Trade Creation and Trade Diversion in the North American Free Trade Agreement: The Case of Agricultural Sector

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Objective

Assess the impacts of NAFTA on U.S.–Mexico trade of agricultural commodities, with specific aim of determining whether NAFTA resulted in trade creation or trade diversion

Agricultural Sector

USDA definition (FAS) : U.S. Harmonized Tariff System (HTS) - Chapters1-24, with the exception for fishery products in Chapters 3 and 16; Chapter 33 (essential oils), Chapter 40 (raw rubber), Chapter 41(raw animal hides and skins), and Chapter 51-52 (wool and cotton).

Characteristics of the Study

➤ Focuses on the agricultural products within the 4-digit level of Harmonized Tariff Schedule (HTS), primarily products with non-zero pre NAFTA tariffs.

➤ Allows the impacts of tariff reduction to differ during the NAFTA period.

➤ Assess the differential impacts of pre-NAFTA tariffs (initial tariff rates) on the U.S. imports from Mexico (See: Clausing, 2001)

ECONOMETRIC ANALYSIS

- **Import demand - Mexico:**

$$\ln Q_{it}^{MEX} = \alpha_0 + \alpha_1 \ln(1 + TR_{it}^{MEX}) + \alpha_2 DNAFTA_t + \alpha_3 TRDN_{1t}$$
$$+ \alpha_4 TRDN_{2t} + \alpha_5 DT_{It} + \alpha_6 DT_{2t} + \alpha_7 \ln Y_t^{US} + \alpha_8 \ln PMEX_{it}$$
$$+ \alpha_9 \ln PROW + \alpha_{10} \ln RER_t^{MEX} + \alpha_{11} DPESO_t + u_{it}$$

- **Import demand - ROW**

$$\ln Q_{it}^{ROW} = \beta_0 + \beta_1 \ln(1 + TR_{it}^{ROW}) + \beta_2 \ln(1 + TR_{it}^{MEX}) + \beta_3 DNAFTA$$
$$+ \beta_4 Y_t^{US} + \beta_5 PROW_{it} + \beta_6 PMEX_{it} + \beta_7 RER_t^{ROW} + u_{it}$$

Where:

$TRDN$: a product of tariff rates and NAFTA dummy (DN) and:

$$DN_{1t} = \begin{cases} 1 & \textit{for observations between } 1994 \textit{ and } 1999 \\ 0 & \textit{elsewhere} \end{cases}$$

$$DN_{2t} = \begin{cases} 1 & \textit{for observations } 2000 \textit{ and on} \\ 0 & \textit{elsewhere} \end{cases}$$

$$DT_{1t} = \begin{cases} 1 & \textit{if } TR_{it}^{MEX} \leq 10\% \quad \textit{for year} \leq 1993 \\ 0 & \textit{elsewhere} \end{cases}$$

$$DT_{2t} = \begin{cases} 1 & \textit{if } TR_{it}^{MEX} \geq 15\% \quad \textit{for year} \leq 1993 \\ 0 & \textit{elsewhere} \end{cases}$$

Variable Definitions

- Q = dollar value of US imports from Mexico/ROW
- TR = tariff rates against exporting country (Mexico/ROW) – ratio of calculated duties and customs value
- PMEX = import price from Mexico (unit value)
- PROW = import price from ROW (unit value)
- Y = U.S. GDP
- RER (Mexico) = real exchange rates (pesos per us dollar)
- RER (ROW) = trade weighted exchange rate index – a weighted average of the foreign exchange value of the US dollar against the currencies of a broad group of major U.S. trading partners (Fed. Reserve Bank)

Data Sources

➢ USITC data base, USDA, BEA, Fed. Reserve Bank of St. Louis, Bureau of Labor Statistics

➢ Quarterly data: 1989 - 2005

ESTIMATION

➤ Panel Data - Fixed Effects model

>> To account for heterogeneity in commodity groups, such as different responses of import demand due to expected reductions in tariff rates and unobservable individual characteristics.

➤ First order autocorrelation

➤ Stata/SAS

Table 1
Effects of Tariff Rates and NAFTA on US Imports from Mexico

Variable	Parameter Estimates
Tariff Rates Mexico, α_1	$-2.48(0.82)^{**}$
DNAFTA, α_2	$0.45(0.11)^{***}$
Tariff Rates x DN1, α_3	$-3.18(1.33)^{**}$
Tariff Rates x DN2, α_4	$-0.08(1.73)$
Tariff Dummy 1, α_5	$-0.28(0.12)^{**}$
Tariff Dummy 2, α_6	$-0.45(0.16)^{**}$
Income (GDP)., α_7	$1.35(0.11)^{***}$
Price_Mexico, α_8	$-0.40(0.08)^{***}$
Price_ROW, α_9	$0.15(0.08)^{*}$
Real exchange rates, α_{10}	$-0.32(0.28)$
Peso Dummy, α_{11}	$0.35(0.17)^{*}$
Intercept, α_0	$-0.92(0.11)^{***}$
R^2	0.58
F Statistics for Fixed Effects Test	66

Interpretations of Parameter Estimates: Table 1

Period	% increase of US Imports
Effects of a 1% reduction in Tariff Rates against Mexico	
Whole period (of sample)	2.48
NAFTA first 6 year (94 – 99)	5.66
NAFTA second 6 year (00 – 05)	2.56
NAFTA period (12 years)	5.74
NAFTA Dummy[a]	55.9

[a]Interpretation of the dummy variable is based on Kennedy (1981): 'Estimation with Corectly Interpreted Dummy Variables in Semilogarithmic Equations", *the American Economic Reviews* 71 (1981):801.

Interpretations of Parameter Estimates: Table 1 - continued

Effects of Pre NAFTA Tariff Rates on US Imports from Mexico

Pre NAFTA Tariff Rates	US Imports from Mexico
<= 10%	24.98% higher
>= 15%	37.03% higher

Note: Interpretation of the dummy variable is based on Kennedy (1981): 'Estimation with Corectly Interpreted Dummy Variables in Semilogarithmic Equations", *the American Economic Reviews* 71 (1981):801.

Table 2
Effects of Tariff Rates and NAFTA on US Imports from ROW

Variable	Parameter Estimates
Tariff Rates ROW, β_1	$-1.47(0.77)^*$
Tariff Rates Mexico, β_2	$0.45(0.58)$
DNAFTA, β_3	$0.19(0.11)^*$
Personal Consumption Exp., β_4	$1.05(0.19)^{***}$
Price_ROW, β_5	$-0.24(0.06)^{***}$
Price_Mexico, β_6	$0.06(0.05)$
Real Exchange Rates, β_7	$0.33(0.35)$
Intercept, β_0	$-0.33(0.07)^{***}$
R^2	0.75
F Statistics for Fixed Effects Test	144

Numbers in parentheses are estimated standard errors. *, ** and *** are significant at 10%, 5% and 1%, respectively.

Interpretations of Parameter Estimates: Table 2

➢ NAFTA Dummy significant: significant evidence that US imports from ROW increased during NAFTA period (20.1%).

➢ A 1% reduction in tariff rates against ROW ⟶ 1.5% increase in US imports from ROW; nearly 1/4 the effects of tariff reductions against Mexico ⟶ Suggests that US gives more preference to Mexican Agricultural Products

➢ Tariff Rates against Mexico: + but not significant ⟶ there is no significant evidence that NAFTA has caused trade diversion in agricultural sector.

➢ Prices and GDP are highly significant: predominant factors that likely determine US imports from ROW

Conclusions

➢ US agricultural imports have been responsive to tariff rate reductions applied to Mexican products, with their impacts declining overtime.

➢ Pre NAFTA tariff rates have significant impacts on US imports: higher pre NAFTA tariff rates resulted in higher US imports during the NAFTA period.

➢ US-Mexico trade agreement under NAFTA has been trade creating rather than trade diverting.

Implications

➢ The extent to which these results may be applicable to other agreements, such as CAFTA/DR, is limited since each case must be empirically verified.

➢ NAFTA will be fully implemented in the next 17 months; No tariff disputes; Future research focuses on SPS including invasive species/animal disease, Anti dumping/Countervailing, market integration.

Percentage Increase of U.S. Imports of Selected HTS 4-digit Level
(Base Year: 1993)

	1994	1995	2000	2005
Mexico	4.43%	33.38%	64.94%	189.58%
ROW	0.16%	-3.81%	40.44%	116.34%
Canada	0.07%	8.71%	66.70%	152.52%