

ECONOMIC IMPACTS OF A POSSIBLE CANADA-U.S. CUSTOMS UNION: A DYNAMIC CGE MODEL ANALYSIS



**Madanmohan Ghosh
and
Someshwar Rao
*MEPA, Industry Canada***

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I.1 CANADA'S INTEGRATION IN THE WORLD ECONOMY

- Canada is one of the World's most integrated economies
- At present, exports account for more than 40 percent of Canada's real GDP
- Between 1990 and 2002, the ratio of exports to GDP in Canada increased by more than 10 percentage points
- Canada has become a net exporter of capital – a reversal of the trend 20 years back

I.2 BUT MOST OF IT IS DUE TO INCREASED LINKAGES WITH THE U.S. ECONOMY

- **More than 85 percent of Canada's exports are destined to the U.S., compared to about 70 percent in 1990**
- **Canada accounts for about 20 percent of U.S. exports and imports**
- **Canada is the largest trading partner of 39 U.S. states**
- **Canada is the largest supplier of U.S. energy requirements; and more importantly,**
- **Close to 80 percent of the growth in Canadian manufacturing shipments in the 1990s was driven by the growth in exports to the U.S.**

II. POLICY RESEARCH QUESTIONS

- What will be the impact of a possible Canada-U.S. *Customs Union* on trade flows and GDP?
- Which industries in Canada will gain and lose from a Canada-U.S. *Customs Union*?

III. WHAT IS A CUSTOMS UNION (CU)

- A CU is a group of countries who eliminate all tariffs on trade in goods among themselves but maintain a common external tariff (CET) on trade with countries outside the union.

IV. RULES OF ORIGIN (ROO)

- The ROO specify the condition under which preferential access to a market are granted.
 - Percentage criterion (value added test)
 - Change in tariff heading test
 - Substantial transformation
- *The economics of ROO*: it prevents trade deflection and protects domestic industries from non-members.

But they cost too...

- Producers' costs for proving that the good is originating
- Trade diversion from least cost countries to member countries
- Administrative costs (customs).

VI. GAINS FROM ELIMINATING THE ROO: A BRIEF LITERATURE REVIEW

- EC Free Trade Association Estimates:
 - Range from 1.4% to 5.7% of the value of export transactions (from Goldfarb 2003).
- ...If we apply these rates to Canada's exports to the U.S. alone, Canada could benefit by \$4 to \$18 billion annually by eliminating the rules of origin of NAFTA (from Goldfarb 2003).
- Restrictiveness of the NAFTA ROO
 - Utilization rate = 55%
 - Average preference rate $(5.5\% - 0.8\%) = 4.7\%$

VII.1 MODELING ROO

- Appiah (1999): welfare cost of ROO
 - 1.5-2.3% of GDP for Canada (intermediate case)
- **Our view of Appiah's Approach**
 - Data intensive
 - ROO is binding at a very disaggregated level
 - Detailed information difficult to obtain
- **Our approach (providing an upper bound of the cost)**
 - The maximum cost would be paying the MFN tariffs
 - Shock the model by replacing the NAFTA tariff rates by the averages of Canadian and U.S. existing Non-NAFTA MFN tariff rates

VII.2 MODELING ROO

- We examine Five Scenarios:
 - 1a. Canada and the U.S. CET rates are set to the minimum of the U.S. and Canada's external tariff rates
 - 1b. Canada's external tariff (ET) rates are set to those of the U.S.
 - 2. NAFTA rates are replaced by the average MFN rates (removal of the *rules-of-origin* provisions of NAFTA)
 - 3a. ☹ 2 + 1a
 - 3b. ☹ 2 + 1b

VIII.1 THE STRUCTURE OF THE MODEL

- Dynamic CGE model with competitive markets (Mercenier (1995), Lavoie, Mérette, and Souissi (2001))
- 8 sectors, 7 regions
- Infinitely-lived representative household in each region owns all primary factors and financial assets
- Labour endowments fixed but capital stock is augmented by investments
- In addition to factor incomes and equity households also receive lump-sum transfers from the Government (tax and tariff revenues)

VIII.2 THE STRUCTURE OF THE MODEL

- Labour and capital are intersectorally mobile but not internationally
- Two types of agents: households and firms
- Households exhibit forward looking behaviour
- Households in each region maximize an inter-temporally additive utility function
 - ... follow a multi-stage budgeting procedure with respect to expenditure allocation in each period
- No explicit representation of government

VIII.3 THE STRUCTURE OF THE MODEL

- International borrowing and lending is allowed
- World rate of interest is given exogenously

Intra-temporal equilibrium

- In each region demand for primary factors equal their supply (full employment)
- Total global demand for each sectoral good must equal its supply
- Sum of global lending and borrowing is zero

Inter-temporal equilibrium (in steady-state)

- Zero profits
- Rate of investment is equal to rate of depreciation of capital and its adjustment cost
- Accumulation of foreign assets are constant

IX.1 MAPPING SCHEME OF COUNTRIES/REGIONS AND SECTORS IN THE MODEL

A. Regions of the Model	Regions/countries in GTAP database
Canada	Canada
USA	The United States of America
Mexico	Mexico
Latin America	Central America and Caribbean, Colombia, Peru, Venezuela, rest of Andean Pact, Chile, rest of South America
Mercosur	Argentina, Brazil, Uruguay
Europe	Austria, Belgium, Denmark, Finland, France, Germany, United Kingdom, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, Switzerland, rest of EFTA
Rest of the World	Australia, New Zealand, China, Hong Kong, Japan, Korea, Republic of Taiwan, Indonesia, Malaysia, Philippines, Singapore, Thailand, Viet Nam, Bangladesh, India, Sri Lanka, rest of South Asia, Hungary, Poland, rest of Central European Associates, former Soviet Union, Turkey, rest of Middle East, Morocco, rest of North Africa, Botswana, rest of SACU, Malawi, Mozambique, Tanzania, United Republic of Zambia, Zimbabwe, rest of southern Africa, Uganda, rest of sub-Saharan Africa, rest of world
B. Sectors of the Model	Sectors in GTAP database
Agriculture	Paddy rice, wheat, cereal grains nec., vegetables, fruit, nuts, oil seeds, sugar cane, sugar beet, plant-based fibers, crops nec., bovine cattle, sheep and goats, horses, animal products nec., raw milk, wool, silk-worm cocoons
Resource based industries	Forestry, fishing, coal, oil, gas, minerals nec.
Food	Bovine cattle, sheep and goat meat products, meat products, vegetable oils and fats, dairy products, processed rice, sugar, food products nec., beverages and tobacco products
Textiles	Textiles, wearing apparel, leather products
Manufacturing	Wood products, paper products, publishing, petroleum, coal products, chemical, rubber, plastic products, mineral products nec., ferrous metals, metals nec., metal products manufactures nec.
Automotive	Motor vehicles and parts, transport equipment nec.
Technology	Electronic equipment, machinery and equipment nec.
Services	Electricity gas manufacture, distribution, water, construction, trade, transport nec., water transport, air transport, communication, financial services nec., insurance, business services nec., recreational and other services, public admin. and defence, education, health, ownership of dwellings

Source: Authors Own Classification.

IX.2 STRUCTURE OF TARIFF PROTECTION BY COUNTRY/REGION

	CAN	USA	MEX	MER	LAT	EUR	ROW
Canada	-	0.4	8.6	6.7	11.2	3.1	11.7
United States	0.8	-	1.8	10.0	10.9	2.6	7.9
Mexico	0.5	0.5	-	14.5	10.3	3.2	5.1
Mercosur	5.6	5.0	10.0	-	11.4	9.4	17.6
Latin America	4.1	6.3	9.3	6.6	-	7.0	7.8
Europe	3.3	1.9	6.4	9.8	7.8	-	7.8
Rest of the World	4.2	3.2	8.4	9.0	10.2	4.2	-
Average	1.93	2.34	3.76	9.45	9.99	3.97	8.17

Source: Computed from GTAP version 5 Data Base.

IX.3 STRUCTURE OF TARIFF PROTECTION BY INDUSTRIES AND COUNTRY/REGION

	AGRI	RESO	FOOD	TEXT	MANU	TECH	AUTO	SERV
Canada	3.8	0.0	28.9	10.6	1.1	0.6	0.7	-
United States	11.1	0.3	11.1	11.2	2.0	1.4	1.3	-
Mexico	17.3	3.9	31.6	4.7	2.5	2.6	2.6	-
Mercosur	7.9	3.6	17.0	18.5	10.3	14.0	23.1	-
Latin America	10.5	6.6	16.9	17.7	9.9	9.3	14.6	2.2
Europe	10.9	0.1	37.2	10.4	3.5	3.7	5.3	
Rest of the World	41.8	2.3	37.3	14.5	7.5	6.1	8.8	0.2

Source: Computed from GTAP version 5 Data Base.

IX.4 PARAMETER VALUES (EXOGENOUS)

	AGRI	RESO	FOOD	TEXT	MANU	TECH	AUTO	SERV
A. Elasticity of Substitution in preferences								
Canada	5.2	6.3	5.3	7.6	5.2	6.3	11.7	4.3
United States	5.2	6.3	5.3	7.6	5.2	6.3	11.7	4.3
Mexico	3.5	4.2	3.6	5.0	3.5	4.2	7.8	2.9
Mercosur	3.5	4.2	3.6	5.0	3.5	4.2	7.8	2.9
Latin America	3.5	4.2	3.6	5.0	3.5	4.2	7.8	2.9
Europe	5.2	6.3	5.3	7.6	5.2	6.3	11.7	4.3
Rest of the World	3.5	4.2	3.6	5.0	3.5	4.2	7.8	2.9
B. World rate of interest		5%						
C. Rate of time preference		5%						
D. Inverse of intertemporal elasticity of substitution					1.51			

Source: GTAP Data Base and authors assumptions. Value of intertemporal elasticity of substitution from Hall (1988).

X.1 SIMULATION RESULTS: MACRO VARIABLES

(% Change over the Base Case)

Region	Tariff rate % point difference	Exports	Imports	Value added	Consumption	Investment	Terms of trade	Price of cons.	Price of invt.
Case 1a: CET is set to the min of Canada and US external tariff									
CAN	-0.91	4.52	4.27	0.071	0.10	-0.08	-0.51	-1.04	-0.48
USA	-0.23	1.01	0.82	0.002	0.00	-0.03	-0.08	-0.18	-0.15
MEX	0.00	-0.04	0.10	0.005	0.04	-0.02	0.11	0.01	-0.01
MER	0.01	0.64	0.54	0.057	0.05	0.09	0.16	0.12	0.10
LAT	0.00	1.09	1.14	0.236	0.23	0.26	0.42	0.34	0.27
EUR	0.00	0.17	0.22	0.013	0.01	0.02	0.04	-0.01	-0.01
ROW	0.01	0.14	0.20	0.012	0.02	0.01	0.06	-0.01	-0.02
Case 1b: CET is set to US external tariff									
CAN	-0.87	4.45	4.23	0.088	0.13	-0.04	-0.48	-0.94	-0.40
USA	-0.08	0.60	0.53	0.015	0.01	0.02	0.03	-0.07	-0.07
MEX	0.00	-0.06	-0.06	-0.015	-0.01	-0.02	-0.01	-0.07	-0.07
MER	0.00	-0.04	-0.02	-0.004	0.00	-0.01	-0.01	-0.04	-0.04
LAT	0.00	-0.10	-0.07	-0.023	-0.01	-0.03	-0.03	-0.07	-0.06
EUR	0.00	0.17	0.23	0.011	0.01	0.02	0.04	0.00	0.00
ROW	0.00	0.07	0.11	0.004	0.01	0.00	0.03	-0.01	-0.01
Case 2: Upper bound calculation of the gains from elimination the rules-of-origin									
CAN	-2.11	12.32	12.93	1.00	0.45	1.22	0.12	0.35	0.21
USA	-0.60	4.87	4.33	0.11	0.10	0.18	0.17	0.05	-0.03
MEX	-5.72	23.72	18.79	4.25	1.32	4.98	-1.09	-0.08	-1.47
MER	0.01	-0.22	-0.01	-0.01	0.01	-0.03	0.00	-0.01	-0.01
LAT	0.01	-0.13	0.06	-0.02	0.05	-0.05	0.05	0.01	-0.01
EUR	0.00	-0.22	-0.10	-0.01	0.02	-0.02	-0.02	0.00	0.00
ROW	0.00	-0.31	-0.19	-0.02	0.01	-0.04	-0.05	-0.02	-0.02

X.2 SIMULATION RESULTS: MACRO VARIABLES

(% Change over the Base Case)

Region	Tariff rate % point difference	Exports	Imports	Value added	Consumption	Investment	Terms of trade	Price of cons.	Price of invt.
Case 3a: Combined effect of 1a and 2									
CAN	-3.02	17.40	17.76	1.07	0.55	1.13	-0.40	-0.69	-0.27
USA	-0.83	5.93	5.18	0.11	0.09	0.15	0.09	-0.13	-0.18
MEX	-5.72	23.65	18.90	4.25	1.36	4.96	-0.96	-0.06	-1.48
MER	0.02	0.42	0.52	0.04	0.06	0.07	0.16	0.11	0.09
LAT	0.01	0.96	1.20	0.22	0.28	0.21	0.47	0.35	0.25
EUR	0.00	-0.05	0.12	0.00	0.03	0.00	0.02	-0.01	-0.02
ROW	0.01	-0.18	0.01	-0.01	0.03	-0.03	0.01	-0.03	-0.03
Case 3b: Combined effect of 1b and 2									
CAN	-2.98	17.32	17.71	1.09	0.58	1.18	-0.36	-0.59	-0.18
USA	-0.68	5.50	4.89	0.12	0.11	0.20	0.20	-0.02	-0.10
MEX	-5.72	23.65	18.72	4.24	1.31	4.96	-1.10	-0.15	-1.54
MER	0.01	-0.26	-0.03	-0.02	0.01	-0.03	-0.01	-0.04	-0.05
LAT	0.01	-0.23	-0.01	-0.04	0.04	-0.08	0.02	-0.06	-0.08
EUR	0.00	-0.05	0.13	0.00	0.03	0.00	0.02	0.01	0.00
ROW	0.00	-0.24	-0.08	-0.02	0.02	-0.04	-0.02	-0.03	-0.03

X.3 SIMULATION RESULTS: VALUE ADDED BY SECTOR

(% change over benchmark)

	AGRI	RESO	FOOD	TEXT	MANU	TECH	AUTO	SERV
CET is set to the min of Canada and US external tariff								
Canada	1.32	1.70	-9.31	2.37	3.29	5.99	27.82	-0.03
United States	-3.22	0.02	0.86	0.82	0.57	0.76	-0.27	0.05
Mexico	5.85	3.39	1.62	14.13	4.68	14.42	21.59	2.13
Mercosur	0.69	-0.09	-0.02	-0.10	-0.06	-0.22	-0.52	0.02
Latin America	4.20	-0.58	-0.06	-1.60	-0.26	-0.98	-1.60	-0.07
Europe	0.44	0.07	0.51	-0.11	-0.07	-0.26	-0.65	0.02
Rest of the World	0.24	0.08	0.02	-0.19	-0.05	-0.29	-0.44	0.01
CET is set to the US external tariff								
Canada	3.10	1.81	-9.26	1.80	3.22	5.84	27.67	-0.03
United States	-0.59	0.11	0.71	0.43	0.48	0.56	-0.50	0.06
Mexico	3.67	3.86	1.59	14.55	4.87	15.12	22.56	2.19
Mercosur	-0.04	0.00	-0.01	-0.05	-0.03	-0.07	-0.30	0.00
Latin America	-0.27	0.10	-0.01	-0.50	-0.08	-0.20	-0.30	0.03
Europe	0.30	-0.08	0.50	-0.13	-0.06	-0.23	-0.62	0.02
Rest of the World	-0.01	0.00	0.02	-0.16	-0.02	-0.22	-0.35	0.01

X.4 SIMULATION RESULTS: TIME PATH OF AGGREGATE VARIABLES (CANADA)

	Period 1	Period 2	Period 3	Period 4	Period 5
Exports	16.15	16.87	17.25	17.39	17.40
Imports	18.34	18.00	17.82	17.76	17.76
Value added	0.60	0.84	0.98	1.06	1.07
Consumption	0.03	0.27	0.43	0.54	0.55
Investment	3.57	2.23	1.49	1.13	1.13
Price of consumption	-0.35	-0.51	-0.61	-0.69	-0.69
Price of investment	0.05	-0.09	-0.19	-0.26	-0.27

X.5 SIMULATION RESULTS: SENSITIVITY OF MACRO VARIABLES TO THE VALUES OF SUBSTITUTION PARAMETERS

(% Change over the Base Case)

Region	Exports	Imports	Value added	Consumption	Investment	Terms of trade	Price of cons.	Price of invt.
Central Case: Combined Effect of the CET and the Rules-of-origin is (CET rates are set to the minimum of Canada and U.S. external tariffs)								
CAN	17.40	17.76	1.07	0.55	1.13	-0.40	-0.69	-0.27
USA	5.93	5.18	0.11	0.09	0.15	0.09	-0.13	-0.18
MEX	23.65	18.90	4.25	1.36	4.96	-0.96	-0.06	-1.48
MER	0.42	0.52	0.04	0.06	0.07	0.16	0.11	0.09
LAT	0.96	1.20	0.22	0.28	0.21	0.47	0.35	0.25
EUR	-0.05	0.12	0.00	0.03	0.00	0.02	-0.01	-0.02
ROW	-0.18	0.01	-0.01	0.03	-0.03	0.01	-0.03	-0.03
Value of Elasticity parameters are increased by 25% at all levels								
CAN	21.49	22.18	1.05	0.70	1.06	-0.37	-0.70	-0.23
USA	7.14	6.17	0.10	0.09	0.12	0.06	-0.14	-0.18
MEX	27.36	22.10	4.39	1.33	5.15	-0.73	0.17	-1.26
MER	0.57	0.64	0.05	0.07	0.08	0.16	0.12	0.10
LAT	1.16	1.41	0.20	0.28	0.17	0.48	0.37	0.27
EUR	-0.04	0.15	0.01	0.04	0.01	0.02	-0.01	-0.02
ROW	-0.21	-0.01	-0.01	0.03	-0.03	0.01	-0.04	-0.04
Value of Elasticity parameters are reduced by 25% at all levels								
CAN	13.42	13.46	1.07	0.40	1.17	-0.47	-0.73	-0.35
USA	4.69	4.17	0.12	0.10	0.18	0.13	-0.13	-0.19
MEX	19.56	15.43	3.99	1.33	4.62	-1.28	-0.41	-1.79
MER	0.30	0.43	0.04	0.05	0.06	0.17	0.11	0.09
LAT	0.78	1.02	0.24	0.28	0.25	0.46	0.32	0.23
EUR	-0.04	0.11	0.00	0.03	0.00	0.03	-0.01	-0.01
ROW	-0.13	0.03	-0.01	0.03	-0.02	0.02	-0.03	-0.03

XI.1 CONCLUSIONS

- Trade among the three NAFTA members will increase considerably.
- Overall economic benefits for Canada from a possible Canada-U.S. customs union will be up to 1% of GDP in real terms.
- The gains from the elimination of the *Rules-of-Origin* will be much bigger than the gains from common external tariff alone.
- Mexico gains the most from the elimination of the ROO.

XI.2 CONCLUSIONS

- All Canadian industries except food and beverages are expected to gain from a Canada-U.S. Customs Union.
- The big beneficiaries will be transportation equipment, electronics and machinery and equipment.
 - Food and beverages lose.
 - Agriculture and textiles will benefit the least.

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