



OFFICE OF INDUSTRIES WORKING PAPER
U.S. INTERNATIONAL TRADE COMMISSION

Exports and New Varieties: An Analysis of U.S.-Mexico Agricultural Trade

**Cathy L. Jabara
Brendan Lynch
U.S. International Trade Commission**

September 2006

Cathy L. Jabara is a Senior Economist and Brendan Lynch is an intern in the Office of Industries of the U.S. International Trade Commission. The authors appreciate helpful reviews by Michael Ferrantino and Tim McCarty of the Commission. Office of Industries Working Papers are the result of the ongoing professional research of USITC Staff and are solely meant to represent the opinions and professional research of individual authors. These papers are not meant to represent in any way the views of the U.S. International Trade Commission or any of its individual Commissioners. Working papers are circulated to promote the active exchange of ideas between USITC Staff and recognized experts outside the USITC, and to promote professional development of Office staff by encouraging outside professional critique of staff research.

**Address correspondence to:
Office of Industries
U.S. International Trade Commission
Washington, DC 20436 USA**

Exports and New Varieties: An Analysis of U.S.-Mexico Agricultural Trade

Cathy L. Jabara
Brendan Lynch
U.S. International Trade Commission

Comments Welcome

ABSTRACT: In recent years, economists have focused on examining the link between trade liberalization and trade in new product varieties in order to more fully quantify the gains from trade. Much of the literature in this area has focused on measuring the growth in trade in new tariff lines and then linking this trade to changes in tariffs or other factors under free trade agreements (Feenstra and Kee (2005), Debaere and Mostashari (2005), and Hillberry and McDaniel (2002)). This paper provides some additional insights on the role of new product varieties by examining the expansion of U.S. trade in agricultural products with Mexico under the NAFTA. Using methodology developed by Feenstra and Kee (2005) we examine the increase in product variety of U.S. imports from Mexico from 1993-2005 using trade variety indexes that measure the increase in new tariff lines. To complement this analysis, we also examine Mexico's exports of new varieties to the United States since 1993 on a value basis. We conclude that while an analysis of changes in trade under new tariff lines is important to understand the importance of new varieties, the effects on international trade flows may be different, depending on the actual volumes of trade in new tariff lines. Additionally, we found that, in addition to tariff preferences, factors such as direct investment, adoption of technological change, and changing consumer tastes in the United States have contributed to Mexico's opportunities for new product exports under the NAFTA.

Exports and New Varieties : An Analysis U.S.-Mexico Agricultural Trade

Introduction

With the expansion of trade agreements in recent years, an important area of economic research is how to more fully analyze and explain the gains from trade. Economics researchers have developed both partial equilibrium and computable general equilibrium models that can explain the effects of changes in tariffs and other trade barriers on existing trade flows using accepted economic parameters. However, more recently, researchers have noted that the value of trade between two countries can grow in two ways following trade liberalization: countries can export more of the goods they had already been trading, which is growth on the *intensive* margin, or they can begin exporting goods they had not been previously trading, which is growth on the *extensive* margin (Kehoe and Ruhl, 2003; Hillberry and McDaniel, 2002). Due to a lack of data and estimates of the parameters necessary to quantify the development of new product varieties following a decrease in trade barriers, economic models have generally not incorporated an extensive margin (Francois and Martin, 2006). The omission of the effects of trade liberalization on the extensive margin likely leads to an understatement of the effects of trade agreements on trade and on the benefits to liberalizing countries.

The objective of this paper is provide some data and information on the role of the extensive margin in the expansion of trade in agricultural products under the NAFTA. In particular, this paper focuses on U.S. imports of agricultural products from Mexico and the opportunities for growth in new product varieties that have occurred in Mexico since the NAFTA came into effect in early 1994. Since 1993, U.S. agricultural imports from Mexico have grown significantly. U.S. agricultural imports from Mexico grew from 10.9 percent of the total of U.S. agricultural imports in 1993, the year before the NAFTA was implemented, to 14.9 percent of total U.S. agricultural imports in 2005. The paper will shed some light on the extent to which the NAFTA provided opportunities for export of new product varieties from Mexico and the factors that contributed to these exports.¹

¹ Hillberry and McDaniel (2002) applied a simple decomposition of U.S. trade growth with NAFTA partners during 1993-2001. Their results showed that a large part of the increase in U.S. imports from Mexico during this time period was due to trade in a larger number of tariff lines.

This paper is organized as follows. First, the background and importance of research on export varieties in international trade is discussed. Second, methodology to examine the changes in export variety over time developed by Feenstra and Kee (2005) is introduced. In the third section, this methodology is used to examine Mexico's changing variety in its exports to the United States from 1989 to 2005. This period of time is significantly long to examine Mexico's export variety both before the NAFTA was implemented in January 1994 and after its implementation. Most studies, utilizing the methodology of Feenstra and Kee and others, have estimated changes in export variety through the increase in tariff lines or "new goods." In the final sections of the paper, we examine Mexico's exports of new varieties to the United States since 1993 on a value and import share basis. We conclude that while an analysis of changes in trade under new tariff lines is important to understand the importance of new varieties, the effects on international trade flows maybe different, depending on the actual volumes of trade in new tariff lines. Additionally, we found that, in addition to tariff preferences, factors such as direct investment, adoption of technological change, and changing consumer tastes in the United States have contributed to Mexico's opportunities for new product exports under the NAFTA.

Background and Importance of the Trade Variety Issue

The lack of economic analysis on the relationship between product variety and trade liberalization has been of concern to economists for two basic reasons. First, to the extent trade liberalization creates the opportunity for exports of new or higher quality products, the liberalizing countries will experience increased productivity and economic growth. Often these gains are unmeasured. For example, Feenstra et. al. (1999) analyzed the relationship between output variety and productivity using disaggregated exports to the United States from South Korea and Taiwan. Their study found that relative export variety had a positive and significant effect on total factor productivity in 9 of the 16 sectors analyzed. In a later study, Feenstra and Kee (2004) analyzed the effects of export variety on GDP for 34 countries using data for 1982 to 1997. Their study showed that tariffs are statistically important in affecting productivity through effects on export variety.

Second, economists have examined issues of trade liberalization and product variety from the point of view of improving studies that model the effects of trade liberalization. Hummels and Kleenow (2002) have noted that trade models, which generally use simple Armington elasticities of national differentiation, predict that trade will occur entirely on the intensive margin. Without an extensive margin, they note that these models miss two-thirds of how larger economies export more, and one-third of how they import more. Moreover, they note that expanding exports of distinct national varieties on a purely intensive margin can drive down the prices of those varieties on the world market, worsening a country's terms of trade. On the other hand, according to Francois and Martin, increases along the extensive margin (new product varieties) shift out the export demand curve and provide additional gains from trade.

In regard to quantifying the gains from globalization and trade, in addition to improving modeling analysis, economists have been concerned that the lack of understanding of the importance of new varieties has led to an under reporting of the gains from trade. In a recent article Broda and Weinstein (2005) examined how the availability of new goods through international trade has affected consumer welfare. They note that international trade has significantly broadened consumer choice. Broda and Weinstein estimated the value of global variety growth in the 1972-2001 period at roughly \$260 billion.

Debaere and Mostashari (2005) have noted that while several studies, including those cited above, have examined the link between the extensive margin and trade liberalization, further analysis would be useful to link tariff reductions to increased trade in new goods at the disaggregated level. Their paper analyzed the changing extensive margin in bilateral exports to the United States between the periods 1989-1991 and 1998-2000. Using disaggregated tariff line data, they found that some goods became obsolete, new goods appeared, and some goods were reclassified. Examining the "permanent goods," or the goods whose HS classifications remained constant over the sample period, they found that countries that benefitted from tariff preferences, such as Mexico, exported new goods during the time period of analysis, but that countries which did not benefit from tariff preferences, such as China, exported new goods as well. Using regression analysis, the authors found that tariffs and tariff preferences

do affect the extensive margin, but that the overall contribution of tariffs and tariff preferences is relatively small. They cite other factors as being more important, such as technological change and the macroeconomic environment in explaining the action at the extensive margin.²

New Products and Measurement of Export Variety

For the purpose of measuring changes in Mexico’s export variety under NAFTA, we utilize methodology developed by Feenstra and Kee (2004, 2005). Feenstra and Kee describe the expansion of product varieties as a “new goods” problem: a good that is newly available will have an observed price and quantity, but no corresponding price or quantity the year before. Assuming the set of feasible varieties in a country will lie along a strictly concave transformation curve, they show that for a given transformation curve, and given prices, an increase in the number of output varieties will raise revenue. They argue that costs are reduced or revenue is increased when the set of product varieties expands. They develop an index of product variety constructed from a CES production function when the inputs enter non-symmetrically (Funke and Ruhwedel 2001). The index is constructed by comparing two units of observations, either two time periods or two countries.

Following Feenstra and Kee (2005), Mexico’s export variety to the United States is measured by comparing its product variety in exports to the United States to that of the world, using the following formula:

$$\lambda_t^c \equiv \lambda_t^*(I_t^c) = \frac{\sum_{i \in I_t^c} p_{it}^* q_{it}^*}{\sum_{i \in I_t^*} p_{it}^* q_{it}^*} = 1 - \frac{\sum_{i \in I_t^*, j \notin I_t^c} p_{it}^* q_{it}^*}{\sum_{i \in I_t^*} p_{it}^* q_{it}^*}$$

² Debaere and Mostashari argue that, in their paper, they are the first to investigate the link between the extent of tariff reductions and the changing extensive margin using very disaggregated data. However, by only examining trade in “permanent” goods, Debaere and Mostashari eliminated new tariff classifications that could have evolved over the life of their sample to accommodate trade in new products or in products that become more economically important. This omission may affect the results of their study.

where λ_t^c is an index of the product variety of a country, in this case Mexico. $\lambda_t^*(I_t^c)$ denotes the expenditure of the United States on the set of varieties imported from Mexico relative to the complete set of varieties imported from the world in time period t , and I_t^c is the complete set of goods imported by the United States from Mexico in period t . The set I_t^* is the complete set of varieties imported by the United States in year t , and $\sum_i p_{it}^* q_{it}^*$ is the total value of imports of good i by the United States. Thus, export product variety in Mexico is measured as an index relative to the world and is interpreted as the share of total U.S. imports from products that are exported by Mexico. Feenstra and Kee note that this measure depends on the set of exports of a given country c , I_t^c , but not on its value of exports, except insofar as they affect the value of worldwide exports. A higher value of the product variety index measured over time indicates a larger range of products being exported by country c .

Mexico's Agricultural Product Variety

As noted in other studies, measurement of changes in product variety requires the availability of highly disaggregated product data. Variety shifts over time may not be observable at the Harmonized System (HS) 2- or 6-digit level if the new varieties fall within tariff headings or sub-headings in which products are being exported at the start of the measurement period time t_0 . The more detailed the data, the more it is possible to observe the variety shifts over time. For the indexes presented below, variety indexes were constructed using the 10-digit HS tariff classification for U.S. imports.

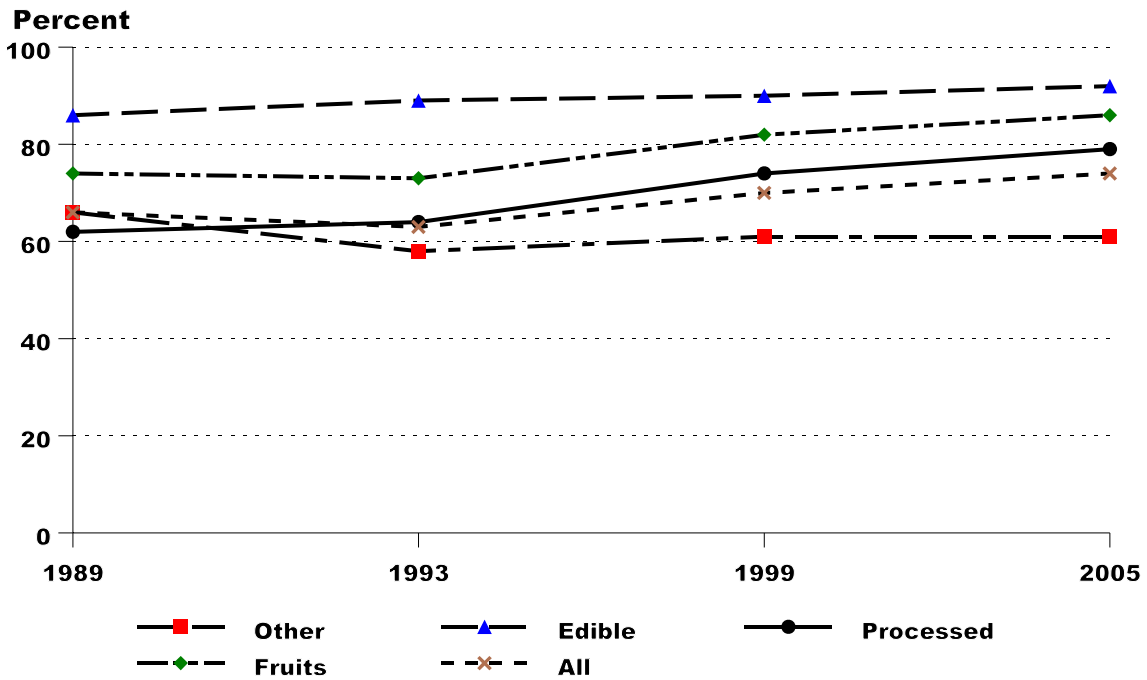
Product variety indexes were constructed for Mexico's agricultural exports to the United States. Five indexes were constructed: agricultural products as a whole; edible vegetables (HS chapter 7); edible fruits and nuts (HS chapter 8); processed foods and beverages (HS chapters 16-22); and other agricultural products in the remaining agricultural HS chapters.³ The indexes were constructed over four years: 1989,

³ In this paper, agricultural products are defined as tariff lines in HS chapters 1-24, less fish in chapter 3; and headings 41.01 to 41.03, 43.01, 50.01 to 50.03, 51.01 to 51.03, and 52.01 to 52.03.

1993, 1999, and 2005. The indexes constructed for 1993 to 2005 reflect changes in Mexico's product variety in exports to the United States in the post-NAFTA world. However we do not formally test for a statistical relationship between product variety and NAFTA tariff changes. Rather, the indexes reflect the opportunities for Mexico's changing product variety under the trade environment provided by NAFTA.

The export variety indexes for Mexico's agricultural exports to the United States are shown in figure 1, which plots the trend in the indexes for 1989 to 2005. As shown in figure 1, the product variety of Mexico's exports to the United States was fairly high prior to the NAFTA. In 1989, 66 percent of U.S. agricultural imports consisted of the set of products exported by Mexico. The share of Mexico's product variety was highest for edible vegetables (86 percent) and lowest for processed products (62 percent). Interestingly, in 1993, the year before the NAFTA was implemented, Mexico's export variety in agricultural exports to the United States had declined in agriculture as a whole (64 percent of U.S. import agricultural import variety), the exceptions being marginal increases in the export variety of edible vegetables and processed foods). This suggests that prior to the NAFTA, the United States was expanding its imports of varieties exported by countries other than Mexico in certain sectors, or that other countries were capturing growth in export opportunities for new product varieties. The NAFTA may have helped to reverse that trend.

Figure 1 Mexico: Agricultural export variety, 1989-2005



All agricultre	66	63	70	74
Fruits and nuts	74	73	82	86
Edible vegetables	86	89	90	92
Processed products	62	64	74	79
Other agriculture	66	58	61	61

Source: Calculated data from the Department of Commerce.

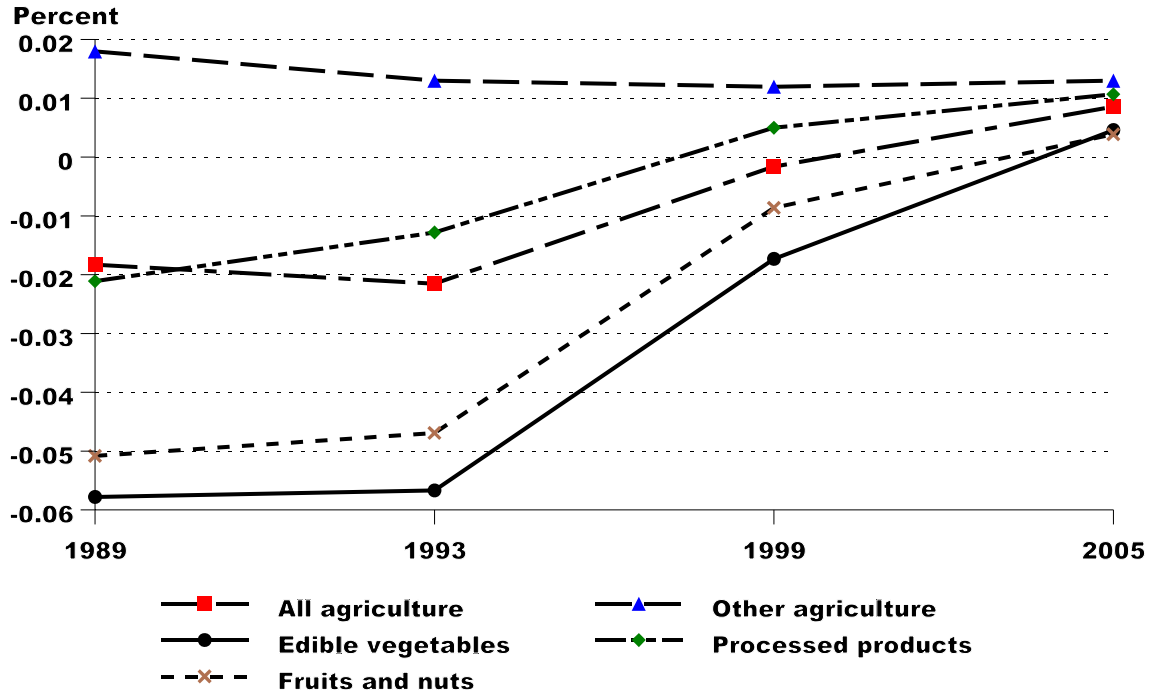
Following the NAFTA, Mexico's product variety in exports to the United States increased sharply in a number of sectors, with the largest increases in fruits and nuts and processed products during the first five years (1994-1999). Mexico's product variety share in U.S. imports of edible vegetables rose marginally, but this share was fairly high in 1999. By 2005, Mexico's share in U.S. agricultural import variety had risen from 63 percent in 1993 to 74 percent in 2005, or by 11 percentage points. From 1993 to 2005, the largest increases in Mexico's export variety to the United States were in processed products (increase from 64 to 79 percent), followed by fruits and nuts (increase from 73 to 86 percent), other agricultural products (increase from 58 to 61 percent), and edible vegetables (increase from 89 to 92 percent).

U.S. Import Preferences for Mexico's Agricultural Goods

Feenstra and Kee (2005) examined the relationship between trade liberalization under the NAFTA and Mexico's export product variety using regression analysis for all U.S. product sectors, including agriculture using pooled data for seven industries and twelve years. They found that a NAFTA dummy variable was statistically significant in explaining the increase in Mexico's export variety to the United States following the NAFTA. In a second regression analysis, Feenstra and Kee removed the NAFTA dummy and regressed the log values of Mexico's and U.S. tariffs, plus an interaction term, on Mexico's export variety. They found the tariff terms to be statistically significant, and that changes in Mexico's export variety were almost fully explained by reductions in the bilateral tariff terms.

The tariff preferences for U.S. agricultural imports from Mexico under NAFTA are shown in figure 2 for the five agricultural sectors. The preferences are calculated as the difference, in percentage points, between the average U.S. tariff applied to goods entering the United States from countries other than Mexico less the average U.S. tariff applied to Mexican goods. A positive value in figure 2 indicates that the U.S. tariffs applied to goods originating from countries other than Mexico were higher than the average tariffs applied to Mexican goods (Mexican goods have a tariff preference). A negative value indicates that the tariffs applied to Mexican goods were higher (non-Mexican goods have a tariff preference). U.S. tariffs were calculated from duties collected as a percent of the applicable customs value.

Figure 2 U.S. tariff preferences: Agricultural imports from Mexico, 1989-2005



All agricultre	-0.0183	-0.0215	-0.0016	0.0086
Fruits and nuts	-0.0508	-0.0469	-0.0086	0.0039
Edible vegetables	-0.0578	-0.0567	-0.0173	0.0046
Processed products	-0.0211	-0.0128	0.0050	0.0107
Other agriculture	0.0180	0.0130	0.0120	0.0130

Source: Calculated data from the Department of Commerce.

The data on tariff preferences indicate that, similar to the findings of Feenstra and Kee, U.S. tariff preferences for Mexico likely provided some incentives for increasing variety in Mexico’s exports to the United States following the NAFTA. During 1993 to 2005, average U.S. tariffs applied to Mexico’s exports of processed products, the sector which experienced the largest increase in product variety, fell below those applied to U.S. imports from other countries in the same chapters by 1999, as noted by the positive coefficient on the tariff preference. On the other hand, the U.S. tariffs applied to Mexico’s exports of “other agricultural products” were lower than those applied to U.S. imports from other countries at the start of the NAFTA, and this “preference” appears to have stayed about the same during the NAFTA. Aside from edible vegetables, this sector had a relatively small increase in export variety following the NAFTA as measured by tariff lines. By 2005, U.S. tariffs applied to Mexico’s agricultural

exports were lower on average than the tariffs applied to U.S. imports from other countries for the sectors in Figure 2 and for agriculture as a whole, as noted by the positive coefficients for all values in 2005.

New Varieties and Impact on Trade Flows

The number of tariff lines under which the United States imported agricultural products from Mexico rose from 425 to 826 during 1993 to 2005, illustrating both the increase in variety in both Mexico's exports and in U.S. agricultural imports. At the same time, U.S. agricultural imports from Mexico increased by over 200 percent during 1993-2005, from \$2.8 billion to \$8.8 billion.

Important questions for both trade modeling and to further understanding of the trade impacts of the NAFTA are (1) to what extent did Mexico's exports of new varieties contribute to an expansion of trade in 2005, and (2) what other factors, other than tariffs, may also have contributed to the increase of new varieties in Mexico's trade. These questions will be addressed in the following sections.

Mexico's new varieties and trade flows

To estimate the new varieties in U.S. agricultural imports from Mexico, we first imposed the set of agricultural goods (I_t^c , $t=1993$) imported by the United States from Mexico in 1993 on the set of goods imported by the United States from Mexico in 2005 (I_t^c , $t=2005$). According to Feenstra and Kee (2005) and Funke and Ruhwedel (2001), if the number of varieties has increased, then the common set of goods in the two periods is represented by I_t^c , $t=1993$, and the new goods are represented by goods in I_t^c , $t=2005$ that are not in the set of goods $t=1993$. Using this methodology, the value of U.S. agricultural imports from Mexico that were imported from Mexico in both 1993 and 2005 in the same HS-10 tariff lines amounted to \$5.1 billion in 2005. The difference, the goods in new tariff lines, accounted for \$3.7 billion, or 42 percent of U.S. agricultural imports of \$8.8 billion from Mexico in 2005, or approximately 62 percent of the increase in U. S. agricultural imports from Mexico from 1993 to 2005.

However, following the methodology of Debaere and Mostashari, the calculation of new goods is likely overstated due to fact that, by 2005, many of the HS-10 classifications had disappeared, or goods

were reclassified in different tariff lines. Trade in goods that were reclassified should not be classified as new goods, as the goods are simply entering under new tariff classifications. In many cases, new HS-10 tariff lines which had appeared as goods in “basket” categories were refined to account for the increasing economic importance of goods in the “basket” categories.

To correct for new classifications (and disappearing old classifications), we compared the tariff lines in which imports entered the United States in 2005 with those in 1993. In instances where trade was reclassified, or broken out into new HS lines, we subtracted this trade from the initial estimate of “new goods” trade of \$3.7 billion in 2005. The estimate of new goods trade is conservative. In instances where it was not clear whether trade in the new classification was comprised of goods that were continuing to be traded or new goods, we subtracted the estimate as trade in old goods.

The calculated values of U.S. imports of new agricultural goods from Mexico in 2005 are shown in table 1 on a total and sectoral basis. As compared to total U.S. agricultural imports from Mexico in 2005, the “new” goods accounted for approximately 16.8 percent of these U.S. agricultural imports. The data suggest that an expansion in products that were already being exported by Mexico in 1993 accounted for the largest increase in U.S. imports from Mexico during 1993-2005, although the trade in new varieties is also significant.

Table 1 U.S. Agricultural imports from Mexico: Estimate of new product trade value and share, 2005

	New product value	Total U.S. imports	Share
	Million dollars	Million dollars	Percent
Processed foods	464.0	3,753.7	15.8
Vegetables	463.0	2,567.7	18.0
Fruit and nuts	385.0	1,410.3	27.3
Other	165.1	1,082.3	15.3
Total	1,477.1	8,818.4	16.8

Source: Compiled from trade data of the Department of Commerce.

The share of new products in the vegetables sector, which experienced the smallest increase in trade variety as measured in tariff lines, amounted to about 18 percent of U.S. imports of such products from Mexico. Much of the growth in new products in this sector is accounted for by new varieties of tomatoes, such as grape varieties, as well as an expansion of greenhouse production of vegetables. A

number of greenhouse tariff lines were added to the U.S. tariff schedule in 1999.⁴ U. S. imports of new products from Mexico in the fruits and nuts sector amounted to 27 percent of sectoral imports in 2005. As will be discussed in a later section, the easing of a U.S. ban on imports of avocados from Mexico played an important role in Mexico's increase in export variety in the post-NAFTA period in this sector.

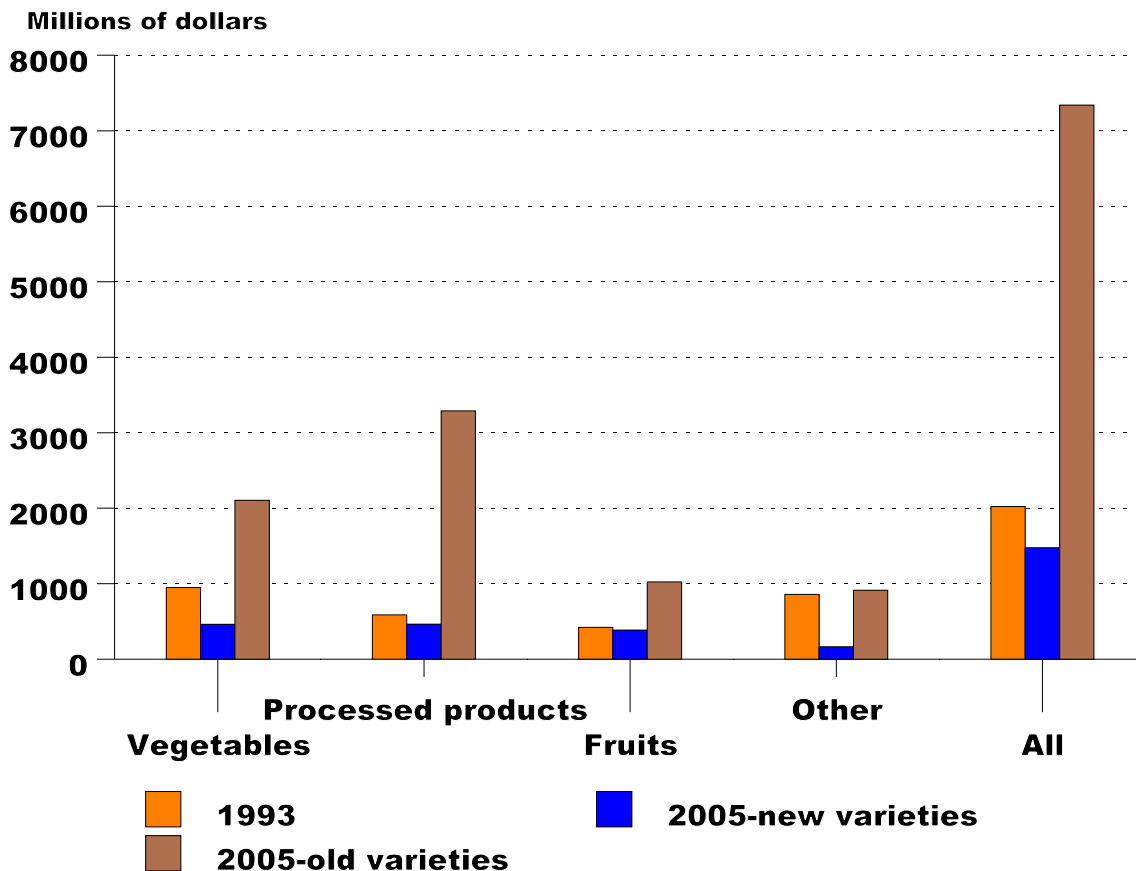
The share of new goods in the processed foods sector, which experienced the largest increase in trade variety as measured by new tariff lines, amounted to approximately 16 percent of U.S. imports in this sector. Trade increases in this sector encompassed a large number of tariff lines, but import growth in individual tariff lines was relatively small, as compared to the vegetables sector. Nonetheless, as measured by the trade variety index, U.S. imports of processed foods from Mexico increased at a faster rate than such imports from other countries. The share of new goods in U.S. imports from this sector is also relatively small because the growth in trade in this sector is dominated by higher U.S. imports of beer and other beverages, products that were not classified as new goods. Similarly, the share of the other agricultural products sector in U.S. agricultural imports from Mexico amounted to about 15 percent of U.S. sector imports from Mexico. However, the low growth in the trade variety index indicates that other countries increased their exports of other agricultural products to the United States at a faster rate.

New varieties and contribution to Mexico's export growth

To estimate the contribution of new product varieties to the growth in U.S. agricultural imports from Mexico since the NAFTA, figure 3 shows U.S. agricultural imports from Mexico in 1993 and 2005, with the 2005 imports decomposed into (1) new agricultural goods, and (2) agricultural goods that were not estimated to be new since 1993 ("old varieties"). Comparing the trade in new goods to the growth in U.S. agricultural imports from Mexico between 1993 and 2005, the trade in new goods of approximately \$1.5 billion amounted to about 25 percent of the growth in total U.S. agricultural imports of \$6.0 billion.

⁴ Greenhouse vegetables were in production in Mexico prior to NAFTA. But since the tariff lines were not established until 1999, it is assumed that such exports were not economically significant.

Figure 3 U.S. agricultural imports from Mexico, 1993 and 2005



Source: Compiled from trade data from the Department of Commerce.

For fruits and nuts, such growth in new product varieties amounted to 39 percent of the growth in total U.S. imports of such products of approximately \$1.0 billion in 2005. For edible vegetables and processed products, U.S. imports of new products in 2005 amounted to 29 and 15 percent of the growth of such imports between 1993 and 2005. The share of new products in the growth of U.S. imports of other agricultural products from Mexico amounted to 74 percent of the total growth of these imports of \$221.8 million. Although U.S. imports of these goods were relatively stagnant, exports of new products accounted for the bulk of the increase. New product varieties in this sector largely occurred in meats and edible offal in HS chapter 2 and dairy products in HS chapter 4.

Factors Affecting Trade in New Varieties

While it has been shown that tariff preferences have been associated with increased product variety in U.S. agricultural imports from Mexico, a number of other factors have also been present to push the process along. These factors, most likely, were also correlated with increasing tariff preferences for Mexican imports as well as the changing macroeconomic environment under the NAFTA. Doan, et. al. noted that many observers believe that NAFTA was an important catalyst for foreign investment in Mexico insofar as it signaled that permanent changes would be made to liberalize the Mexican economy. They report that, by 2002, the stock of U.S. direct investment in Mexican food industries accounted for \$1.4 billion, based on data from the Department of Commerce. Moreover, data on foreign direct investment (FDI) in Mexico from Mexican sources indicates that foreign investment in the food, beverage, and tobacco sector amounted to \$6.4 billion from January 1999 to September 2004 (Secretaria de Economia). Almost half of that total originated from U.S. companies.

In the edible vegetables sector, new product varieties arose from new varieties of tomatoes (grape) that met the changing tastes of U.S. consumers for such products. In addition, the expansion of greenhouse technologies increased U.S. imports of a variety of vegetables from Mexico, including tomatoes, cucumbers, and peppers. In the edible fruit and nuts sector, the largest growth in new products was in imports of avocados. Such imports accounted for \$226.7 million in U.S. imports or 59 percent of the new trade value in this sector in 2005. The expansion in U.S. imports of avocados from Mexico resulted from the lifting of a longstanding ban in 1997 that had been imposed by the United States to prevent the introduction of plant pests. In addition, new imports of limes also contributed to new trade varieties in this sector. In the case of limes, although tariffs were eliminated under NAFTA, the growth of new varieties was accelerated by Hurricane Andrew in 1992 which decimated the Florida industry.

In the processed foods sector, U.S. sugar policies, in addition to reduced tariffs on U.S. products, likely spurred the development of new export varieties in this sector.⁵ Industry sources have reported that

⁵ For example, the U.S. Department of Commerce (2006) reports that high sugar costs during 1997-2002 were a major factor in U.S. companies' decisions to relocate to other countries.

many U.S. confectionary companies have moved their manufacturing operations to Mexico, primarily due to access to cheaper labor and sugar prices. As noted above, new product varieties in Mexico's exports of dairy products and preparations also increased following the NAFTA. FDI in those industries in Mexico totaled over \$1.0 billion between January 1999 and September 2004, equivalent to almost 17 percent of the FDI in the agriculture, food, and beverage industries during that period (Secretaria de Economia). There was an especially large increase in FDI in 2003 and 2004 in the production of condensed and powdered milk, with a corresponding increase in Mexico's exports of these products to the United States.

Conclusions

To date, there has been much interest by economists on analyzing the relationship between development of new export varieties and trade liberalization. While a number of papers have examined the relationship between trade liberalization and trade variety indexes, few have examined the relationship between the development of new varieties and trade flows. This paper has attempted to measure the importance of new varieties in U.S. imports of agricultural products from Mexico under the NAFTA, and to provide information on some of the factors that likely affected such trade flows.

Overall, the data indicate that while it is important to examine the relationship between trade liberalization and changes in export variety, the impact on trade flows may differ, depending on the level of trade in new goods tariff lines. An examination of U.S. agricultural imports from Mexico also showed that tariff liberalization, along with such factors as U.S. policies, disruptions in U.S. supplies, foreign direct investment, and the ability of the Mexican industry to meet U.S. phytosanitary standards and to invest in products that met the changing tastes of U.S. consumers were also factors affecting developments in new goods and industries.

References

- Broda, Christian and David Weinstein. "Are We Underestimating the Gains from Globalization for the United States?" *New York Federal Reserve Bank Current Issues in Economics and Finance* 11, no. 4 (2005). http://www.ny.frb.org/research/current_issues/ci11-4.html.
- Debaere, Peter and Shalah Mostashari. "Do Tariffs Matter for the Extensive Margin of International Trade? An Empirical Analysis." Center for Economic Policy Research. Discussion Paper 5260, Sept. 2005.
- Doan, Darcie, Andrew Goldstein, Steven Zahniser, Tom Vollrath, and Chris Bolling. "North American Integration in Agriculture: A Survey." In *North American Agrifood Market Integration: Situation and Perspectives*, edited by Karen M. Huff, Karl Mielke, Ronald D. Knutson, Rene F. Ochoa, James Rude, and Antonio Yunez-Naude, 51-85. Guelph: University of Guelph, 2005.
- Feenstra, Robert C., Dorsati Madani, Tzu-Han Yang and Chi-Yuan Liang. "Testing Endogenous Growth in South Korea and Taiwan." *Journal of Development Economics*, 60 (1999), 317-341
- Feenstra, Robert C., and Haiiau Looi Kee. "On the Measurement of Product Variety in Trade." *American Economic Review*, 94, no. 2 (2004), 145-149.
- Feenstra, Robert C., and Hiau Looi Kee. "Export Variety and Country Productivity." National Bureau of Economic Research. Working Paper 10830, October 2004.
- Feenstra, Robert C., and Hiau Looi Kee, "Trade Liberalization and Export Variety: A Comparison of China and Mexico." prepared for The World Bank, March 2005.
- Francois, Joe and Will Martin. "Great Expectations: Ex Ante Assessment of the Effects of Trade Reform." Paper presented at the Ninth Annual Conference on Global Economic Analysis, Addis Ababa, Ethiopia, June 15-17, 2006.
- Funke, Michael and Ralf Ruhwedel. "Product Variety and Economic Growth: Empirical Evidence from the OECD Countries." IMF Staff Papers, 48, no. 2 (2001), 225-242.
- Hillbery, Russell H. and Christine McDaniel. "A Decomposition of North American Trade Growth Since NAFTA." U.S. International Trade Commission. Office of Economics Working Paper, Dec. 2002.
- Hummels, David and Peter J. Klenow. "The Variety and Quality of a Nation's Trade." National Bureau of Economic Research Working Paper 8712, Jan. 2002.
- Kehoe, Timothy and Kim J. Ruhl. "How Important is the New Goods Margin in International Trade?" Federal Reserve Bank of Minneapolis. Research Department Staff Report, Oct. 2003.
- Secretaria de Economia (Mexico). "Cuadro No. 4: Inversion Extranjera Directa Maerializada en Alimentos, Bebidas y Tabaco.." <Http://www.economia.gob.mx/pics/p/p1177/ALISEP04.xls>.
- U.S. Department of Commerce. Employment Changes in U.S. Food Manufacturing: The Impact of Sugar Prices. Feb. 2006. <Http://www.ita.doc.gov/media/Publications/pdf/sugar06.pdf>.