Assessing the Economic Impacts of Free Trade Agreement:
A Computable Equilibrium Model Approach

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Scope of the Paper

- Assessments of the economic impacts of Free Trade Agreements (FTAs) relating to Japan.

- Relying on a simulation with a computable equilibrium model.

- The impacts of various combination of FTAs are assessed to draw policy implications.

Structure of this Paper

1. Review the theoretical framework, together with the specification of the simulation model.

2. Simulations on the various cases cover both the bilateral FTAs of Japan and regional FTAs including Japan.

3. Short summary of implication from the simulation work comes.

Welfare decomposition

- Assess the welfare changes, brought about by trade liberalization. Baldwin and Venables (1995).
- Six effects (all of them are *static*)
1. trade volume effect
2. trade cost effect
3. terms of trade effect
4. output effect
5. scale effect
6. variety effect

Two effects only, in this paper

- The simulation study here focus on (i) trade volume effect and (ii) terms of trade effect.

- Assuming (i) constant returns to scale with perfect competition, and (ii) trade barriers giving rise to only domestic agencies.

- Limitation from the data and model technology.

Trade Volume Effect

- (trade creation effect) + (trade diversion effect): Viner (1950)
- $t * dm$ (*i.e.* rates of tariff times changes in net trade amounts)
- Essentially, the change in tariff revenue (obtained by all the domestic agencies)
- In partial equilibrium framework, corresponding to two triangles of the dead weight loss.

Dead weight loss from tariff
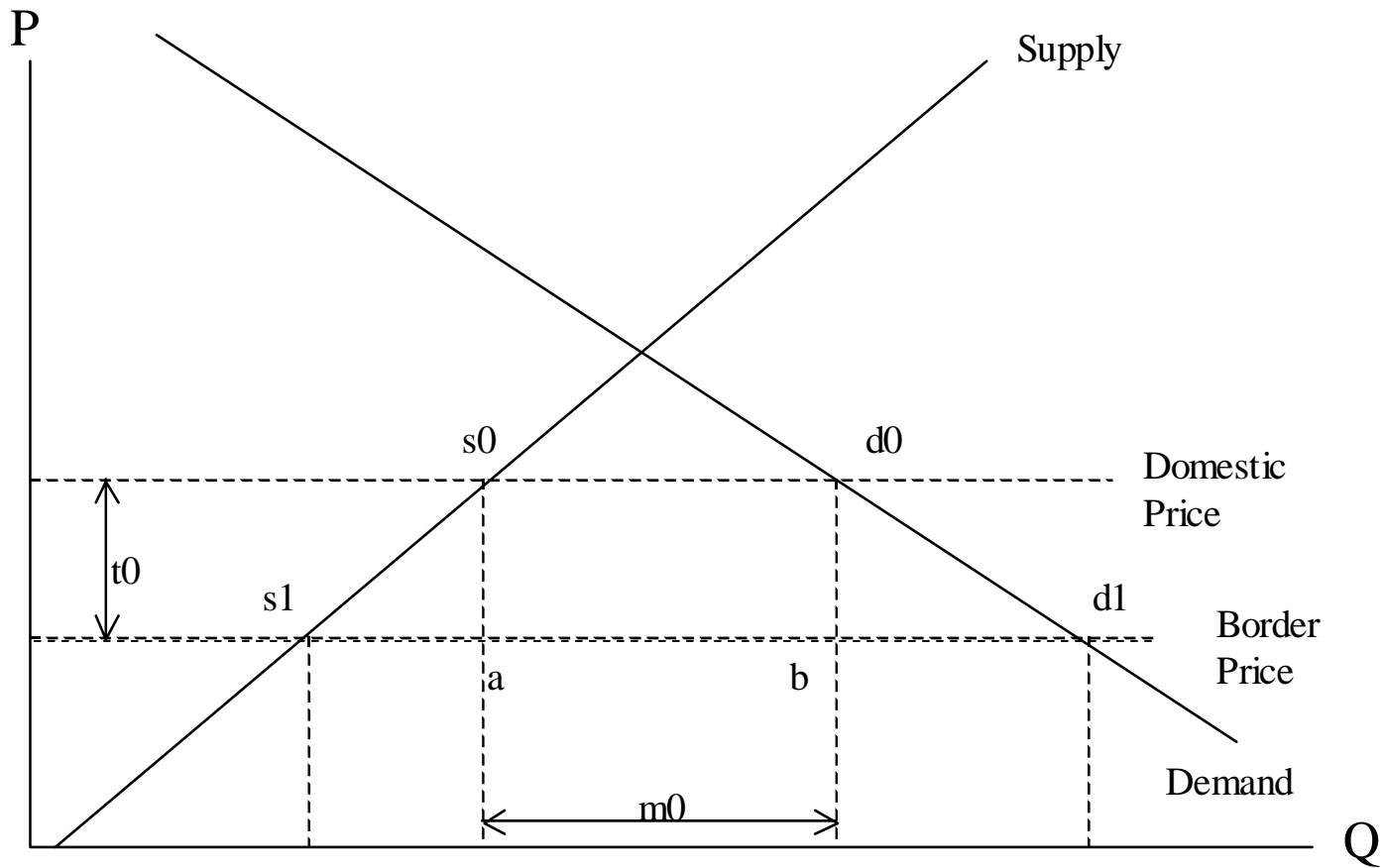
Terms of Trade Effect

- Defined as *dp * m* (the changes in import / export prices times net imports)
- Depends on the mechanism of the determination of import / export prices.
- In the GTAP model (adopted here), the Armington assumption: the fixed elasticity of substitution between imported and domestic goods due to changes in the relative price of those two goods.

Location effects and other dynamic effects (neglected in this study)

- Assuming imperfect competition and scale economies, scale economies and economies of agglomeration may result that industry will be drawn into high wage locations, *increasing* inter-regional wage difference.

- FTAs may result in more competitive environments and improve productive inputs, leading to higher rates of technological progress.

Adopts GTAP with the specification of capital accumulation

- GTAP featured with Armington (1969) structure
- Baldwin (1992) capital accumulation
- From a point on the long-run path to another point on the long-run path
- Simulate the transition with faster capital accumulation.
- Expand the effects of efficiency improvement.

Three FTAs of Japan
Japan's Import Shares and Tariff Rates

	Singapore		Mexico		Malaysia	
	Import Share	Tariff Rates	Import Share	Tariff Rates	Import Share	Tariff Rates
GRN	0.0	0.0	0.0	0.0	0.0	967.1
CROP	0.1	1.6	6.1	3.0	0.5	0.2
LSK	0.0	119.2	9.3	62.7	0.0	9.0
FRS	0.0	1.0	0.2	0.0	0.0	0.0
FSH	0.1	3.4	2.8	3.9	0.4	3.2
MNG	23.1	0.0	17.2	3.1	33.7	0.0
FDP	4.6	20.8	1.8	8.5	2.8	3.7
TEX	0.0	8.6	0.2	6.1	0.5	4.1
WAP	0.1	15.4	1.3	11.8	0.5	6.6
CHM	11.3	1.8	3.0	0.2	7.5	0.2
MET	6.4	0.4	7.1	0.0	3.2	0.0
MVH	0.1	0.0	10.3	0.0	0.3	0.0
OTN	0.1	0.0	0.0	0.0	0.0	0.0
ELE	24.2	0.0	10.6	0.0	25.7	0.0
OME	28.9	0.1	22.5	0.0	11.3	0.0
OMF	0.8	0.5	7.6	0.4	13.5	2.6
Total	100.0		100.0		100.0	

Sector Shares of Imports and Tariffs of the FTA Partners

	Singapore		Mexico		Malaysia	
	Import Share	Tariff Rates	Import Share	Tariff Rates	Import Share	Tariff Rates
GRN	0.0	0.0	0.0	0.0	0.0	967.1
CROP	0.1	1.6	6.1	3.0	0.5	0.2
LSK	0.0	119.2	9.3	62.7	0.0	9.0
FRS	0.0	1.0	0.2	0.0	0.0	0.0
FSH	0.1	3.4	2.8	3.9	0.4	3.2
MNG	23.1	0.0	17.2	3.1	33.7	0.0
FDP	4.6	20.8	1.8	8.5	2.8	3.7
TEX	0.0	8.6	0.2	6.1	0.5	4.1
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CHM	11.3	1.8	3.0	0.2	7.5	0.2
MET	6.4	0.4	7.1	0.0	3.2	0.0
MVH	0.1	0.0	10.3	0.0	0.3	0.0
OTN	0.1	0.0	0.0	0.0	0.0	0.0
ELE	24.2	0.0	10.6	0.0	25.7	0.0
OME	28.9	0.1	22.5	0.0	11.3	0.0
OMF	0.8	0.5	7.6	0.4	13.5	2.6
Total	100.0		100.0		100.0	

Technical Assumptions of the Simulation

1. The GTAP database reflects the effective tariff rates in 2001. The partners may have changed the tariff rates between 2001 and the enforcement of the FTAs.

2. The targeted tariff rate specified by the FTAs may be different fromthe existing concession rate. (the existing rates may be the concession rates of the MNF treatment made after the WTO agreement).

3. Often allowed for grace periods and scheduling in the reduction of tariff rates of specific items, often over next ten years. This study ignore the transition periods.

4. Baldwin accumulation specification

Simulation shocks (tariff reduction)

	Singapore		Mexico		Malaysia	
	Import Share	Tariff Rates	Import Share	Tariff Rates	Import Share	Tariff Rates
GRN	0.0	0.0	0.0	0.0	0.0	967.1
CROP	0.1	1.6	6.1	3.0	0.5	0.2
LSK	0.0	119.2	9.3	62.7	0.0	9.0
FRS	0.0	1.0	0.2	0.0	0.0	0.0
FSH	0.1	3.4	2.8	3.9	0.4	3.2
MNG	23.1	0.0	17.2	3.1	33.7	0.0
FDP	4.6	20.8	1.8	8.5	2.8	3.7
TEX	0.0	8.6	0.2	6.1	0.5	4.1
WAP	0.1	15.4	1.3	11.8	0.5	6.6
CHM	11.3	1.8	3.0	0.2	7.5	0.2
MET	6.4	0.4	7.1	0.0	3.2	0.0
MVH	0.1	0.0	10.3	0.0	0.3	0.0
OTN	0.1	0.0	0.0	0.0	0.0	0.0
ELE	24.2	0.0	10.6	0.0	25.7	0.0
OME	28.9	0.1	22.5	0.0	11.3	0.0
OMF	0.8	0.5	7.6	0.4	13.5	2.6
Total	100.0		100.0		100.0	

Macroeconomic Impact (GDP and EV)

	JSEPA		LM xEPA		JM sEPA	
	GDP	EV	GDP	EV	GDP	EV
AUS	0.00	-1	0.00	2	-0.01	-32
NZL	0.00	0	0.00	0	0.00	0
CHN	0.00	-5	0.00	-75	0.00	-69
HKG	0.00	0	-0.01	-17	0.02	25
JPN	0.00	-2	0.02	1358	0.02	1017
KOR	0.00	-1	-0.01	-64	-0.01	-63
TWN	0.00	-1	-0.02	-72	-0.01	-67
IDN	0.00	-1	-0.01	-19	-0.03	-47
MYS	0.00	-2	-0.03	-40	1.41	862
PHL	0.00	-1	-0.07	-44	-0.04	-24
SGP	0.02	26	-0.02	-19	-0.01	-26
THA	0.00	-1	-0.05	-58	-0.04	-53
VNM	0.00	-1	0.00	0	0.00	1
XSE	0.00	0	0.01	6	0.01	8
IND	0.00	-1	0.00	12	0.00	0
XSA	0.00	0	0.00	-5	0.01	6
CAN	0.00	-1	0.01	50	0.00	11
USA	0.00	-11	0.00	-405	0.00	139
MEX	0.00	-2	0.64	3032	0.01	57
PER	0.00	0	0.02	7	0.01	5
CHL	0.00	0	0.00	0	0.00	1
EU15	0.00	-12	0.00	207	0.00	139
RUS	0.00	-1	0.00	23	0.00	1
ROW	0.00	-6	0.00	53	0.00	58
World		-25		3929		1948

Simulation Results

1. the FTA members, both Japan and her FTA partners, tend to gain GDP and EV, and many of the other regions lose them. This results from the trade diversion effect.

2. Mexico and Malaysia will gain larger percentage of GDP, but Japan and Singapore gain little. The countries that reduce the tariffs more will generally gain more. Mexico and Malaysia will reduce tariffs by greater percentage, but the tariff reduction of Singapore and Japan will be less. The existing tariff rates of Singapore are virtually zero. Japan will maintain the high tariff in agriculture and only reduced the existing tariff rates in limited sectors, i.e. TEX and WAP.

3. The EV in the world generally adds up to positive numbers. The FTAs will increase the welfare in the world, albeit the little amounts.

Impacts on sector based production

	JSEPA		JM xEPA		JM sEPA		Total
	Japan	Singapore	Japan	Mexico	Japan	Malaysia	Japan
GRN	0.0	0.0	-0.1	0.1	-0.1	-0.5	-0.2
CROP	0.0	0.0	-0.1	0.0	0.0	-0.3	-0.1
LSK	0.0	0.1	-0.1	0.4	-0.1	-0.4	-0.2
FRS	0.0	0.0	-0.1	0.5	0.0	2.2	-0.1
FSH	0.0	0.0	0.0	0.3	0.0	0.3	0.0
MNG	0.0	0.0	-0.1	0.1	0.0	0.3	-0.2
FDP	0.0	0.0	0.0	0.4	0.0	0.3	0.0
TEX	0.0	0.8	-0.3	0.5	-0.1	3.6	-0.4
WAP	0.0	4.7	-0.1	0.6	-0.1	3.7	-0.3
CHM	0.0	0.0	0.0	0.5	0.1	0.7	0.1
MET	0.0	0.0	0.2	0.5	0.4	0.0	0.5
MVH	0.0	-0.1	0.0	1.1	0.3	3.8	0.3
OTN	0.0	-0.1	-0.5	0.6	-0.1	1.7	-0.5
ELE	0.0	0.0	0.0	2.0	-0.4	2.4	-0.4
OME	0.0	0.0	0.2	1.2	-0.1	2.9	0.1
OMF	0.0	0.0	0.0	0.6	0.0	3.6	0.0
EGW	0.0	0.0	0.0	0.5	0.1	1.2	0.1
CNS	0.0	0.0	0.0	0.9	0.0	2.2	0.1
TRD	0.0	0.0	0.0	0.7	0.0	0.8	0.0
TRS	0.0	0.0	0.0	0.6	0.0	1.3	0.0
CMN	0.0	0.0	0.0	0.6	0.0	0.7	0.0
FIN	0.0	0.0	0.0	0.5	0.0	1.3	0.0
PRS	0.0	0.0	0.0	0.7	0.0	1.2	0.0
OFS	0.0	0.0	0.0	0.3	0.0	0.3	0.0
DWE	0.0	0.0	0.1	0.8	0.0	1.0	0.1

A note on RoOs

- The GTAP database incorporates the input-output tables which simply mix the imported and domestically produced intermediates. All the exports from an FTA member to another can enjoy the tariff concession.
- In reality, however, the rules of origin (ROOs) clauses in the FTAs may possibly block the concession to the exports.
- ROOs may function as trade protection measures when a country establishes numerous overlapping FTAs.
- Eessential in the case of the regional FTAs which are expected to function to extend the regional production networks, but the bilateral FTAs also suffer from them.
- The effects assessed by the GTAP model should be possibly overestimated.

Future Scenarios of FTA/EPAs relating to Japan

1. Bilateral FTAs of Japan with her possible FTA partners in the future. (i) remaining ASEAN 8 countries; (ii) China and Korea; (iii) ASEAN 10 countries plus CJ and (iv) ASEAN 10 countries plus 5.

2. Regional FTAs relating to Japan or the East Asia in the future. : (i) ASEAN10; (ii) China, Japan and Korea: (iii) ASEAN10 plus 3 (CJK); and (iv) ASEAN10 plus six (China, Japan, Korea, Australia, New Zealand, and India).

Assumptions on the Scenarios

1. Bilateral FTAs: The FTA partners will abolish all the tariffs to Japan, and that Japan (and CK) will *not* change the tariff rates in agriculture, fishery, forestry and processed food. Regional FTAs assumes, as the simulation shocks, that all the parties, including Japan, will reduce the tariff rates to zero in all the sectors.

2. ROOs may significantly curtail the merits of the concession under the regional FTAs by preventing the free movement of materials in the regional production networks. The GTAP simulation may overestimate the impacts.

3. The GTAP model simulations cannot measure the scale merits from the formation of regional production networks, which may result from the region-wide FTAs. The GTAP simulation may fail to assess this effect, and therefore, it may underestimate the impacts. Table 7 below summarizes the welfare gains from the potential bilateral and regional FTAs.

4. China significantly reduced the tariff rates of many sectors as the commitment to access WTO after 2001, the simulated impacts of zero tariffs of China should are not fully attributable to the FTAs of China. The effects of the FTAs of China are rather overestimated.

Welfare gains from scenarios

	Patners of Japan's Bilateral FTAs					Regional FTAs			
	Existing FTAs	ASEAN10	C+K	ASEAN10 +CK	ASEAN10 +CKANI	ASEAN10	CJK	ASEAN10 +3	ASEAN10 +6
AUS	-31	-78	-300	-366	188	-9	-586	-701	8,384
NZL	0	2	-69	-64	88	-15	-93	-110	827
CHN	-149	-621	3,253	2,639	2,438	-329	5,509	8,596	9,345
HKG	8	47	-208	-156	-203	85	-311	-19	-100
JPN	2,373	4,094	11,452	15,503	17,781	-262	10,304	14,233	16,177
KOR	-129	-400	-503	-861	-1,012	-199	17,587	18,628	20,623
TWN	-140	-336	-1,571	-1,854	-1,955	-151	-1,889	-2,788	-3,131
IDN	-68	1,099	-597	427	377	1,167	-709	3,588	4,132
MYS	820	827	-510	280	241	1,498	-622	3,468	4,446
PHL	-69	412	-529	-147	-192	909	-605	1,429	1,539
SGP	-19	-47	-413	-450	-515	2,143	-464	3,620	4,044
THA	-113	3,698	-857	2,591	2,439	3,271	-1,066	11,421	11,462
VNM	0	440	-153	168	159	220	-299	2,105	2,106
XSE	14	211	-162	42	30	472	-107	691	461
IND	12	-108	-456	-540	35	-65	-457	-857	3,945
XSA	0	-26	-231	-248	-252	-21	-245	-361	-506
CAN	61	21	-259	-225	-250	68	-226	-74	-241
USA	-278	-253	-6,232	-6,208	-6,777	679	-5,779	-5,194	-7,116
MEX	3,087	30	-841	-772	-754	75	-403	-185	-206
PER	12	-6	-114	-114	-121	-19	-137	-173	-232
CHL	0	3	-92	-85	-87	13	-161	-162	-204
EU15	333	18	-5,822	-5,550	-6,157	636	-4,357	-2,981	-4,426
RUS	23	-7	-262	-260	-287	68	-150	-62	-128
ROW	105	-123	-3,290	-3,287	-3,788	507	-3,166	-2,010	-3,638
World	5,853	8,898	-8,764	463	1,426	10,742	11,570	52,103	67,563

Japan's bilateral FTA/EPA

- Japan always gains welfare from her own bilateral FTAs.
- The welfare gain of Japan expands as the number of the bilateral FTAs increases.
- The welfare gain from the existing three FTAs in total will be much smaller than those from the FTAs with China and Korea, and/or ASEAN10 countries.
- In particular, the FTAs with ASEAN10 plus five (China, Korea, Australia, New Zealand and India) will bring about the welfare gain of more than seven times as the existing three FTAs.
- The bilateral FTAs of Japan tend to bring about welfare loss to the third countries (due to trade diversion effect).

Regional FTAs including Japan

- The countries that are members of a regional FTA almost always gain the welfare.
- The magnitude of welfare gains to the members expands as the members of the regional FTA expand.
- The largest-scaled regional FTA by ASEAN10 plus six will bring about the largest amount of welfare gains to the members, as well as the world in total.
- However, the welfare loss to the non-member countries also expands, due to the more serious trade diversion.

Implications

1. The existing three FTAs of Japan may bring about only small benefits. Much larger potential welfare gains are expected from the bilateral FTAs with ASEAN10, China, Korea, Australia, NZ, and India. Japan should proceed to expand the FTA partners.

2. Regional FTAs including Japan will bring about welfare gains to all the members in the region. In consideration with the un-assessed benefit of forming regional production networks, Japan should seek the formation of FTA networks to make them regional. ROOs should be harmonized.

3. The preferential trade arrangements, including an FTA, inevitably cause trade diversion, especially to the non-member countries. Expansion of the FTA members in the region will reduce such non-member countries, as well as build the achievement toward the multi-lateral arrangements at the same time.

ASEAN+6 excluding J agri

E V	ASEAN+6 inclu agr	ASEAN+6 excl agri J
A U S	8 , 3 8 4	2 , 4 7 1
N Z L	8 2 7	5 7 7
C H N	9 , 3 4 5	9 , 5 8 5
H K G	- 1 0 0	- 1 0 4
J P N	1 6 , 1 7 7	1 3 , 7 9 1
K O R	2 0 , 6 2 3	2 0 , 5 4 6
T W N	- 3 , 1 3 1	- 3 , 1 1 3
I D N	4 , 1 3 2	4 , 2 9 4
M Y S	4 , 4 4 6	4 , 4 9 3
P H L	1 , 5 3 9	1 , 5 1 1
S G P	4 , 0 4 4	3 , 5 5 1
T H A	1 1 , 4 6 2	9 , 9 6 6
V N M	2 , 1 0 6	2 , 1 3 3
X S E	4 6 1	5 0 4
I N D	3 , 9 4 5	3 , 9 7 9
X S A	- 5 0 6	- 4 5 9
C A N	- 2 4 1	- 1 7 0
U S A	- 7 , 1 1 6	- 6 , 8 4 2
M E X	- 2 0 6	- 4 8 6
P E R	- 2 3 2	- 2 1 0
C H L	- 2 0 4	- 1 2 9
E U 1 5	- 4 , 4 2 6	- 5 , 3 9 6
R U S	- 1 2 8	- 1 2 0
R O W	- 3 , 6 3 8	- 4 , 0 6 1
W o r l d	6 7 , 5 6 3	5 6 , 3 1 1