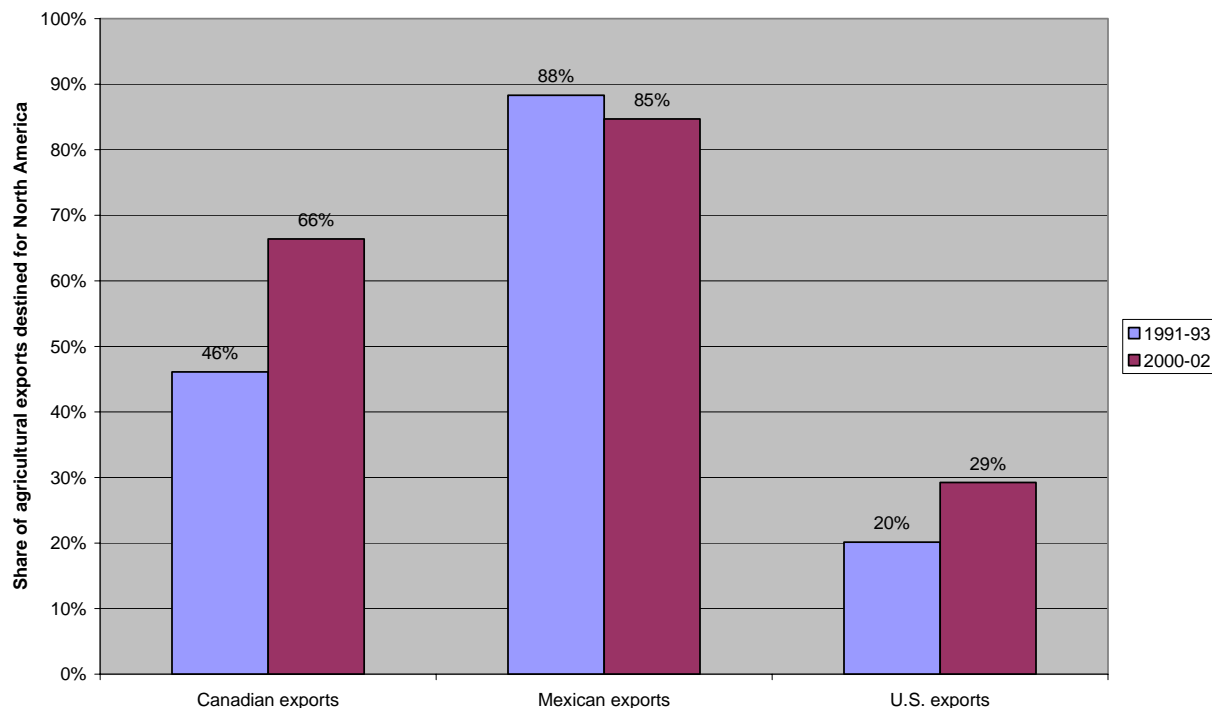


Figure 1B--Agricultural trade between Canada and Mexico has experienced solid growth but is still much smaller than Canada-US and Mexico-US agricultural trade



Source: United Nations Statistical Office, as compiled by USDA, Foreign Agricultural Service, Global Agricultural Trade System.

Figure 2—Canada and the US have become more dependent on the North American market, while Mexico's exports have become slightly more diversified geographically



Source: United Nations Statistical Office, as compiled by USDA, Foreign Agricultural Service, Global Agricultural Trade System.

The expansion of agricultural trade within North America contrasts sharply with the experience of Canadian and US exports to countries outside NAFTA (fig. 3). Such exports actually declined during the late 1990s for a variety of reasons—including the financial crisis in Asia, the relatively weak currencies of key importing countries, and the growing competitiveness of producers in such countries as Brazil and Argentina (Jerardo, 2004; Schnepf, Dohlman, and Bolling, 2001). Mexican agricultural exports to the countries outside of NAFTA were an exception to this pattern. Such exports more than doubled during the 1990s, but Mexican exports to non-NAFTA countries still constitute a small fraction of the country's total agricultural trade.

Figure 3A--Agricultural exports by the NAFTA countries to the rest of the world generally experienced modest growth in the late 1990's

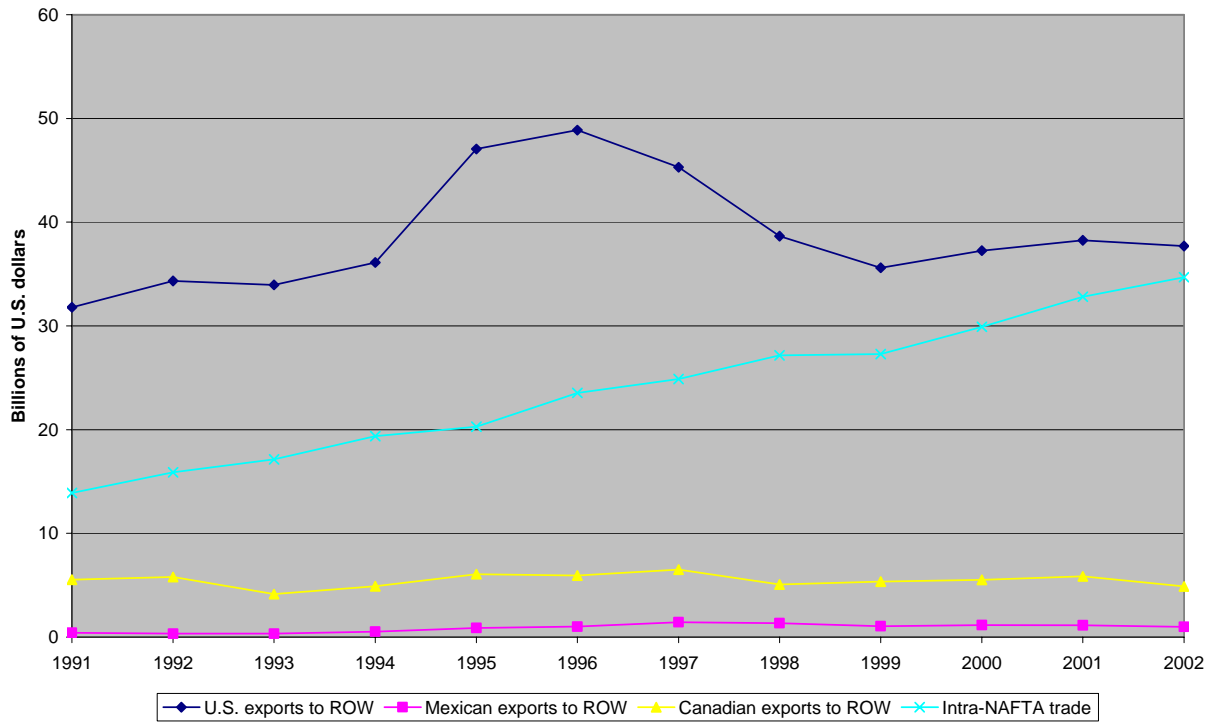
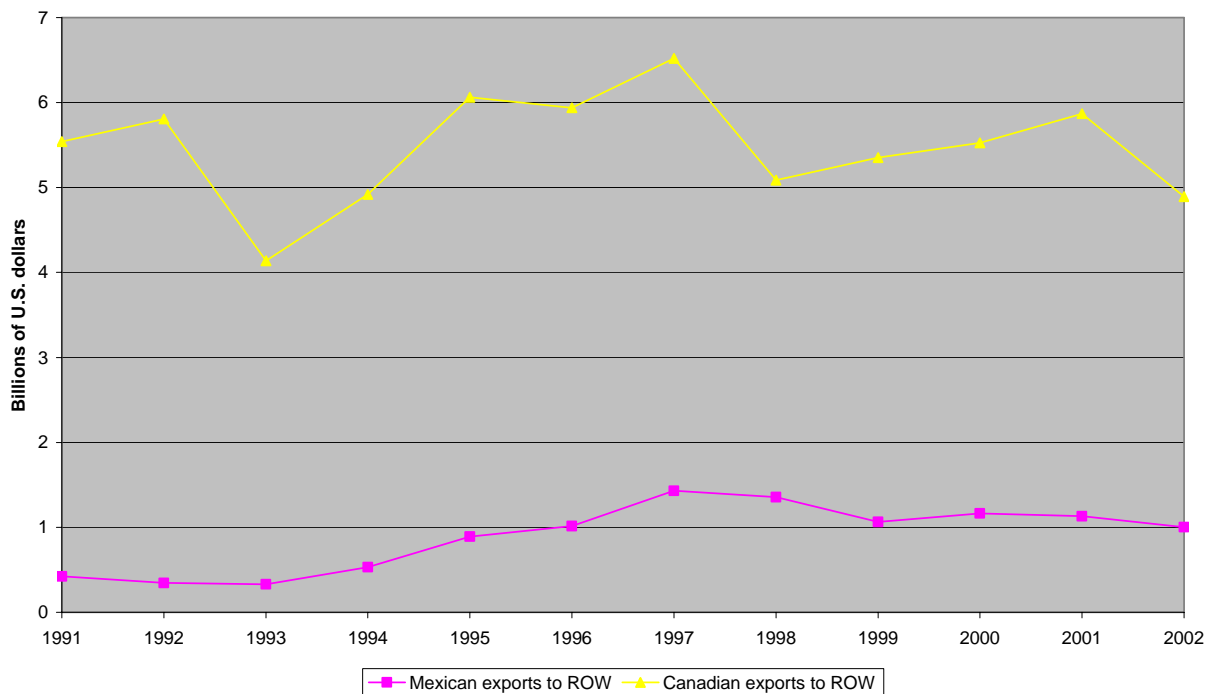


Figure 3B--Mexican agricultural exports to countries outside NAFTA generally increased during the 1990's, while Canada's experience was similar to that of the US



Source: United Nations Statistical Office, as compiled by USDA, Foreign Agricultural Service, Global Agricultural Trade System.

Further evidence of the close integration of the North American market may be obtained from bilateral trade-intensity indices (BTI's) (Brown, 1947). The BTI measures the relative importance of a specific exporter in supplying imports to a particular country, compared with other supplying countries. For example, the BTI for Canadian exports to the US equals:

$$BTI_{\text{Canada-to-US}} \equiv \left(\frac{\text{Canadian exports to the US}}{\text{World exports to the US}} \right) \times \left(\frac{\text{World exports to all countries but Canada}}{\text{Canadian exports to the world}} \right)$$

BTI's for North American agricultural trade confirm what many people already sense—that intra-NAFTA trade is relatively more important to each member country than extra-NAFTA trade (Vollrath, 2003). For Canada-US agricultural trade, this heightened importance is stronger for Canadian exports than it is for US exports. During 1999-2001, the BTI for Canadian exports to the US was about 6, while the BTI for US exports to Canada was about 4. This means that Canadian share of US agricultural imports was about 6 times the Canadian share of the rest of the world's agricultural imports; while the US share of Canadian agricultural imports was about 4 times the US share of the rest of the world's agricultural imports. Similarly, for Mexico-US agricultural trade, the BTI for Mexican agricultural exports to the US is larger than the BTI for US agricultural exports to Mexico (7 versus 5). Since the mid-1990's, the BTI's for both Canadian and Mexican exports to the US have declined due to a large increase in US imports from countries outside NAFTA.

The composition of agricultural trade within the NAFTA region also provides many insights into market integration and specialization (appendix tables 1-4). Many commodity producers in North America now view the entire continent as a single market for their final goods. Mexican breweries, for example, have emerged as a major force in the US and Canadian markets. In fruits and vegetables, Mexico has greatly increased its exports to the US since NAFTA's implementation, and Canada has become an important supplier of vegetables to the US over the 15 years. Moreover, US fruit and vegetable producers have long been active in the Canadian market and are becoming more so in the Mexican market, thanks in part to the close ties between US producer-exporters and supermarket chains operating in Mexico (Tropp, Skully, Link, and Málaga).

Among meat products, there is growing intra-industry trade for consumer products between Canada and the US in beef and pork. Moreover, US beef and pork exports to Mexico have roughly tripled in volume under NAFTA. Exports to Mexico include not only cuts that are popular in the US but also “variety meats” that many Mexicans view as delicacies. Intra-industry trade in consumer agricultural products between Canada and the US includes highly processed products other than meat, such as pasta, cookies, and candy. To date, intra-industry trade in such products between Mexico and the US has been fairly limited, although this may change in the future.

The growing trade in intermediate agricultural goods within North America is another sign that production processes for many agricultural and food products cut across international borders. This is particularly true for livestock and meat production. US grains, oilseeds, and related products are important inputs for the Mexican hog and poultry industries, and rising numbers of Canadian pigs and Mexican cattle are among the livestock that are finished and slaughtered in the US. Intermediate inputs for the processed food industry, such as mixes and doughs for baked goods and odoriferous mixtures for food manufacturing, are an important aspect of Canada-US agricultural trade.

Complementarity indices (CI's) provide a framework that summarizes relationships in the composition of agricultural trade between two countries (Drysdale, 1967). Specifically, the CI links the export specialization of one country with the commodity import shares of its trading partner across the spectrum of all traded goods. Vollrath (2001) calculated CI's for partner countries in North America by dividing agricultural trade into two broad categories: field crops and high-value products. His analysis revealed that Mexico-US complementarities in field crops exceed those for Canada-US trade in field crops. This is not unexpected, given that both Canada and the US are major exporters of grains and oilseeds. On the other hand, Mexico is a major producer of tropical and labour-intensive fruits, vegetables, and horticultural products. This production pattern is a reflection of the warm climate and relative labour abundance that exist in Mexico. For both the US and Canada as well as for the US and Mexico, agricultural trade complementarities have increased following the inception of CUSTA and NAFTA. This indicates that all countries are trading more in products that reflect their agricultural comparative advantages.

Spatial markets within each NAFTA country are more integrated than combined North American markets, despite the progress that has been towards continental integration. Prior to CUSTA, merchandise trade among Canada's provinces was 20 times larger than Canada-US trade, according to gravity-model analysis conducted by Helliwell (1998). Hufbauer (2003) contends that this ratio has diminished to about 12 since the implementation of CUSTA—a sign of greater integration, but also an indication that border effects are still relevant. No similar study has yet been conducted for Mexico-US trade, but numerous observers agree that the NAFTA countries have not fully realized the possibilities of integrating their markets (Courchene, 2003; Knutson and Ochoa, 2004; Vollrath, 2004).

The Impact of BSE on the Integrated Cattle and Beef Industry

Until recently, the cattle and beef industry of North America was characterized by a large volume of two-way trade between Canada and the US in feed, cattle, beef, and various beef products. The high cost of transporting live animals overseas, coupled with high and stable US beef demand, makes the US a natural destination for Canadian cattle and beef. In 2002, 90% of Canadian beef exports and almost all Canadian cattle exports went to the US (Boame *et al*, 2004). US cattle and beef exports to Canada also have grown under CUSTA and NAFTA, as the industries in the two countries have reoriented along north-south lines. Mexico is also part of the continental market; it is the second largest market for US beef exports, and it supplies a large number of feeder cattle to the US for finishing.

With the discovery of Bovine Spongiform Encephalopathy (BSE) in a Canadian beef cow in May 2003, the US closed its border to Canadian cattle and beef, and most other foreign markets were also closed to Canadian beef products. By the following month, Canadian beef slaughter had fallen by 22% and cattle prices had dropped by almost half (Boame *et al*, 2004). The entire industry in Canada entered a “wait and watch” mode, with few cattle going to market, excess slaughter capacity increasing, and renderers even refusing to pick up dead animals. In August 2003, the US re-opened its border to Canadian boxed beef from animals under 30 months of age, as well as a select few other ruminant products. With this action, US beef and veal imports from Canada during the fourth quarter of 2003 returned to almost the same volume as the same quarter of 2002 (USDA/FAS).

Canadian beef producers and processors were hopeful that a new trade rule slated for discussion in January 2004 would result in the resumption of live cattle exports to the US. With the discovery of BSE in a Washington dairy cow in December 2003, however, all discussions of live cattle imports from Canada were postponed. This discovery also led major US trading partners—including Mexico, Japan, and South Korea—to close their border to US beef. Strong demand for beef within the US, coupled with cyclically high prices for cattle, helped to mitigate the impact of these closings on US cattle producers and processors. In March of 2004, the Mexican government re-opened its border to shipments of boxed beef from the US – the first government to have relaxed import restrictions.

The discovery of BSE has highlighted several important aspects of market integration in the North American agri-food sector. The first is the dependence of the Canadian industry on the US market. While not all sub-sectors in North America display dependence to the same degree as the Canadian cattle and beef industry, it is a central feature of Canadian agriculture and one that has important policy implications. The economic hardship caused by the disruption in Canada-US trade has been felt most acutely by producers north of the border, and Canadian policymakers have a strong incentive to work with their US counterparts to minimize the risk of such disruptions in the future.

The BSE incident also focuses attention on the power of food safety issues to disrupt market integration. The presence of animal diseases that may affect human health, such as BSE and Avian Flu, generates concern among consumers and health professionals alike. The risk of food-borne illness prompts governments to take strict measures to prevent the importation of contaminated food. A ban on imports from affected countries is an extremely blunt policy tool. It reduces health risks, but it also excludes many disease-free producers in those countries from gaining access to foreign markets. More sophisticated measures, such as additional testing of imports and the adoption of more stringent sanitary regulations, are needed to protect consumers and to stabilize the continental market, creating more durable integration.

Greater cooperation among the NAFTA partners may prevent further border closures in response to new food safety problems. In the wake of the BSE discoveries, the Canadian and US governments have adopted new regulations that should reduce the risk that the disease will end up in the food supply. Moreover, the governments of North America are working to create a harmonized framework for the resumption of beef trade, to update international guidelines concerning BSE, and to ensure that all countries are treated fairly and consistently when BSE is found. These new systems promise to mitigate trade disruptions.

The beef industry in North America has made significant investments in large processing and packing facilities, particularly in Canada and the US. These facilities depend on open borders for their profitability. In order to operate at capacity and retain their competitiveness, packers need access to large and consistent supplies of cattle, much of which is secured through international trade. Disruptions in trade impose costs on packing operations and increase investment risks. If discoveries of livestock diseases continue to be accompanied by blanket import bans, investors may be discouraged from relying upon cross-border supply chains—a trend that has greatly increased the efficiency of the North American industry.

Price Studies

One of the main indicators of cross-border market integration is the co-movement of prices in different national markets. Economic theory informs us, for example, that in competitive markets, where transportation costs are insignificant and barriers to trade non-existent, identical goods sell for the same price. Arbitrage provides the mechanism for price convergence: to the extent that price differences exist, traders have an incentive to buy goods in the low-priced market and sell them in the high-priced market until prices in both markets equalize. This phenomenon is commonly referred to as the Law of One Price (LOP) (Krugman and Obstfeld, 2000).

Several empirical studies have measured the degree to which the LOP holds in Canadian and US agricultural markets. These studies have used various methodologies but come to a similar conclusion: agricultural commodity markets are integrated to varying degrees, and the degree of price integration roughly corresponds to the prevailing degree of trade liberalization. They also show that, although cross-border price relationships were strong prior to CUSTA and NAFTA, they became stronger as a result of these agreements.

Moodley, Kerr and Gordon (2000) study CUSTA's effects on producer price integration at the aggregate level between Canada and the US using an econometric LOP model. They find that market integration existed prior to CUSTA, but that increased convergence in producer prices between the two countries followed CUSTA's implementation, providing evidence of deepening cross-border integration.

Vollrath (2003) estimates the degree of integration in Canada-US meat markets using both simple price correlations and more complex econometric models that measure the speed and the degree of price transmission. Both studies show that pork product markets are more integrated than markets for beef or whole chicken. Given that the Canadian poultry market is supply-managed with high tariffs, these results confirm expectations.

Mohanty and Langley (2003) use a cointegration and error-correction approach to measure the degree of price integration in Canada-US wheat and barley markets. They found that integration improved following the implementation of NAFTA and again after the repeal of the WGTA. Interestingly, the effect of the WGTA's elimination exceeded that of NAFTA.

More nuanced studies of price transmission differentiate between price shocks based on where they originate. Time-series analysis by Vollrath and Hallahan (2003) reveals that US price shocks affect Canadian prices in the meat and livestock markets, but Canadian price shocks do not always have a significant bearing on corresponding prices in the US. Two-way integration (US-to-Canada and Canada-to-US) was found in the markets for steers, ham, and spare ribs, while one-way integration (i.e., shocks transmitted from the US to Canada) characterizes the markets for hogs, beef loins, chuck, and whole chickens. The asymmetry in price transmission is probably due to the large size of the US livestock and meat markets.

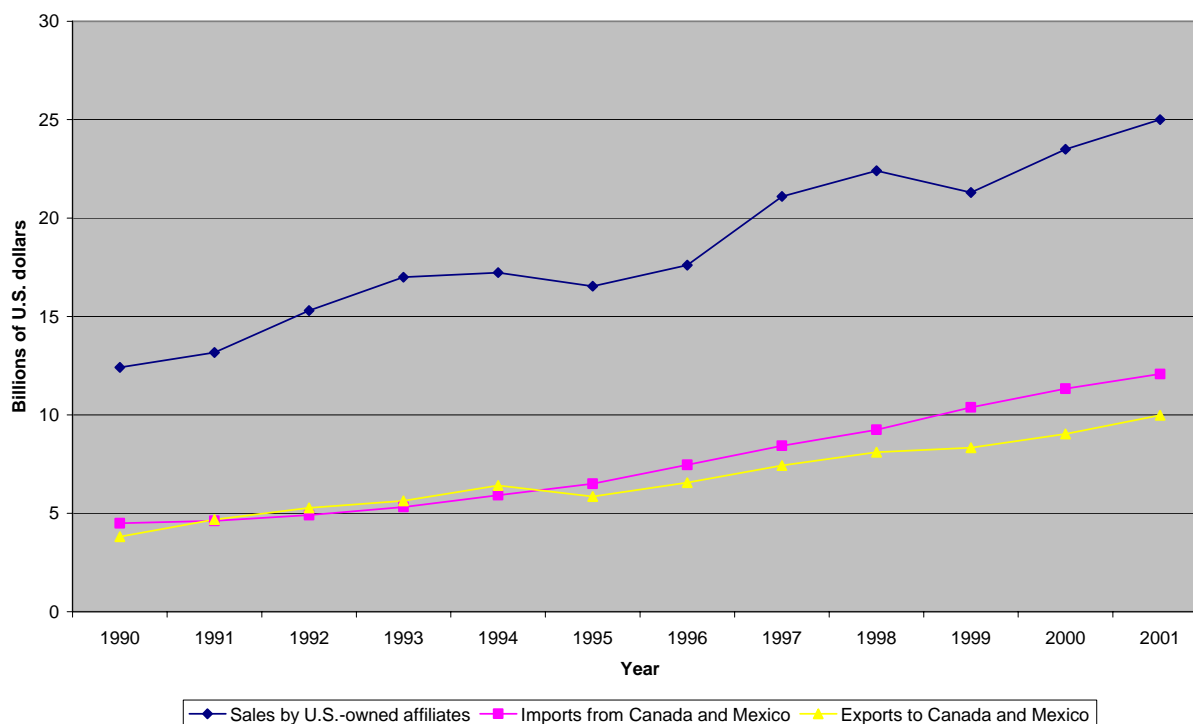
4. FOREIGN DIRECT INVESTMENT AND THE ROLE OF MULTINATIONALS

In recent decades, global consumer demand has shifted toward more high-value processed food. Between 1972 and 1993, processed food's share of global agricultural trade rose from 58 percent to 67 percent (Henderson, Handy, and Neff, 1996). Demand for processed and prepared foods is particularly great in high-income countries such as Canada and the US, but it is

also growing rapidly in middle-income countries such as Mexico. The production, marketing, and distribution of these food products are typically capital and technology-intensive and have come to be dominated by large multinational enterprises (MNE's)—enterprises with productive assets in more than one country.

Demand for processed food is largely met by domestic industry in most developed countries, but foreign ownership is nevertheless significant. Foreign direct investment (FDI), defined as the ownership and control of assets in one country by a national of another country,² is now the dominant form of international commerce in processed foods. Sales by foreign affiliates³ account for about 60% of total international commerce in processed foods. Exports account for 30%, and sales through licenses and joint ventures account for the remaining 10% (Handy and Bamford, 2000). This phenomenon is particularly pronounced in North America, where sales by Canadian and Mexican affiliates of US companies are about two-and-a-half times the level of US processed food exports to those countries (fig. 4). With the rapid increase in intra-regional processed food trade, however, the ratio between affiliate sales and exports has fallen. In 1993, for instance, sales by Canadian and Mexican affiliates of US food companies were about 3 times the level of US processed food exports to Canada and Mexico.

Figure 4--Processed food sales of U.S.-owned affiliates in Canada and Mexico versus processed food trade with Canada and Mexico, 1990-2001



Sources: US Department of Commerce, Bureau of Economic Analysis and USDA/ERS, Processed Food Trade database

Given that an increasing share of the agri-food sector is organized under the auspices of the firm, the business strategies adopted by food processing companies are a critical component of the analysis of economic integration. Nevertheless, agricultural trade continues to receive more attention from agricultural economists than does the industrial organization of food

² FDI is to be distinguished from **portfolio investment**, which is characterized by a lack of management control.

³ **Parent firms** are located in the home country, while **foreign affiliates** are located in the host country. Foreign affiliate sales refer to sales by foreign-owned companies in the host country market.

processing. Empirical studies of investment and firm behavior are hampered by the scarcity of detailed data, particularly at the firm level, as well as the complexities associated with measuring variables that are hypothesized to affect investment strategies.

Six of the ten largest food processing firms in the world are headquartered in the US, so it should be no surprise that most FDI in the North American processed food sector is undertaken by US firms. In 2002, the stock of US direct investment in the Canadian and Mexican food industries equaled (in US currency) \$3.7 billion and \$1.4 billion, respectively (US Department of Commerce, Bureau of Economic Analysis). In contrast, the stock of Canadian and Mexican direct investment in the US processed food industry equaled \$1.1 billion and \$1.2 billion, respectively. US authorities do not routinely report similar statistics for the beverage industry and production agriculture, often to maintain the confidentiality of the respondents. Very roughly speaking, the stock of intra-NAFTA direct investment in the beverage industry runs in the billions of dollars but in the millions of dollars for crop and livestock production.

Both CUSTA and NAFTA contain provisions designed to facilitate foreign investment, including the equal treatment of domestic and foreign investors and the prohibition of applying certain performance requirements to foreign investors, such as a minimum amount of domestic content in productions. Some researchers have questioned whether these reforms have affected the level of FDI between Canada and the US (Sparling and Cook, 2000; Vaughn, 1995; Worth, 1998). While the stock of US direct investment in the Canadian processed food industry has nearly tripled during the CUSTA-NAFTA period, the stock of Canadian direct investment in the corresponding US industry has fluctuated in recent years, in part due to large transactions such as the Bronfman family's liquidation of its assets in Seagram's (Bolling and Jerardo, 2002).

Many observers believe that NAFTA was a particularly important catalyst for foreign investment in Mexico, insofar as the agreement signaled that the economic liberalization of the late 1980's and early 1990's represented a permanent policy shift (Burfisher, Robinson, and Thierfelder, 2002; Worth, 1998; Vollrath, 2001). The stock of US direct investment in the Mexican processed food industry has tripled since NAFTA's implementation. As recently as 1997, Mexican direct investment in the US processed food industry was just \$304 million (Bolling and Jerardo, 2002).

Nevertheless, it is important to remember that there was substantial US direct investment in the Mexican agri-food sector long before NAFTA. As early as 1948, US companies attempted to develop frozen strawberry enterprises in Mexico (Cook, 1991). Eventually, these enterprises shifted to Mexican ownership. Later, the fruit and vegetable freezing industry left California for Mexico. Major companies like Birdseye and Green Giant established freezing facilities in Mexico, particularly in frozen broccoli and cauliflower. In addition, the Mexican government implemented numerous reforms during the course of 1980's to attract additional foreign investment, not just in the agri-food sector but in the economy as a whole (Robertson, 2004).

The Motivation for FDI

Switching from analyses of trade and investment flows to an examination of the role of MNE's necessitates a subtle change in perspective. Instead of simply quantifying the movement of prices, capital, and goods, it is necessary to examine the decision-making criteria used by corporate management, as well as the industrial organization of particular industries.

Executives in the agri-food sector identify several reasons for undertaking FDI: to gain access to raw materials, to get around trade barriers, to respond to an opportunity for market expansion, or to expand production when existing facilities are at capacity (AAFC, 2003; West and Vaughan 1995). The overriding concern is the return-on-investment to any new venture. Consequently, detailed analyses of cost competitiveness, market opportunities, and profitability form the basis for investment decisions. Taxation is a secondary, though not insignificant, concern. The characteristics of the product also help to determine the most profitable location for investment. When raw inputs are bulky or perishable, it may be unprofitable to transport them more than a couple of hundred miles, and processing and packaging operations are located near to the site of production.

Firm-specific advantages are also important to multinational food companies. The most important factor influencing this decision is the ability to control and exploit intangible assets. In the food industry, this is especially true for intangible assets such as brand names and marketing skills (West and Vaughan, 1995). Innovations in food processing and packaging are important elements of competitive advantage, and firms wish to retain control over the use of these assets. Finally, firms noted the advantages of FDI in terms of reduced transaction costs and achieving economies of size in the use of marketing and research & development resources.

Preference for Majority Ownership, Yet Cross-Border Relationships Take on Many Forms

The desire for control over brand, technology, and market development usually translates into a preference for 100% ownership of foreign affiliates in the processed food industry. Companies may decide to test the waters using exports, and then progress gradually from licensing to joint ventures to FDI, but there is widespread agreement that majority ownership of foreign assets is, in most cases, ultimately preferable to any other form of organization. When ownership is chosen, acquisition of an existing business is typical. An acquisition provides rapid access to the facilities, people, knowledge, and market share of the acquired firm.

When majority ownership is not desired or not possible, cross-border business relationships take on other forms. Joint ventures are fairly common in the North American agri-food sector, and in some instances, they may be more agreeable to antitrust officials than majority ownership. For instance, in 1996, Archer-Daniels-Midland (ADM) and the Mexican firm Gruma abandoned their intention to merge their six masa flour mills in the US to form a single company in order to satisfy US antitrust authorities at the Federal and State levels (US Department of Justice). Instead, the two companies agreed to an arrangement in which ADM acquired 22 percent of Gruma, Gruma sold one of its US mills, and Gruma and ADM teamed up to operate their remaining US mills. In Mexico, ADM also embarked with Gruma on numerous joint ventures related to corn flour.

Licensing is another important type of arrangement. The soft drink and brewing industries in particular are built solidly on licensing. On the basis of licensing, soft drink bottlers in Mexico have built regional fiefdoms that extend to many countries in South America. Similarly, certain US brewing companies are licensed to brew specific brands of Mexican beer. Licensing is also prevalent in other parts of the processed food industry. For example, the Mexican firm GIBSA has licensing agreements to sell Wrigley chewing gum products in Mexico and to produce Hostess snack foods products in its Mexican facilities. Because of its large distribution network, GIBSA also serves as distributor for many U.S. products in Mexico. Such arrangements are fairly common in the NAFTA region, as the distribution systems developed by the major companies now offer a suite of products that are from more than one NAFTA country.

For instance, Mexico's Grupo Herdez works with Hormel so that its products are distributed to U.S. supermarkets.

Contracting is a common organizational form in production agriculture, where the preference for majority ownership may be less strong than in the processed food sector. In US agriculture, contracting has a long history that dates back at least to the 1960's, and it is also take place across borders among the NAFTA countries. For example, in the Canadian hog industry, major US and Canadian processors are contracting directly with hog producers and specifying both the production methods and the record-keeping requirements to be implemented on the farm (AAFC, 2003). In return, the producer receives a guaranteed price that covers the cost of production as well as technical assistance. In addition, it is becoming common for US companies with processing or packing facilities in Mexico to enter into contracts with Mexican producers. In a growing but small number of cases, US firms have actually acquired a controlling stake in Mexican farm operations. Vertical coordination of this type is particularly prevalent in the Mexican poultry and tomato industries (Bolling, Elizalde, and Handy, 1998).

Contracting has certain advantages to the buyer of farm output, in that the risks regarding the variability of production are borne entirely by the producer. In addition, long-standing attitudes against foreign and corporate ownership of farmland may encourage the use of contracting instead of direct ownership, even with the removal of legal restrictions to such types of land tenure. Farm owners may also be reluctant to sell properties that have personal and historical significance to them and their families. A large amount of contracting also takes place in the multinational fast food industry. Many products that McDonalds and Kentucky Fried Chicken serve in Canada and Mexico are produced in the country where the restaurant is located.

Whatever the organizational form, business relationships in the North American agri-food sector tend to be fluid over the long run, just as they are in the economy as a whole. With the passage of time, some operations change hands multiple times. For instance, the US company Green Giant was once part of Pillsbury, later became a part of Grand Metropolitan of the United Kingdom, and recently returned to US ownership. Similarly, Schneider Foods, a well-known Canadian pork processor, has gone from being an independent company to being a subsidiary of a US firm (Smithfield Foods) to once again being part of a Canadian company—Maple Leaf Foods.

“Market Servers” versus “Exporters”

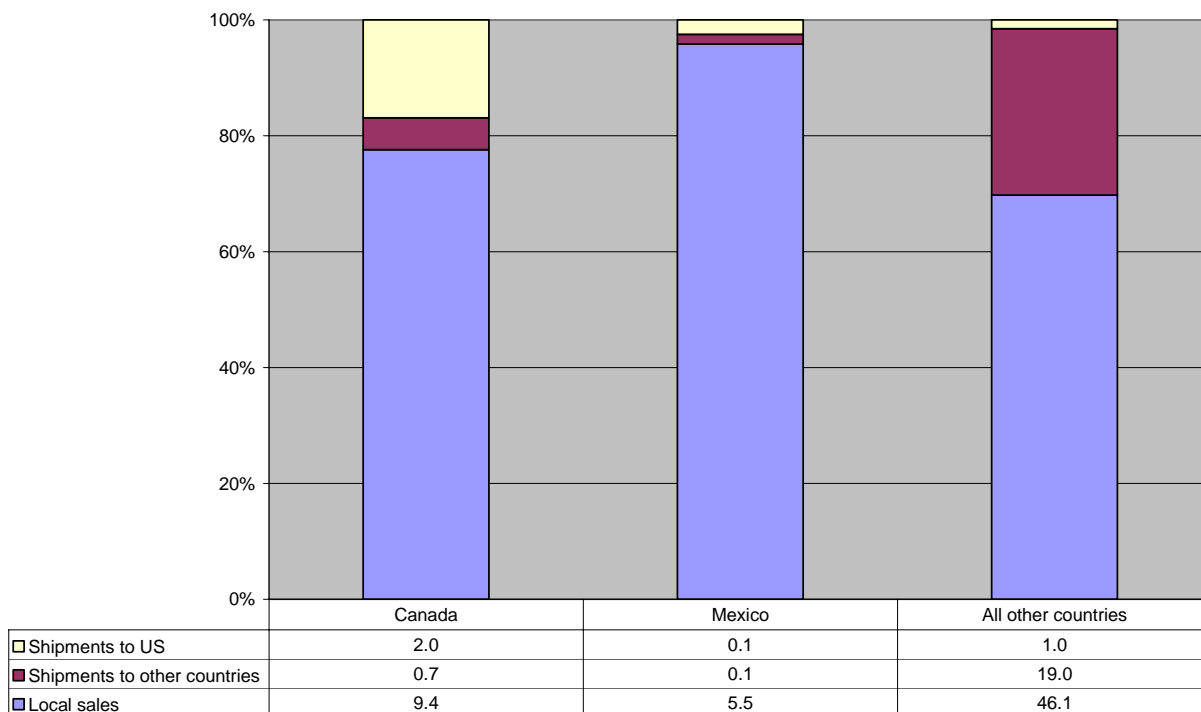
Two main types of foreign direct investors are identified in the literature (Trebilcock and Howse, 1995; Shatz, 1997). The first undertakes FDI in order to serve a foreign market. “Market servers” look for high-growth markets and choose to serve them via FDI rather than exports due to high tariff or non-tariff barriers, or because of high transportation costs. The second type of investor seeks to secure foreign supplies to sell in the home-country market or another foreign market. In the case of fruits and vegetables, many “exporters” are seeking locations with growing seasons that complement those of other markets. In general, “exporters” look for sites with low costs of production and few export restrictions. Reliable transportation for the final product and any required inputs is a must.

The existence of two different types of investors, market-servers and exporters, makes the relationship between trade policy and investment more complex than it might seem. It is not always the case, for example, that a reduction in tariff barriers will lead to increased investment. For a market server who has invested abroad in order to gain access to a highly protected market,

a tariff reduction may well result in the abandonment of the foreign subsidiary. On the other hand, if a particular country is well endowed with factors of production (including agricultural land and labour), the reduction of tariffs may encourage FDI by “exporters”. Burnham and Epperson (1998) studied the investment decisions of US fruit and vegetable firms in Latin America and found that the reduction of trade barriers has strongly encouraged FDI in this sector. FDI by US firms into fruit and vegetable production is, by and large, for the purpose of securing year-round supplies for the US market.

Most food multinationals operating in North America are market servers. Factors such as perishability, regionalized food preferences, and high transportation costs force food companies to buy or build food manufacturing facilities in close proximity to their intended markets. Foreign affiliates are frequently oriented much more toward their host country markets, rather than globally integrated with an export-orientation (Vaughan, 1995). In 2001, Canadian affiliates of US processed food companies (excluding the beverage industry) sold 78% of their product in Canada, exported 17% to the US, and exported only about 6% to the rest of the world (fig. 5). Many US affiliates in Canada have product mandates, often importing intermediate food products, processing these further, and then selling them in both Canada and the US. This phenomenon helps to account for the relatively high proportion of affiliate sales exported to the US. In the case of Mexican affiliates of US processed food companies, 96% of sales were domestic, with the remainder being fairly evenly divided between exports to the US and exports to the rest of the world. To date, very few US MNE’s in the processed food sector have used their Mexican facilities as export platforms.

Figure 5--Distribution of Sales of US-Owned Foreign Affiliates in the Processed Food Industry, 2001



Data do not include the beverage industry.

Source: US Department of Commerce, Bureau of Economic Analysis.

Big Fish from Canada and Mexico Now Swim in a Bigger Pond

Through direct investments in the other NAFTA countries, several large companies from Canada and Mexico have reinvented themselves as larger, stronger, and more viable firms. In some instances, the resulting operations outside the home country rival the operations in the home country in size and importance. Moreover, US companies participating in these endeavours should not be automatically viewed as the dominant partners.

McCain Food is a good example of a large Canadian firm that has ventured far from its original home base. Over the course of some 50 years, it has evolved from a small producer of frozen French fries in the Province of New Brunswick to Canada's largest processed food company, supplying both retailers and food service providers. McCain now accounts for about one-third of the world's French fry production, and its product line also includes frozen green vegetables, frozen pizzas, TV dinners, single-strength juices, and juice concentrates, among other items. The firm operates 11 processing facilities in Canada, eight in the US, and one in Mexico.

Another Canadian example is George Weston Limited, whose three reportable operating segments are food production, food distribution, and fisheries. While the food distribution segment remains largely a Canadian operation, the food-producing segment, Weston Foods, is a major actor in the US baked goods industry. Weston Foods has roughly a 5-percent share of the US bakery products market, and in 2003, the US accounted for about 75 percent of Weston Foods' sales.

Quite a few Mexican food companies have histories that are broadly similar to McCain and Weston Foods. For example, Gruma has emerged as the world's largest producer of corn flour and tortillas, as well as the largest such producer in the US, due in part to the joint venture mentioned earlier with ADM. For the last several years, Gruma's US operations have accounted for about half of its total corporate sales. Competition between Gruma and US tortilla producers is intense. In December 2003, the US District Court for the Southern District of Texas dismissed a lawsuit brought by 17 US tortilla manufacturers alleging, among other things, that Gruma was monopolizing shelf space at grocery stores through the payment of slotting fees.

Another Mexican food company that has expanded operations into the US is GIBSA (Grupo Bimbo), Mexico's largest baking company. It has purchased several bread-baking enterprises in the western US, including the western division of Weston Foods, Mrs. Baird's Bread in Texas, and several large firms in California. GIBSA is now the third largest baker in the world, with roughly a 5-percent share of the US market for bakery products.

5. PERFORMANCE OF THE INTEGRATED AGRI-FOOD SECTOR

When evaluating the impact of integration on structural change and the performance of the North American agri-food sector, there are three main questions to answer. Firstly, what kinds of economic gains can be expected from increased integration? Secondly, what evidence is there that these gains have been realized? And finally, how have these gains been distributed? The first question is relatively straightforward as answers are available in the relevant body of economic literature. The second and third questions are empirical, and a lack of data impedes our ability to answer them completely. Instead, partial answers will be provided when they are available, and gaps will be identified in order to guide future empirical research efforts.

Benefits and costs of integration⁴

The benefits of integration can be divided into two categories. First, gains from integration through trade may be realized; these are gains from rationalization, specialization, economies of scale, and increased competition. Secondly, positive externalities across international borders may arise through spillovers of know-how, technology, and managerial expertise.

All of the above factors are expected to contribute to growth in the agricultural economy. Higher agricultural productivity growth rates in Mexico vs. Canada or the US are to be expected with increased economic integration, for several reasons. First, Mexico has a lower capital/labour ratio than either Canada or the US. With increased flows of capital (both portfolio and FDI) into Mexico following trade and investment liberalization, the capital to labour ratio increases, and Mexican agricultural productivity should begin to grow more rapidly than the two more "mature" NAFTA economies (Diao, Somwaru, and Raney) . Furthermore, Mexico came into NAFTA with higher agricultural tariffs than either Canada or the US (Burfisher, Robinson, and Theirfelder, 2002), and it is more dependent upon North America as a market for its agricultural exports than are Canada or the US. NAFTA can therefore be expected to have a larger impact on the Mexican agriculture sector than on that of Canada or the US.

Comparative Advantage

⁴ The theory in this section is adapted from Vaughan (1995), Chapter 4.
April 26, 2004

Trade liberalization increases the gains from exchange as countries specialize in the production of those goods and services for which they have demonstrated comparative advantage. However, trade liberalization alone may not be sufficient for the realization of comparative advantage. Appropriate domestic policy is needed in order to reap the gains from trade that are associated with tariff reduction (Burfisher, Robinson, and Theirfelder (2002). Using a computable general equilibrium model of North American agriculture, economic adjustment to NAFTA is modeled using two sets of domestic agricultural policies: the pre-reform policies of the 1980's and the more market-oriented policies that were adopted by the NAFTA countries during the early 1990's. The authors find that welfare gains from NAFTA trade liberalization depend on the implementation of domestic policy reforms.

As discussed in an earlier section of this report, the empirical evidence suggests that Canada, the US, and Mexico have specialized in those commodities for which they demonstrate comparative advantage, at least to a limited extent, since NAFTA's implementation. Research by Vollrath (2001), described earlier in this report, suggests that there has been a post-NAFTA rise in commodity complementarities. This provides evidence that structural change and shifting trade patterns have benefited US, Canadian, Mexican, and global agriculture. Because the Canadian and US agricultural sectors are very similar in structure, trade complementarities are greater in the case of US-Mexico than US-Canada trade.

Scale economies

Integration enlarges the size of the market. As firms (and farms) enlarge the scale of production in response to new market opportunities and new technologies, they often benefit from reduced per unit costs of production. These economies of scale improve the efficiency of the sector.

Notable examples of economies of scale occurring in North America include the expansion of meatpacking plants in Canada and the US and the increased size of vegetable production and marketing operations in Mexico (Vollrath, 2003). Trade liberalization is making it possible for manufacturers to process raw agricultural products into intermediate inputs in very large, centralized facilities, and to export these for further processing in facilities located throughout the world. However, multinationals must always consider the tradeoff between the benefits from economies of scale and the added costs associated with transporting finished products to market (Vaughan, 1995).

Research Area: There is little in the way of empirical research that links consolidation in the agri-food sector to changes in the industry's cost structure. Further empirical research could identify the impact of integration on economies of scale and, in turn, the effect that these economies of scale have on economic efficiency.

Competition

The integration of the North American agri-food sector has the potential to increase economic competition, since the number of suppliers in the combined continental market is likely to be larger than the number of suppliers in each formerly segmented national market. However, economic integration may also lead to concentration, perhaps even to the extent that certain firms are able to exert market power on a continental rather than national basis. Whether market openness actually enhances price competition is therefore ambiguous and must be investigated empirically, on a sub-sector by sub-sector basis.

At the national and regional level, a large share of some product markets is held by very few firms. For example, many subsectors of Canadian food manufacturing have concentration ratios exceeding 90%.⁵ In these sectors, firms may be able to exercise market power. Quagraine, Unterschultz, Veeman, and Jeffrey (2003) found evidence to suggest that Canadian beef packers, but not Canadian hog packers, exercised market power throughout the 1980's and 1990's. Similar research has concluded that beef packers also exert market power in the US (see, for instance, Azzam, 1998), though these results have been contradicted by other studies.

Market integration makes the task of promoting competition more complicated for individual governments. It is increasingly apparent that individual nations cannot effectively carry out their activities to foster competition without taking account of the activities of MNE's outside national boundaries (Vaughan, 1995). International monitoring of anti-competitive behavior requires inter-governmental cooperation. This kind of international effort is beginning to be addressed in the Doha Round of trade talks at the WTO, and it was also an element of the failed Multilateral Agreement on Investment at the OECD.

Research Area: Economic research can help to determine the relationship between increasing trade and investment and the market power exercised by food processing companies.

Employment and Labour Productivity

In Canada and the US, the percentage of the total civilian workforce employed in agriculture has declined gradually over the last century and is now quite small—about 4% for Canada and 3% for the US (OECD, 2003). In contrast, agriculture accounts for almost one quarter of civilian employment in Mexico. As market integration leads to the rationalization of agricultural production on a continental scale, the proportion of the Mexican labour force employed in agriculture can be expected to decline substantially.

Mexico's labour productivity in agriculture⁶ is about one-eighth of Canada's and less than one-tenth that of the US. With increasing integration and capital flows across borders, labour productivity in Mexico is expected to increase more rapidly than in either Canada or the US. Again, this is due to the relatively low capital/labour ratio in Mexico compared to the other two NAFTA members. Economic models constructed by Nkunjimana, Love, and Shumway (2003) show that, in the intermediate run with flexible capital markets, trade liberalization (i.e. the full implementation of URAA commitments) will result in increased farm profits, agricultural labour wage, and agricultural labour productivity in Mexico.

In Mexico, there is a wide diversity in the size of farm holdings. A major difference between the size structure of Mexican agriculture compared to that of the US or Canada is the large number of small holdings, with 10 or fewer hectares. On the other hand, large commercial farms are relatively small in number, but account for the largest proportion of marketed output (OECD, 1997). Rationalization in Mexican agriculture is displacing a large number of these small farm operations, thereby increasing the size and relative importance of medium-to-large commercial farms. This rationalization can be expected to boost labour productivity. There is also the potential for increased unemployment if excess agricultural labour is not rapidly absorbed by other sectors of the Mexican economy (Nkunjimana, Love, and Shumway, 2003).

⁵ The concentration ratio refers to the sales of the top four firms as a percentage of total sales by the sector.

⁶ Labour productivity is a measure of an industry's value-added per unit of labour worked.

Mexican employment data (as cited by Polaski, 2003) indicate that the country's agricultural sector lost about 1.3 million jobs between 1994 and 2002. While there has been concomitant job growth in the export-oriented manufacturing sector, this growth has not been sufficiently robust to improve the employment situation in much of rural Mexico.

The difference in labour productivity between the US and Mexico is a key factor contributing to the large flows of Mexican migration to the United States. US farmers rely heavily on Mexican-born workers, many of whom lack legal authorization in the US. According to data from the US Department of Labor's National Agricultural Workers Survey, people born in Mexico made up 78 percent of all US farmworkers in crop agriculture Fiscal Year 1998 (Zahniser and Treviño). Fifty-seven percent of these individuals lacked legal immigration status. Numerous Mexican migrants are also employed in meat processing and other subsectors within the US processed food industry. The presence of so many undocumented workers in the US agri-food sector underscores the fact that the North American labor market is still largely segmented. It also raises questions about which portions of the US agri-food industry would be competitive in the absence of these workers.

Total Factor Productivity

An important strand of recent research focuses on the link between increased integration and total factor productivity (TFP) to show how openness can lead to growth. New growth theory provides an explanation for TFP in terms of knowledge spillovers. These are benefits that are derived from investment in R&D (including new technologies and new management systems) which are not completely internalized by the investor. These benefits may accrue to other firms, including competitors, suppliers, and customers. MNE's help to spread innovations across borders by engaging in intrafirm trade in knowledge-related intangibles, and although this trade usually does not show up in any balance sheet, it represents an important transfer of resources from the parent to the affiliate, and by extension, to the affiliate's host country.

Research shows that both inter-industry and intra-industry spillovers from the US have had an important impact on productivity in the Canadian food and beverage industry during the period 1966-91 (Bernstein, 1998). Inter-industry spillovers are generated by the sum of the research-and-development (R&D) capital stocks in US manufacturing industries *other than* food and beverage. Intra-industry spillovers are generated by the sum of R&D capital stocks in the US food and beverage manufacturing industry. Inter-industry and intra-industry R&D spillovers from the US to Canada have resulted in the reduction of the average variable cost of food and beverage processing in Canada, as well as the intensity of labour, intermediate inputs, and physical capital. In other words, spillovers are causing the Canadian food and beverage processing to become more knowledge-intensive and more cost-effective.

Research Question: What is the relationship between increased trade and investment productivity growth in the sector? Further research in this area could help to identify and quantify dynamic gains arising from integration in the agri-food sector.

6. OPPORTUNITIES FOR FURTHER INTEGRATION

While integration of agriculture and food industries in the NAFTA countries has increased rapidly in the past decade, there is still significant potential for further progress. Trade and investment continue to be hampered by regulatory differences, complicated border procedures, tariffs and duties, producer support programs and trade disputes. Furthermore, the events of September 11, 2001, have heightened concerns about food safety and bioterrorism, causing governments to be particularly careful regarding imported foods.

Remaining Tariff Barriers

NAFTA and the URAA have gone a long way towards removing tariff barriers among the member countries, and only a handful of tariffs governing agri-food trade within North America are still in effect. Several commodities traded between Mexico and the US (and between Mexico and Canada) are subject to NAFTA's 14-year transition period and thus will not enjoy tariff- and quota-free trade until 2008. Prominent examples are US exports to Mexico of corn, nonfat dried milk, and dried beans, and Mexican exports to the US of sugar, peanuts, and asparagus. For corn, Mexico has chosen to implement a more liberal transitional policy than that specified by NAFTA, to the benefit of Mexican hog and poultry producers who rely on imported feed ingredients. In sharp contrast, Mexico and the US are locked in a protracted dispute about the implementation of NAFTA's provisions for bilateral sweetener trade. Due to this dispute, US-Mexico trade in sugar and sweeteners has experienced a marked decline. For Fiscal Year 2003, the US provided Mexico with its minimum market-access allocation for raw sugar under the WTO and its customary portion of the US TRQ for refined sugar, but not the much larger additional allocation specified by NAFTA. In addition, Mexico did not allow the entry of any US high-fructose corn syrup in calendar year 2003.

Several trade barriers were exempted from CUSTA and NAFTA and thus are likely to be the subject of market access disciplines negotiated in the context of the WTO's Doha Round. Canada retains high over-quota tariffs on imports of dairy products, poultry, and eggs, and imports are effectively restricted to very low levels. For its part, the United States also retains a system of TRQ's for dairy imports, as well as peanuts, peanut butter, and sugar.

Trade Disputes

Tariff elimination among Canada, US, and Mexico has not resulted in a frictionless system of international exchange. Imports of many agricultural products have, at various times, been subject to antidumping and countervailing duties by a NAFTA partner. Member countries have even resorted to closing their borders to imports of certain products. On occasion, actions taken to thwart trade are the result of lobbying by producer groups who wish to protect the domestic market from foreign competition (Young, 2001). The interruption of commerce has frequently led to trade disputes.

Each country has its own institutions devoted to determining if trade remedies are warranted: the Canadian International Trade Tribunal, the US International Trade Commission and the US Department of Commerce, and the Mexican Secretariat of the Economy. The final determinations of these bodies may be appealed to the secretariats of the WTO and NAFTA.

Formal dispute resolution represents only a very small part of the resolution processes that have occurred. Most disputes are addressed in earlier stages through consultation and

negotiation. Informal mechanisms are cost- and time-effective ways to resolve conflicts that may impede trade flows.

In the future, further attention should be paid to those areas in which divergent regulatory standards are the source of trade disputes. Incompatible national regulatory frameworks are sometimes the results of inadequate national capacity to set and enforce standards. Technical assistance provides a mechanism for resolving or preventing disputes by building scientific and institutional capacity. The inclusion of private industry in dispute resolution proceedings may circumvent the need to utilize formal, intergovernmental processes of dispute resolution. In disputes over grapes and cattle, producer groups in Mexico and the US worked together to address the regulatory incompatibilities and allegations of dumping that were at the heart of the disagreements (Zahniser and Link, 2002).

Regulations

Cooperation to eliminate regulatory incompatibilities can not only help to prevent some types of trade disputes, but it can also facilitate trade by reducing transaction costs. As tariffs have come down as part of CUSTA/NAFTA, various behind-the-border barriers (including regulatory differences) have increased in relative importance. In a recent survey of Canadian exporters conducted by the Fraser Institute (2003), a majority of respondent expressed that “informal” barriers are hindering access to the US market. These informal barriers include regulatory differences and regulatory complexity, cumbersome customs procedures, and domestic content requirements.

Regulation addresses the need to ensure that reasonable measures have been taken to address health and safety concerns, some of which arise directly from the use of new technologies in food production (Short, 2000). Moreover, an increase in the incorporation of science and technology in food products, coupled with greater consumer awareness and concern about the health aspects of the food they eat, has increased pressure to regulate food production.

According to the WTO and NAFTA, countries are allowed to set regulatory standards as they see fit, as long as these are based upon a scientific assessment of risk. However, regulations made at different times by different scientists working in different countries are likely to be different. A conscientious policy is therefore needed if harmonization is to be achieved (Short, 2000).

Harmonize what and with whom?

Government officials and regulatory agencies may wish to consider where harmonization efforts will yield the greatest trade benefits. For Canada and Mexico, harmonization with the US will make the most sense most of the time. Although there may be exceptions for certain product categories, the US dominates Canadian and Mexican agri-food export markets.

Regulatory harmonization may not always be appropriate because of other policy considerations. Uniquely national regulation that differs from that of trading partners may offer some benefits to domestic producers whose production is oriented mainly toward the domestic market. There may also be instances in which citizens would prefer regulations that differ from those of a major trading partner – whether for health, environmental, cost, or other reasons.

National governments could do much more to simplify the harmonization of regulations affecting cross-border economic activities. Regulatory guidelines could be developed, requiring governments to consider whether or not the adoption of a trading partner's regulation would suit domestic objectives. If so, the development of specifically national regulations would not be necessary. Governments could also review existing regulation with a view of removing arbitrary differences (Short, 2000). Technical regulations on food packaging, as well as some sanitary and phytosanitary requirements are areas in which regulatory differences “make work for border officials but do little to add to the store of human happiness” (Josling, 1997).

In order to address the issues raised by regulatory divergence in a concerted and productive manner, additional political interaction and institutional cooperation is needed (Josling, 1997). NAFTA is accompanied by relatively few tri-national institutional structures, particularly when compared with the European Union. NAFTA established two committees which play a role in ensuring that regulations are compatible: the Committee on Standards and Related Measures and the Sanitary and Phytosanitary (SPS) Committee. Committee power is limited to making recommendations to member governments (Young, 2001). The Technical Working Group on Pesticides, which operates under the auspices of the SPS Committee, could also potentially play a more active role in challenging regulatory initiatives that are not fully harmonized.

Domestic Farm Programs

Convergence in the area of domestic agricultural policy is perhaps more problematic than regulatory convergence. Such programs involve the spending of large sums, collected through domestic taxation. The idea of spending taxpayer's money on farm programs in neighbouring countries is not likely to be politically acceptable in North America, though it is a central feature of farm policy in Europe (Josling, 1997).

Domestic programs of the traditional type (such as supply management) require border measures in order to be effective. If one allows free trade in all commodities, one is agreeing to modify domestic agricultural programs (Josling, 1997). Decoupled and better targeted programs will be relatively unaffected by freer intra-bloc trade. The logic behind recent decoupled programs, such as Canada's Agricultural Income Stabilization (CAIS) program, is to eliminate trade distortions by severing the link between producer support and the prices for specific commodities.

Consumer demand

Food consumption across the NAFTA countries exhibits many differences and similarities. One of the more noteworthy differences concerns the level of meat consumption. Mexicans tend to eat less meat than US and Canadian consumers. In 2001, Mexican meat consumption equaled about 63 kilograms per capita, compared with 101 kilograms in Canada and 122 kilograms in the US (United Nations, Food and Agriculture Organization). Insofar as this lower level of meat consumption is driven by cross-country differences in per capita income and not cross-country differences in preferences, the gap between Mexican meat consumption and US and Canadian meat consumption should continue to narrow as incomes grow in Mexico.

Within each NAFTA country, there are also important differences in food consumption across socioeconomic groups. Food consumption naturally changes across the human life cycle, with caloric intake growing from birth to adulthood and eventually declining as people enter old

age. Even if preferences in each NAFTA country followed the same pattern across the life cycle, there would still be cross-country differences in food consumption, since Mexico's population is substantially younger than the populations of Canada and the US. Among the NAFTA countries, the median age is 37 years in Canada, 23 in Mexico, and 35 in the US (United Nations).

There are also broad similarities across the NAFTA countries. A recent survey of attitudes toward food and food issues, conducted by Environics International (2002) in four countries in the Americas (Mexico, Brazil, Canada, and the US) and four in Europe (Great Britain, Italy, Germany and France), found that people in the Americas had very similar attitudes toward food. They are open to change in the food system as long as the change promises to be beneficial, such as the enhancement of the nutritional value of food. Furthermore, nutrition is the most important factor when choosing food. When compared with Europeans, those from the Americas are much less strongly opposed to genetically modified foods. In short, there are many similarities in view among consumers in Canada, the US, Mexico, and Brazil, and "a pronounced food culture divide" between the Americas and Europe. Interestingly, in all three NAFTA countries, food from "some other country" is regarded as potentially less safe than domestically-produced food.⁷

While the similarity in food attitudes among North Americans bodes well for food manufacturers who would like to achieve economies of scale through market consolidation on the continent, differences in consumption patterns across and within the NAFTA countries contribute to the differentiation of food products. Large ethnic niche markets, such as Hispanic groups throughout the US and Asians in both Canada and the US, present important opportunities for food manufacturers that are able to customize their products to particular segments of the population. At the same time, there is a process of cultural blending in which people are eating foods from other cultures and sometimes shunning foods from their own cultures. Wider availability of cuisines from different cultures generally enhances consumer welfare, but the adoption of unhealthy or excessive food intake patterns (coupled with a sedentary lifestyle) is having negative health effects in many parts of the NAFTA region.

Food Safety and the Threat of Bioterrorism

The terrorist attacks of September 2001 heightened concerns about possible threats to the safety of the American population by politically motivated groups. Contamination of the food supply using agents such as anthrax, botulism, and pneumonic plague is viewed as one of the most potentially devastating forms of bioterrorism. The US government has taken steps to protect its population from the threat of bioterrorism. The US Bioterrorism Act contains several provisions which relate to agri-food imports and are designed to give US authorities greater control over incoming food shipments.

One measure that is likely to affect the conduct of international agricultural trade is the regulation regarding Prior Notice of Imported Food Shipments. The prior notice regulation requires that the US Food and Drug Administration (FDA) receive prior notice of food to be imported into the US. Most of the information required is already provided by importers to US customs when goods arrive at the border or shortly thereafter; the new regulation makes it necessary for importers/brokers to provide this information *in advance* of the shipment's arrival.

⁷ Data is not readily available to indicate if North Americans view food produced in other North American countries as safer than food produced outside North America. If this were the case, it would represent an important factor favoring North American integration in this sector.

The FDA plans to use the lead time generated by Prior Notice to deploy additional food inspection resources to border points that may need them.

7. CONCLUSION

Integration of the North American agri-food sector has created tangible economic benefits for producers, processors, and consumers. Integration has expanded the range and amount of food products available to consumers, it has allowed producers and processors to specialize in goods for which they demonstrate comparative advantage, and it has generated important international knowledge spillovers in the food processing industry.

However, there remain many unanswered questions about the impact of integration. While there are extensive data describing changes in trade and investment levels, much less is known about how integration is reshaping the industrial and social organization of the North American agri-food sector. Relatively little empirical evidence exists about integration's impact on employment, competition, efficiency, and productivity growth, and there is scant evidence that separates integration's influence from other factors, particularly at the state, provincial, and local levels. Further research in these areas could help decision-makers to anticipate the benefits and costs which are likely to arise from further integration, so that policies might be crafted to facilitate the adjustment process. Such research will also help policymakers understand how best to achieve domestic food and agricultural policy objectives in the context of increasingly integrated continental markets.

As tariffs come down and agri-food trade among Canada, the US, and Mexico reaches higher levels, other trade barriers are attracting the attention of the public and private sectors of each NAFTA country. These barriers often take the form of regulatory differences or domestic farm programs, neither of which are typically considered "border policies", *per se*. Already, the agricultural ministries of the NAFTA countries have devoted a great deal of energy to improving sanitary and phytosanitary measures so that they do not unnecessarily restrict trade, and producers and policymakers in each member country are keenly interested in the domestic agricultural policies of the neighbouring NAFTA countries.

The increasing economic interdependence of the NAFTA countries will provide impetus to harmonize policies so that their impact on continental production and trade patterns is lessened. There may also be a need for increased cooperation among the governments of the NAFTA countries, possibly through new or augmented institutional structures, for the design of more compatible regulatory standards and domestic farm and food policies. Policy convergence is also favoured by common membership in multilateral institutions, such as the WTO. Improved dispute resolution procedures, with an emphasis on informal measures, will also favour a smooth transition to more integrated markets.

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