How to Measure Non-tariff Barriers? A Critical Examination of the Price-Differential Approach

Kyoji Fukao*
Hitotsubashi University and RIETI
Goushi Kataoka
UFJ Institute
Arata Kuno
UFJ Institute

1. Introduction

- Research on a Japan - Korea FTA often emphasizes the importance of the elimination of NTBs (e.g. JETRO, 2000; KIEP, 2000; Kim et. al. 2003).

- The political background: Korea has higher tariff rates (7.9%) in place against Japan than Japan has against Korea (2.9%).

- If only tariffs are abolished, Korea would have to make unilateral concessions to Japan.

- It has been argued that given the pervasiveness of *non-tariff* barriers in Japan, Korea can increase its exports to Japan if reduction of NTBs is included.

- In order to study NTBs, the Japan-Korea FTA Study Group launched a Non-tariff Measures (NTM) Cooperation Committee in May 2003.
- However, so far, neither the study group nor other researchers have come up with a consensus concerning the size of NTBs in Japan and Korea.
- This paper attempts to address this issue by critically examining the methods used by preceding studies to measure NTBs.

Four methods of measuring NTBs

1. The first approach calculates the differential between the import price and the domestic price of each commodity at a disaggregated level and subtracts the tariff rate on the commodity from this differential. The result is treated as a non-tariff barrier.

   Japan: Sazanami, Urata, and Kawai (1995) , Kataoka and Kuno (2003)

   Korea: Kim (1995), China: Shuguang et. al. (1999), EU: Messerlin (2001)

2. The second approach, studies the disparity between domestic and foreign prices. JETRO (2000), METI Statistics

    Data on PPP are limited.

    It is not easy to take account of differences in distribution margins and trade costs among countries.

    With this approach, it is also difficult to treat tariff barriers and NTBs separately.

3. The third approach estimates gravity models and regards the residual error that cannot be explained by the models as tariff and non-tariff barriers. Japan; Sohn and Yoon (2001) , Harrigan (2003)

There are a variety of factors other than NTBs that are responsible for residual errors (such as imports from overseas affiliates).

The number of estimates at the disaggregated commodity level is limited.

4. In the fourth approach, scholars produce a list of individual cases of NTBs and use a frequency measure based on the number of cases as the basis for an international comparison.

UNCTAD, OECD, KITA . Not quantitative.

The coverage of GTAP database on NTBs is limited.

MacMaps (CEPII) is not open to the public.

How Price Differentials Were Calculated by Kataoka and Kuno (2000)

- Prices of domestic goods were obtained from the *Japan Input-Output Tables, 1995*.
- Prices of imported goods were obtained from Japan's Customs data provided by the Ministry of Finance (MOF), which are recorded at the 9-digit HS88 level.

(% except for import amounts and domestic production amounts)

Japanese 1995 benchmark Input-Output table Sector codes	Items included in the survey	Level of trade protection (①+②)	Tariff ratio (①)	Non-tariff barrier (②)	1999 import amount (billion yen)	1999 domestic production amount (billion yen)	Degree of transparency of imports
1111011	Beef (dressed carcass)	63.7	27.6	36.1	411.9	608.1	40.4
0111011	Rice	262.7	0.0	262.7	16.0	2338.9	0.7
(iron and steel)		49.7	1.2	48.5	145.6	5033.2	2.8
2621012	Ordinary steel sheets	75.8	0.9	74.9	28.9	439.8	6.2
2621013	Ordinary steel bands	35.8	1.3	34.4	63.8	1755.4	3.5
2621015	Other ordinary steel hot rolled materials	15.5	1.0	14.5	6.5	278.6	2.3
2622011	Ordinary steel pipes	39.9	1.1	38.8	8.2	507.7	1.6
2623021	Plated steel materials	15.6	1.7	13.9	27.9	1239.9	2.2
2631031	Iron casting	136.1	0.0	136.1	10.3	811.9	1.3
(Petroleum products)		112.2	0.9	111.2	804.0	4569.2	15.0
2111012	Jet fuel	12.3	0.1	12.3	180.3	187.2	49.1
2111013	Kerosene	26.1	2.7	23.4	80.3	563.8	12.5
2111014	Diesel fuel	206.3	5.4	200.9	38.2	2470.6	1.5
2111015	A-grade heavy oil	45.8	3.4	42.4	27.9	572.4	4.7
2111016	B-grade heavy oil and C-grade heavy oil	42.1	2.6	39.5	86.6	638.8	11.9
2111018	Liquified petroleum gas (LPG)	11.2	0.0	11.2	390.7	136.4	74.1

Note 1: The tariff rate is calculated on the basis of the annual table as follows: (tariff amount/import amount) x 100.

Note 2: The degree of transparency of imports is calculated as follows: Import amount//(domestic production amount + import amount) x 100.

Note 3: The import amount and domestic production amount data is from the 1999 annual table (1995 Standards).

Note 4: The values for the sectors in parentheses and the total values indicate the aggregate calculation of the results of estimates for the covered items against the domestic production amount and import amount.

| Row sector codes of 1995 benchmark I-O table	Description	HS 9 digit codes
1111011	Beef (dressed carcass)	0201.10-000、0201.20-010、0201.20-090、0201.30-010、0201.30-020、0201.30-030、0201.30-090、0202.10-000、0202.20-010、0202.20-090、0202.30-010、0202.30-020、0202.30-030、0202.30-090
0111011	Rice	1006.10-000、1006.20-000
2621012	Ordinary steel sheets	7208.32-011、7208.32-019、7208.33-010、7208.34-010、7208.35-010、7208.42-010、7208.42-090、7208.43-010、7208.43-090、7208.44-000、7208.45-000、7208.90-000
2621013	Ordinary steel bands	7208.11-010、7208.12-011、7208.12-019、7208.13-010、7208.14-010、7208.21-000、7208.22-010、7208.22-090、7208.23-000、7208.24-000、7211.12-010、7211.19-010、7211.22-000、7211.29-000
2621015	Other ordinary steel hot rolled materials	7207.11-010、7207.11-090、7207.12-010、7207.12-090、7207.19-000、7207.20-011、7207.20-012、7207.20-019、7213.10-000、7213.31-010、7213.31-090、7213.39-000、7213.41-000、7213.49-000、7215.90-010、7217.11-000、7217.19-000、7217.21-000、7217.29-000、7217.31-000、7217.33-000、7217.39-000、7225.10-010、7225.10-090、7226.10-010、7226.10-090、7302.10-000、7302.20-000、7302.30-000、7302.40-000、
2622011	Ordinary steel pipes	7304.10-020、7304.20-020、7304.20-040、7304.31-010、7304.31-020、7304.39-010、7304.39-020、7304.90-040、7305.12-020、7305.31-020、7305.39-020、7306.10-020、7306.30-011、7306.30-019、7306.30-021、7306.30-029、7306.30-090、7306.60-021、7306.60-029、7306.90-020
2623021	Plated steel materials	7210.11-000、7210.12-000、7210.20-000、7210.31-010、7210.31-020、7210.39-000、7210.41-000、7210.49-000、7210.50-000、7210.60-000、7210.70-000、7210.90-010、7210.90-020、7212.10-000、7212.21-010、7212.21-020、7212.29-000、7212.30-000、7212.40-000、721250-000、7212.60-010、7212.60-020、7217.12-010、7217.12-090、7217.13-010、
2631031	Iron casting	7325.10-000、7325.91-000、7325.99-000
2111012	Jet fuel	2710.00-143
2111013	Kerosene	2710.00-149
2111014	Diesel fuel	2710.00-150
2111015	A-grade heavy oil	2710.00-161、2710.00-163、2710.00-164、2710.00-165、2710.00-166、2710.00-167、2710.00-169
2111016	B-grade heavy oil and C-grade heavy oil	2710.00-171、2710.00-173、2700.10-175、2710.00-179
2111018	Liquified petroleum gas (LPG)	2711.12-010、2711.12-020、2711.13-010、2711.13-020、2711.14-021、2711.14-022、2711.19-012

Price-differential approach, too, is not without its problems

- As Komiya and Negishi (1998) has pointed out, in order to obtain reliable results, it is necessary to ensure that the quality of the imported and domestic goods that are the subject of the comparison is in fact identical.

- Although subsidies for domestic production impede imports we can not measure such effects using this approach.

Beef

- Before 1991, Japan imposed import quota on beef.

- The applied tariff rate on beef in 1991 was 70%.

- The tariff rate is now 38.5% (concession rate of 50%).

Fig. 3.1 Trends in the production and imports of and self-sufficiency rate for beef in Japan

Thousand Tons

Domestic Production (left axis)   Imports (left axis)

Self-sufficiency rate (right axis)
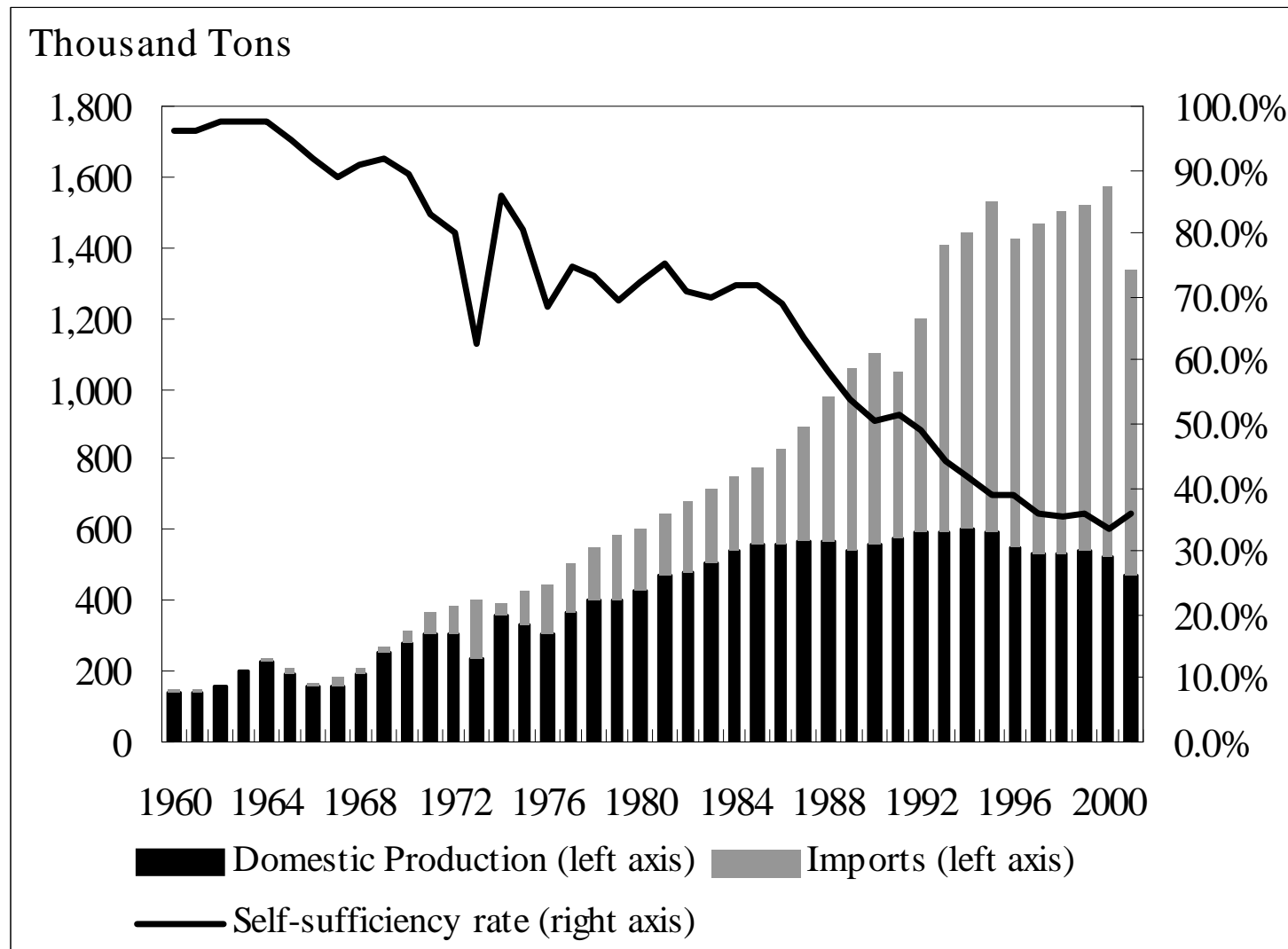
Price Differential between Imported Beef and Japanese Beef: 2000

(Yen/Kg)

	Ordinary retail price				Bargain sale price			
	Shoulder	Brisket	Sirloin	Round	Chuck	Brisket	Sirloin	Round
Japanese beef cattle	530	478	1129	550	400	371	854	400
Domestic beef	339	301	641	376	241	224	479	256
Imported beef (US)	220	272	398	218	144	193	264	128
Imported beef (Australia	175	159	350	173	111	111	232	103

Source: Agriculture & Livestock Industries Corporation

Comparison of Beef Prices between U.S. and Japan (yen/kg)

	US Omaha fob base price, strip loin chilled	Trade price in Japan, strip loin chilled imported	Ordinary retail price, sirloin	Bargain sale price, sirloin
2003 March	1152.4	1,914	3,840	2,700
2003 April	1440.1	2,030	3,900	2,730
2003 May	1656.9	2,175	3,920	2,620
2003 June	1673.1	2,413	3,950	2,620
2003 July	1274.8	2,534	3,870	2,690
2003 August	1192.5	2,367	n.a.	n.a.

Source: USDA「National Carlot Meat Report」
　　　　Livestock-industry information network
　　　　Agriculture & Livestock Industries Corporation

- It seems that consumers have a strong preference for domestic beef.
- We can explain the price differential between the US wholesale price and the trade price in Japan by a tariff of 36 % and additional transportation and distribution costs.
- We can conclude that there are no substantial NTBs in the case of beef except the grading-system and the information issue.
- Unlike other tariff revenues, those from beef imports in Japan are utilized as a part of beef-related subsidies, such as funding for the rationalization of beef production and meat distribution.

Rice

- Prior to the Uruguay Round agreement, rice imports were handled exclusively by the Food Agency exclusively as a state-trading item.
- In April 1999, Japan introduced a tariff–rate quota system, maintaining minimum access rice imports under the state-trading system. The current tariff rates are zero for minimum access rice, and 341 yen/kg for above-quota imports.

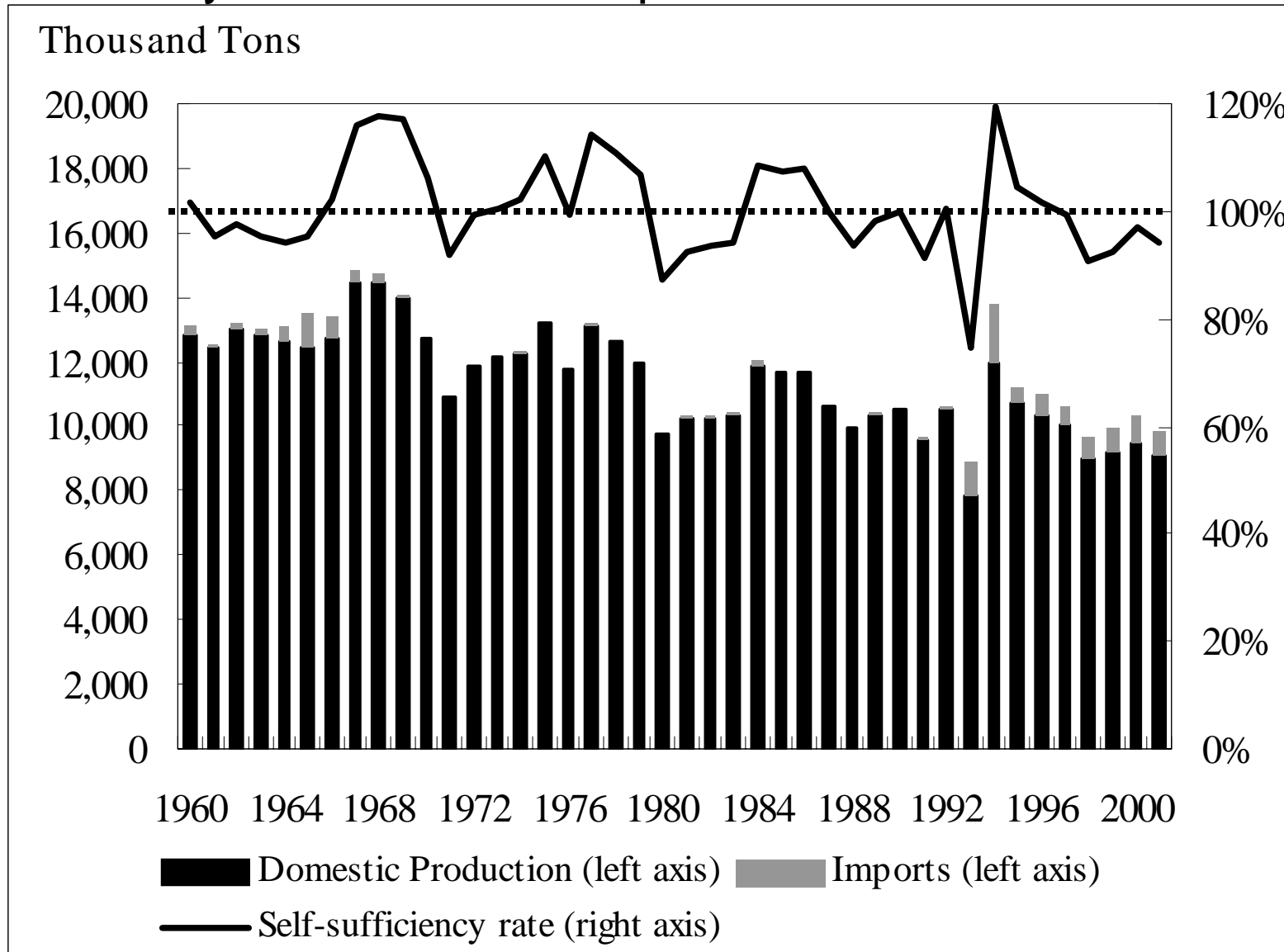# Fig. 3.2 Trends in the production and import of and self-sufficiency rate for rice in Japan

Thousand Tons

Domestic Production (left axis)　Imports (left axis)
Self-sufficiency rate (right axis)

Table 3.8 The results of the second round of SBS bidding in 2002

Exporting country	Type	Volume of imports (1)	Price* Government purchase (2)	Price* Government sales (3)	Markup (3)-(2)=(4)	Modified border piece ratio (3)÷(2)=(5)
		(ton)	(yen/ton)	(yen/ton)	(yen/ton)	
U.S.A.						
	non-glutinous short grain, brown rice	126	86,000	228,457	142,457	2.66
	non-glutinous short grain, milled rice	2,867	94,836	219,359	124,523	2.31
	non-glutinous medium grain, milled rice	100	61,190	216,901	155,711	3.54
	glutinous short grain, brown rice	18	78,000	238,200	160,200	3.05
	glutinous short grain, milled rice	1,440	85,509	213,203	127,694	2.49
	subtotal	3,634	80,166	235,547	155,381	2.94
Australia						
	non-glutinous short grain, brown rice	22	89,000	233,300	144,300	2.62
	non-glutinous short grain, milled rice	435	94,121	247,128	153,007	2.63
	subtotal	457	93,874	246,462	152,588	2.63
Thailand						
	non-glutinous long grain, milled rice	60	69,667	228,333	158,666	3.28
	glutinous long grain, milled rice	40	72,000	231,000	159,000	3.21
	subtotal	100	70,600	229,400	158,800	3.25
China						
	non-glutinous short grain, milled rice	2,200	80,450	228,831	148,381	2.84
	glutinous short grain, milled rice	788	82,755	233,858	151,103	2.83
	subtotal	2,988	81,058	230,157	149,099	2.84
Total		8,096	87,147	224,056	136,909	2.57

Note: The second round of SBS bidding took place on August 30, 2002.

The total volume offered was 20,278 tons.

　　* Weighted average price of the accepted offers.

Source: Shokuhin Sangyo Shinbun-sha, *Easy to Understand Handbook of Rice* , *2002/2003* , 2003.

- Because of the prohibitively high tariffs, almost no rice is imported beyond the minimum access volume. Even though no revenues are collected from tariffs, a large disparity is created between import and domestic prices. When analyzing the rice market, we might mistakenly identify the presence of a very high non-tariff barrier if we were to use the price differential approach.
- Uses of minimum access rice; processed foods (37.5%), government stockpiles (32.6%) and foreign aid (20.2%).
- Highly regulated distribution channels seem to give rise to higher transportation and distribution margins for imported rice.
- Various kinds of subsidies are being applied and over 300 billion yen has been set aside for a rice policy reform budget for FY2004

Steel

Table. 3.12 Japan's imports and exports of steel by country（Year 2002, Thousand JPY）

Exports			Imports		
R KOREA	81,716,443	29.9%	R KOREA	379,639,789	23.1%
CHINA	46,132,554	16.9%	CHINA	336,176,569	20.4%
TAIWAN	34,944,445	12.8%	TAIWAN	152,225,250	9.2%
S AFRCA	22,311,996	8.2%	THAILND	149,492,858	9.1%
BRAZIL	13,887,392	5.1%	HG KONG	96,249,162	5.8%
RUSSIAN	8,052,964	2.9%	MALYSIA	61,609,843	3.7%
KAZAKHS	7,766,041	2.8%	USA	61,561,994	3.7%
ROW	58,552,455	21.4%	ROW	409,381,737	24.9%

Japan's Trade of Ordinary Steel Pipes

Imports of commodity	Quantity (metric tons)	Value (1000yen)	Unit price (1000yen/metric tons)	Value shares (%)
730410020	565	33,788	60	0.24
730420020	106	25,616	242	0.18
730420040	124	15,362	124	0.11
730431010	966	199,316	206	1.39
730431020	763	175,018	229	1.22
730439010	97	20,991	216	0.15
730439020	2,760	366,465	133	2.56
730490040	628	57,964	92	0.40
730512020	2	1,841	921	0.01
730531020	1,921	111,664	58	0.78
730539020	3,054	266,878	87	1.86
730610020	19	792	42	0.01
730630011	7,493	449,904	60	3.14
730630019	46,297	2,130,797	46	14.87
730630021	66,052	3,805,078	58	26.55
730630029	58,965	2,843,688	48	19.84
730630090	23,636	1,862,781	79	13.00
730660021	20,204	914,683	45	6.38
730660029	15,725	800,550	51	5.58
730690020	3,643	250,822	69	1.75
Total	253,020	14,333,998	57	100.00

Exports of commodity	Quantity (metric tons)	Value (1000yen)	Unit price (1000yen/metric tons)	Value shares (%)
730410900	267,202	17,129,249	64	11.46
730420900	373,512	29,894,483	80	20.00
730431100	8,301	1,430,105	172	0.96
730431900	26,649	5,761,084	216	3.85
730439100	25,274	2,274,887	90	1.52
730439900	281,960	19,736,092	70	13.20
730490100	59	32,215	546	0.02
730490900	1,455	435,129	299	0.29
730511900	470,132	30,552,902	65	20.44
730512900	83,905	4,651,098	55	3.11
730519900	12	1,947	162	0.00
730520290	11,721	802,783	68	0.54
730531900	60,267	4,862,683	81	3.25
730539900	21,542	1,585,591	74	1.06
730590900	73	42,490	582	0.03
730610900	125,414	8,204,734	65	5.49
730620900	61,606	3,439,005	56	2.30
730630100	4,908	439,182	89	0.29
730630200	20,264	1,725,255	85	1.15
730630900	104,655	14,116,108	135	9.44
730660900	27,209	1,975,082	73	1.32
730690900	1,260	408,924	325	0.27
Total	1,977,380	149,501,028	76	100.00

- The difference in product compositions makes the unit value of Japan's exports of ordinary steel pipes higher than the unit value of Japan's imports.
- Looking at the unit prices on an HS9 basis, export unit prices are higher than import unit prices, which points to the possibility of a difference in quality for each product (in addition to the difference in product compositions).

Petroleum Products

Table 3.15 Japan's imports of petroleum products by country （Year 2002, Thousand JPY）

Light petroleum oils and preparations			Other		
Country	Value	Share	Country	Value	Share
Republic of Korea	159,268,143	26.20%	Republic of Korea	100,890,894	53.10%
Kuwait	101,537,706	16.70%	Indonesia	25,861,326	13.60%
United Arab Emirates	69,801,818	11.50%	Singapore	12,023,746	6.30%
Saudi Arabia	61,880,913	10.20%	Russian Federation	8,042,086	4.20%
Indonesia	36,752,775	6.00%	Taiwan	6,828,375	3.60%
ROW	178,920,071	29.40%	ROW	36,276,036	19.10%
Total	**608,161,426**	**100.00%**	Total	**189,922,463**	**100.00%**

Source: Ministry of Finance, *Japan Exports & Imports: Commodity by Country.*

Japan's Trade of B-grade Heavy Oil and C-grade Heavy Oil

Imports of commodity	Quantity (kilo-litre)	Value (1000yen)	Unit price (1000yen/kilo-litre)
271000171	470,324	5,022,939	11
271000173	2,217,954	22,722,820	10
270010175	1,054,291	10,316,436	10
271000179	7,218	99,260	14
Total	3,749,787	38,161,455	10

Exports of commodity	Quantity (kilo-litre)	Value (1000yen)	Unit price (1000yen/kilo-litre)
271000400	4,269,365	45,961,781	11

- Comparing import and export prices, all products recorded almost similar prices for exports and for imports, bringing us to the conclusion that we can not explain the price disparity between domestic and foreign prices by either the difference in quality or commodity composition between imported and domestic goods.

- Until 1997, imports of specific kinds of petroleum refined products were regulated through a system of registration of importers by law, the Provisional Measures Law on the Importation of Specific Kinds of Petroleum Refined Products. It seems that there exist substantial NTBs at least for the period before 1997.

Conclusions

- Price-differential approach provides us a good starting point. But too simplistic.
- In order to obtain reliable results, it is necessary to ensure that the quality of the imported and domestic goods that are the subject of the comparison is in fact identical.

  Beef, Steel
- Although subsidies for domestic production impede imports we can not measure such effects using this approach.

  Rice, Beef