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Bilateral Export Performances
Between Thailand and Japan, 1960-1977

by

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BILATERAL EXPORT PERFORMANCES
BETWEEN THAILAND AND JAPAN, 1960 - 1977

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Supote Chunanuntathum
and
A. Murakami

Abstract

This paper has two objectives. It first adopts a constant market share model to the annual data of bilateral export between Japan and Thailand during 1960-1977. The emphasis is, howerver, on Thailand's export performance in the Japanese market. Calculations for 1960-1973 indicated negative performances of Thailand's export to Japan which were, in an aggregate term, dominated by an unfavourable compositional effects of primary products particularly of crude materials. Though the aggregate export performances were favourable during 1973-1976, it was offset by a large and unfavourable export performance in 1977. There were large fluctuations of primary product exports. But Thailand's export of manufactured goods showed almost a consistent favourable export performance throughout the entire period. These results were mainly due to the favourable pattern of Japanese demand for Thai manufactured exports. The competitive effect of Thai manufactured exports also improved after (around) 1970. The last section of this paper attempts to explain the real price effect as well as the policy effect on Thailand's broad commodity composition of primary vis-à-vis manufactured export. Market share and competition of various export items to the Japanese market are also estimated protracting the role of relative prices.

<u>บทคัดย่อ</u>

งานวิจัยนี้มีวัตถุประสงค์ ๒ ประการ คือ

๑. ใช้เครื่องมือที่เรียกว่า Constant Market Share อธิบายการค้าระหว่าง
ประเทศไทยและญี่ปุ่นระหว่างปี ๑๙๖๐-๑๙๗๗ แต่การศึกษานี้เน้นการส่งออกของไทย การคำนวณ
ทำเป็นรายปีต่อปี และทำแยกสินค้าอุตสาหกรรมและเกษตรกรรม ผลปรากฏว่า ในระหว่างปี
๑๙๖๐-๑๙๗๓ นั้น export performance ของไทยในตลาดญี่ปุ่นติดลบเกือบทุก ๆ ปี
สาเหตุที่สำคัญเนื่องมาจากการส่งสินค้าเกษตรกรรมที่เป็นวัตถุดิบ (raw materials)
สัดส่วนของการส่งออกของไทยในสินค้าเหล่านี้ในตลาดญี่ปุ่นมีสูงมากโดยเฉพาะอย่างยิ่งในต้น ๆ ปี
ของทศวรรษของ ๑๙๖๐ คือ อยู่ระหว่าง ๖๐.๐-๖๖.๐ เปอร์เซนต์ การส่งเข้าของญี่ปุ่นใน
สินค้าเหล่านี้มีอัตราการเพิ่มต่ำกว่าสินค้าอื่น ๆ สินค้าออกของไทยประเภทอาหารมี export
performance ที่ไหวตัวขึ้นลงมาก และมีสินค้าอาหารประเภทใหม่ ๆ หลายชนิดที่ส่งไปขายญี่ปุ่น
เพิ่มขึ้น สินค้าอุตสาหกรรมของไทยในตลาดญี่ปุ่นมี export performance ที่เป็นบาทเกือบ
ทุก ๆ ปี และเริ่มมีความสำคัญมากยิ่งขึ้นหลังปี ๑๙๗๐ เป็นต้นมา แม้นว่าฐานการส่งออก
ยังเล็กอยู่ก็ตาม สาเหตุของ export performances ที่ดีขึ้นเกิดจากมีสินค้าอุตสาหกรรม
ใหม่ ๆ ที่ผลิตในประเทศไทยที่เริ่มส่งออก ทำให้ compositional effect ของ
อุตสาหกรรมในการคำนวณดีขึ้น ส่วน competitive effect โดยส่วนรวมของอุตสาหกรรม
การส่งออกของไทยในตลาดญี่ปุ่นดีขึ้น หลังจากปี ๑๙๗๐

๒. ได้พยายามอธิบายโดยทางสถิติถึง commodites compositional effect
โดยดูบทบาทของราคาเปรียบเทียบของสินค้ากลุ่มเกษตรกรรมและอุตสาหกรรม ได้พิจารณา
บทบาทของนโยบายการส่งเสริมอุตสาหกรรมต่อสัดส่วนของการส่งสินค้าทั้งสามกลุ่มดังกล่าว
บ้างด้วย นอกจากนี้ยังได้แสดงบทบาทของราคาของสินค้าบางชนิดที่มีต่อ market share
และการแข่งขันของสินค้าไทยกับคู่แข่งของไทยในตลาดญี่ปุ่น

BILATERAL EXPORT PERFORMANCES

BETWEEN THAILAND AND JAPAN, 1960-1977

I. Introduction and Purpose of Study

Exports from developing countries have generally been analysed from the perpective of demand and supply factors. The slow growth of exports of developing countries is attributed, under the demand deficiency postulate, to the constraints operating in the international demand.[1] These factors include for example (a) generally low elasticities of consumer demand for many primary exports; (b) development of synthetic substitutes through the growth of chemical industries; (c) input-saving technical progress including recycling in metal use in industrialised countries, and (d) the restrictive import policies of developed countries. On the other hand, the hypothesis of supply inelasticity of exports, as expounded by its protagonists, is considered to be more important.

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[1] See, for instance, Ragnar Nurkse, "Patterns of Trade and development," Wicksell Lecture as given in Stockholm in Aprill 1959, which is republished in Economics of Trade and Development, ed. by J.D.Theberge, John Wiley & Sons, New York, 1968, pp.91-99; Raul Prebisch, "Development Problems of the Peripheral Countries and the Terms of Trade," in J.D. Theberge, ibid, pp.287-297. Since then there are a number of works and articles particularly those publications under UNTAD regarding not only on trade and growth and distribution but also on the question of stability problem of LDC's export earnings as well as on the various aspects of foreign investment in these countries. Therberge's edited book contains many articles on trade and development written by famous economists in the 1950's and 1960's.

These analysts maintain that the slow growth of exports from
developing economies is due more to constraints on the supply side.[2]
The supply problem are in most cases traced back to their inward-
looking economic (trade and industrialisation) policies. Particularly,
the trade and industrialisation regimes which give more emphasis
in production to substitute imports of manufactured consumer-goods,
often tends to result in the relation between the domestic and export
prices discouraging exports.[3] The supply-constraint hypothesis also
points to the empirical evidences of the recent rapid growth of
manufactured exports, beginning mostly from the early 1960's well
up to the last decate, of a number of developing countries. The
successful story of these newly industrialised countries e.g. Korea,
Taiwan, Israel, Hong Kong, Singapore, Greece, Portugal, Mexico, and
Spain is attributed to the adoption of outward-looking policy. They
have adopted an appropriate trade and industrialisation policy with an
important aim of promoting labour-intensive production for export.

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[2] The supply side can be traced back to the thought of the
Classical theory in the 19th century on efficiency of allocation of
recources basing on the Ricardiam theory of intemational comparative
advantage. See, for example, A.K. Caimcross, "Intemational Trade
and Economic Development, "Kyklos, 1960; Gottfried Harberler, "An
Assessment of the Current Relevance of the Theory of Comparative
Advantage to Agricultural Production and Trade. "The Intermational
Journal of Agarian Affairs, May, 1964. See also Hla Myint, Southeast
Asia's Economy in the 1970's, and Richard E. Caves, "Vent for
Surplus Models of Trade and Growth", in J.D. Theberge, op.cit, pp.221-230.

[3] See two important empirical studies on this subject by Bela
Belassa, and Associates, The Structure of Protection in Developing
Countries, Baltimore, 1971, and Ian Little, Tibor Scitovsky, and
Maurice Scott, Industry and Trade in Some Developing Countries, A
Comparative Study, Oxford University Press, London, 1970.

The above two approaches to explain a developing country's export are essentially supplementary. Recently there have been some attempts to combine them together.[4] The general theme of this paper is also in that same direction, by applying it to the bilateral trade performance between Thailand and Japan. But exports from Thailand to Japan will be, however, the focus of this study. The case of bilateral trade performances between Japan and Thailand is interesting not only because Japan is the most important trade partner[5] but also because of the rather very large bilateral imbalances of trade favouring Japan.[6]

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[4] Juergen B.Donges and James Riedel, "The Expansion of Manu-factured Exports in Developing Countries: An Empirical Assessment of Supply and Demand Issues, "Weltwirtschaftliches Archive, 1977. This is a supplementary research of the total research on trade regime and export performance done at Institut fur Weltwirtchaft, Kiel on fifteen country studies including Brazil, Columbia, Egypt, Hong Kong, India, Israel, Malaysia, Mexico, Pakistan, Singapore, South Korea, Spain, Taiwan, Turkey, and Yugoslavia. Ranadev Banerji, "The Export Performance of Less Developed Countries: A Constant Market Share Analysis," ibid, 1974. Hollis B. Chenery and Donald B. Keesing, The Changing Composition of Developing Country Exports," World Bank Staff Working Paper, No.314, January 1979. See also a number of other recent articles in the reference of this useful paper.

[5] Thailand's export to Japan ranged in between 14.2-27.6 percent of the total Thai export during 1960-1977 while the figures for Thailand's import from Japan fell in between 25.6-37.7 of its total import in the same period.

[6] Trade deficit with Japan contributed from 39.7 to as high as 507.6 percent of the Thailand's total trade deficit during 1960-1977.

While this introduction serves as Section I of this paper, Section II introduces the constant market share (CMS) model together with an outline of its implications and various limitations. An application of this model to the actual trade data between Japan and Thailand will follow in Section III. In Section IV, some estimates of the supply and demand price elasticities will also be attempted. Some conclusions are then drawn in the final section.

II. The CMS Model, Its Implications and Limitations

The slow growth of a country's exports under the well-known Constant Market Share model, can be broadly attributed to three factors. First, a country's exports is growing slower than the world average for all commodities. Second, exports may also be concentrated in the commodities and/or markets which are expanding at a lower rate than that of the world average. Third, the residual is then reflecting the difference between the actual export growth and the growth that would have occured if that country had maintained its share of every commodity to each market. However, disregarding the comparative market differentiation effect, the CMS model adopted here is stated below.

$$\sum_{c=1}^{n} (X_c^1 - X_c^0) = r^0 \sum_{c=1}^{n} X_c^0 + \sum_{c=1}^{n} (r_c^0 - r^0) X_c^0$$

$$+ \sum_{c=1}^{n} (X_c^1 - X_c^0) - \sum_{c=1}^{n} r_c^1 X_c^1$$

$$+ \sum_{c=1}^{n} (r_c^1 - r_c^0 X_c^0) \qquad \text{-------- 1}$$

The superscripts (0 and 1) refer to the terminal and initial year respectively. The subscript (c) refer to an individual commodity and the sign of summing is over all the commodities.

X_c = a country's export earning of commodity c and $\sum_{c=1}^{n} X_c$ equal to X.

r_c = percentage increase in the world trade of commodity c from time period 0 to 1.

r = percentage change in total world trade from time period 0 to 1.

The left-hand side of equation (1) indicates the actual change in a country's export in a specified two periods of the super-scripts. The right-hand side consists essentially of three terms. The first term, $r^0 \sum_{c=1}^{n} X_c^0$, is the world growth effect. It is the amount of export earnings which would have been obtained by the country under studies if it had maintained its original share in the world trade.

The second effect, $\sum_{c=1}^{n} (r_c^0 - r^0) X_c^0$, may be termed the commodity compositional effect. It indicates the original composition if the country's exports. The country's export may or may not be concentraded in the commodities which grow slower than the world growth rate in aggregate. The negative effect for this term means that the composition of the country's exports to the world market

clustered in slow-growth commodities. This also means equivalently
that it failed to keep pace with world export in each class of commo-
dities or its share of exports had declined in commodities classes
which comprised the bulk of its total earnings. The positive
compositional effect is then the opposit.

The third effect is the deviation of the actual export
growth from the sum of all commodities with each individual one
hypothetically moving at the same rate as the world rate for that
specific commodity. The difference is the competitive effect. This
term indicates whether the country has been able to compete with its
competitors in each individual commodity market. The competitive
effect is in turn broken down into two components. The first part
reflects the competitiveness in terms of the initial sizes of
exports while the second portion relates to the changes in the
values of exports. The first may be called the pure competitive
effect. The second one is the interaction effect with a positive
value indicating that the country concerned is able to diversify
its exports from the slowly-growing to the morerapidly-growing export
items. However, the overall competitive effect, being the residual,
usually poses difficulty of interpretation. One straight forward
interpretation of the competitive effect is the price elasticity
of substitution in international trade. The share of the country's
export in the total market can then be expressed as a function of

ralative price of the country concerned vis-avis its competitors.

Although this is the line of reasoning adopted in this study, we are fully aware of the fact that competitive power is also affected by non-price factors. These involve e.g. the quality and the variety of export products, marketing techniques, terms of export financing the capacity to meet the order in time and so on. The non-price factors are, however, much more difficult to quantify.

There should be no difficulty now to recognize that the CMS model is based on a rather narrow scope and has limitations. First of all, the model is an identity which fails, like any identity in economic theory, to establish any causual relationship. The result obtained stops short of providing the explanations as to why exports increased as the way they actually did. A negative compositional effect, for example, only tells us that the export structure is more than proportionally concentrated in slow-growing commodities, and not more than that. To gain insights into why the structure of exports are badly diversified by commodities, additional information must be required. The obstacles to better commodity diversification may not be only due to economic factors but also historical and or institutional factors. But the model is, of course, very useful in numerically splitting a mass of trade data into different components for the analysis of its growth in the past. It is an anytical tool helping to guide us initially to the areas where factors

should be sought to explain in details a country's export per-
formance. Second, the CMS model shown above has no stochastic

basis and cannot be used for the purpose of an econometric projection

of the probable change in the market share the concerned country's

export. It is only used to analyze the past export. Third, the

CMS analysis is valid only on the basis of the particular time

period and the level of commodity aggregation chosen. A different

time period and level of aggregation may give different results

and conclusions. In our empirical analysis below, a series of

annual calculations will be attempted starting from 1960 to 1977.

III. Application to the Bilateral Trade Between Thailand and Japan

A. Thailand's Export Performance in Japan

Basing on the CMS model in equation (1), we apply

it to Thailand's exports to Japan and, vice-versa, Japan's exports

to Thailand. Data are taken from the United Nations International

Trade Statistics in terms of Standard International Trade Classification

(SITC). Since Thailand's export to Japan in SITC 3 (mainly fuels)

is neglegible, it is excluded from the calculation.

Table 1 gives the compound rates of growth of Japanese

imports from Thailand and non-Thai source. Table 2 shows the

results of decomposing the actual annual increase or decrease in

Thai exports to Japan during 1960-1977. The actual increase is in

column (1). Column (2) is the hypothetical growth which is the amount of annual export earnings should Thailand maintain its original share of export in Japan in a given period. The net difference between the actual increase and the hypothetical growth is given in column (3). This net change can be regarded as Thailand's total export performance in the Japanese market. The analysis shows that in most cases from 1960 to 1973 Thailand did not perform well in the Japanese market.

The main reason was the compositional structure of Thailand's exports to Japan which concentrated in the slow-growth categories, particularly those of crude materials. The average growth rate of total Japanese import of crude materials ranged in between 10.00 to 12.28 percent between 1960/1-1963/64 to 1968/69-1971/72, as compared to its overall growth rates of 12.42 to 15.68 percent in the corresponding periods. At the same time, Thailand's crude material exports constituted approximately 60.00-66.00 percent of its total export earnings from Japan in the early years of 1960's even though it gradually declined to about 40.00 percent in 1972. The overall result is then that Thailand's structure of export to Japan together with the growth of Japanese markets seriously deterred the rapid expansion of Thai trade to Japan up to 1973. Since then, and, as indicated in Table 2, Thailand's total export performance tended to become favourable with positive compositional effects.

The overall competitive effect also tended to improve after 1973.
The exceptionally large unfavourable export performance for 1976/77
was affected also by the enormous expansion of total Thailand's
export in 1976 and the slower growth of agricultural export in 1977
drought year.

The CMS exercise is repeated for primary and manufacutured
exports separately. The results are shown respectively in Table 3.
The total result for the primary export indicates a wide fluctuations
of Thailand's annual export performances during the period from
1960 to 1973. There is no discernable trend in the total agricultural
export performance. Nevertheless, when we look closely into each
commodity class, again it is the crude material (SITC 2) e.g. rubber
and jute, which contributed mostly and significantly to these years
of negative performances. To take a specific example of rubber which
is a very important single import of crude material from Thailand to
Japan. Japan's import of rubber experienced a negative simple
average annual growth rate of -5.13, -1.49, and -2.01 percent in
the period of 1960/61-1963/64, 1964/65-1967/68 and 1968/69-1971/72
respectively, while the same growth rates of rubber imports from
Thailand were correspondingly 6.10, -9.20, and 24.41 percent.
Moreover, during 1964/65 to 1968/69 period Thailand's rubber export
to Japan drastically fell short of the average growth of the Japanese
import of this commodity. Hence, Thailand's rubber export earning

from Japan also suffered as a result of competition from non-Thai suppliers to the same market. However, as a result of rising rubber prices, after 1973 Japanese import value of rubber tended to increase rapidly. Thailand was able, after 1973 up to the end of the period of this study, to maintain more than the average share of the total raw rubber market in Japan.

Unlike crude materials, growth rates of Japanese imports of food, beverage and tobacco under the time span of this study were generally higher than those of total primary imports and the total imports. The performance of Thailand's export of food, in aggregate, was fluctuating but not wholly unsatisfactory. In particular there tended to be new commodities exported to Japan. When total rice export of Japan and that from Thailand began to fall abruptly and then absolutely in the early 1960's, Thai maize export to Japan rose to prominance. Jute export to Japan also went up substantially in 1960's but only for a short period of time. Then shrimp and black matpe came along in the latter half of 1960's. Pineapple and especially molasses and sugar became major exports in the middle of 1970's with the rising shares in the Japanese market going to Thailand. Most lately frozen chicken, other beans, and cuttle fish also rose enormously even though Thailand's share in cuttle fish suffered.

From Table 3, we can see that, the perforance of manufactured export tended to improve almost consistently after 1960/61 period. Both the compositional effect and the overall competitive effect tended to be favourable and became relatively large after 1971/72 period. The pattern of Japanese demand for manufactured imports tended to be more favourable to Thailand and the competitive power of Thai manufacturers relative to its competitors also increased. Hence, Japanese imports from Thailand of total manufactured products generally grew much faster than those from other sources. The compound growth rates of aggregated Japanese import of manufacturers from Thailand were 49.55, 55.56 and 25.67 percent in periods of 1960-64, 1965-69, 1970-1974, 1975-1977 as against 10.68, 15.84, 20.68, and 1.04 percent from other sources.

Nevertheless, there are three things to be cautious regarding the favourable performance of Thailand's manufactured exports to Japan. First, the data base for our CMS calculation is very aggregative. The favourable competition of Thai manufactured product might be blurred by the fact that Thai products might lose its share in a narrower or specific product in the Japanese market. But the commodities, as supplied by others in this same market, might have been growing slowly and might be receiving a greater weight in the aggregate data of the total Japanese import. Second, which is more important and is not wholly divorced from the first,

manufactured commodities exported by Thailand to Japan started from a negligible or zero base in many cases of our annual CMS calculations. We shall look at some examples. Textile yarn and thread and cotton fabrics exported to Japan were negligible in the first half of 1960's and started to rise rapidly by the end of 1960's. Bags and sacks of textiles and some clothing emerged and rose rapidly from the late of 1960's and middle of 1970's respectively. Export of precious stones also began after 1970's. While some furniture parts were exported in early 1970's and teak veneer shared importantly in the total Japanese market, other wood manufactured were sporadic and in fact, the export of wood and cork manufactures (SITC 63) were even non-existant until 1972. In the last few years of the period of this study, there have been new manufactured commodities exported to Japan, including for example phamazutical products, photo equipments and optical goods, some electrical and industrial machinery, etc.

Third, there is a change of classification for tin export. Before 1968, tin exported from Thailand to Japan was in the from of tin concentrates, falling under the category of SITC 2, a primary product. Since 1968 all tins exported have been the tin metal which is classified as manufactured product under SITC 687. Thus, the export of tin metal to Japan from Thailand suddenly jumped from zero in 1967 to U.S. $ 3.7 million in 1968.

Nothwithstanding all the above three factors, it cannot
be denied that Thailand's manufactured exports to Japan grew more
rapidly than its primary exports. The rapid growth of manufactures
seems to take place from the late 1960's. In addition in 1972 the Board
of Investment in Thailand also announced that it would start to change
its policy from import-substitution industrialisation to that of
export promotion. Various tax incentives were, of course, given.
We will also see whether this has contributed to Thailand's
compositional export trade to Japan. We will also look at Thailand's
competitive power in come of these markets. But before we will take
matter further, we will briefly look at the Japanese export per-
formance in the Thai market.

B. Japanese Export Performance in Thailand

Table 4 shows the result of our CMS calculation for
the total Japanese export in the Thai market during 1962-1977.
From Table 4, we can see that except the years of 1963-65, Japan
had favourable export performances in all the years covered up
to 1970-71 period. This was so despite of the fact that Japan's
export growth suffered an almost continuous negative compositional
effect. The unfavourable pattern of Thai import demand to the
Japanese export did not deter Japanese penetration into the Thai
market at all. The overall competitive position of Japan was
adequately strong to more than offset the negative compositional
effect.

However, the competitive effect was mainly dominated by
the pure competitive effect which indicates the ability of Japan
to capture on the average, a larger share of the market in each
commodity group relative to its competitors. The interaction
effect was, in fact, consistently negative after 1963/1964 up to
the last year of our CMS calculations in 1977. Though the
negativity of the interaction effect was relatively minor it
indicated that Japan's export expansion in the Thai market was not
quite diversified toward the rapidly growing commodity class.

During 1971-1977, Japanese total export performances
in Thailand were mixed. It was unfavourable for the years of
1971-74; it altered to be favourable for 1974-76 period, and
turned around to be negative in 1977. The factors explaining
the Japanese unfavourable export performances were also mixed.
Though the compositional effect was still an important factor,
the pure competitive effect came out to be large and negative
in 1972-74. To be more specific, the negative pure competitive
effect explained 159.22 percent of the total unfavourable export
change in 1972/73 and 102.31 percent in 1973/74. Japan lost some
of its competitive position as a result of letting the yen to
float upward in August and its subsequent revaluations and apprecia-
tions since the Smithsonian Agreement in December 1971. The yen
stood, on the average at 308 and 272 yen per U.S. dollar in 1972
and 1973 respectively as compared to the rate of 360 yen per

dollar representing an increase of 14.14 and 24.44 percent in value.[7]
The negative competitive effect for Japanese export as a result
of the yen's appreciation was of course initially moderated by the
contracted export price which was (and still is) habitually nominated
in U.S. dollar. Though the reduction of Japanese export unit value in
yen also helped to absorb further some effect of the yen's rising
value externally, this did not stop the erosion of the Japanese
competitive power particularly in the period of 1972-1974. The
yen's value vis-a-vis the dollar and also the baht due to the pegging
of the baht to the American dollar depreciated somewhat and tended to
be stabilized averaging at 297 yen in 1975-76. After that it rose
rapidly again to 270 and 210 yen per U.S. dollar in 1976 and 1978.
In our last CMS calculation in 1976-77, the average competitive effect
contributed 61.48 percent of the total negative export performance
of U.S. $20.82 million.

IV. Commodity Composition Effect

The analysis under Table 3 for Thailand's export to
Japan indicated a favourable trend of manufactured export. The
question we now try to answer is to what extent this relatively
faster growth of Thailand's manufactured exports was a consequence
of the price differential of primary and manufactured products.
Relative price of international trade for Thailand's export
generally moved in favour of manufacturers during 1960-1971 even

[7] The Japanese yen was internationally pegged as an undervalued
currency at 360 yen per dollar during April 1949 up to 1971. The under-
valuation of yen became much wider through the course of rapid economic
growth in Japan during the decade of 1960's. On this last point, see
Miyokei Shinohara, "Evaluation of the ¥ 360 Exchange Rate," The Japanese
Economy and Southeast Asia in the New International Context, I.D.E.
Occasional papers, Tokyo 1977.

though Thailand pursued an industriatization policy of import substitution type. As mentioned above, an export-promotion policy has been launched since 1972 even though it coincided with the beginning of a period of unfavourable export price for Thai manufacture relative to the primary product. The relative price movements were against Thailand's manufactured export up to the end of the period of this study. We can find out the role of the relative price movements that play on the relative volume of manufacture and primary exports through the following equation:

$$\left[\frac{Xm}{Xp}\right]_t = f\left[\frac{Pm}{p_p}\right]_{t-1} \quad \text{----------(2)}$$

$$\text{with} \quad d\left[\frac{Xm}{Xp}\right]_t \Bigg/ d\left[\frac{Pm}{p_p}\right]_{t-1} > 0$$

More specifically the equation can be written as

$$\left[\frac{Xm}{X_p}\right]_t = \alpha_0\left[\frac{Pm}{P_p}\right]_{t-1}^{\alpha_1} e^{u} \quad \text{---------(3)}$$

Where Xm, Xp are the export volume[8] of manufactures and primary products to Japan and Pm, p_p are their prices respectively.

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[8] In the actual statistical analysis, a value term is used as a proxy. This gives rise to an error-in-variable and in the problem at hand, the price coeffcient estmate tends to be some what upward biased.

The disturbance term, u, is specified as exponent to the natural base, e. The constant term is α_o and α_1 represents the coefficient of substitution between export trade in the two commodity classes. When the equation is estimated in the double log functional form, it becomes the price-elasticity of sub-stitution. It can then be interpreted somewhat like the price responsiveness in export trade. In our actual estimation, we also use two dummy variables. The first dummy variable, D_1, represents the data problem on the change of classification of tir export from a primary product (tin concentrate) to a manufactured product. The other dummy variable, D_2, representing the differential impact of the policy change for the period before and after 1972 is also included in the equation. The first dummy variable takes the value of zero before 1968 and one after that, while D_2 is zero up to 1973 after which it is one. The estimated equations are shown below.

(I) $\quad \ln\left(\dfrac{X_m}{X_p}\right)_t = -5.36 + 2.40 \ \ln\left(\dfrac{P_m}{P_p}\right)_{t-1} + 1.83 \ D_1$

$\qquad\qquad\qquad (-11.94) \ (3.30) \qquad\qquad (9.27)$

$\qquad\qquad R^2 = 0.91; \ DW = 2.155$

(II) $\quad \ln\left(\dfrac{X_m}{X_p}\right)_t = -5.30 + 2.28 \ \ln\left(\dfrac{P_m}{P_p}\right)_{t-1} + 1.85 \ D_1 + 1.76 \ D_2$

$\qquad\qquad\qquad (-8.89) \ (2.10) \qquad\qquad (7.80) \qquad (3.35)$

$\qquad\qquad R^2 = 0.92; \ DW = 2.156$

$$(\text{III}) \quad \ln\left(\frac{X_m}{X_p}\right)_t = -5.78 + 3.18 \ln\left(\frac{P_m}{P_p}\right)_{t-1} + 1.87 \ D_1$$
$$(-6.47) \quad (2.59) \quad\quad\quad (7.66)$$

$$+ \left[2.26 - 1.62 \ \ln\left(\frac{P_m}{P_p}\right)_{t-1} \right] D_2$$
$$(2.59) \quad (-0.73)$$

$$R^2 = 0.92; \ DW = 2.11$$

The figures in the parentheses are the t- statistics and DW denotes the Durbin-Watson statistic. Price estimates in all equations are highly significant at not more than 5 percent level. In equation III, we also introduces the possibility of testing the effect of policy change on the relative volume of export through the use of the analysis of co-var.ance. The multiplication of the dummy variable, D_2, with the relative price term gives us the required variable to test the difference between the two sub-periods of 1960-1972 and 1973-1977. The parameter of D_2 indicates the change in the intercept while the parameter of $\left[P_m/P_p\right]_{t-1} D_2$ gives the change in the slope reflecting the change in the price responsiveness in the two sub periods under consideration. Equation II suggests that a ten percent increase in the average price ratio of manufactured and primary product increases the ratio of manufactures to the primary exports by 20.28 percent. The estimated coefficeints for the two dummy variables give correct signs and are very significant.

There is a change in the intercept from the period of 1960-1972
to that of 1973-1977. But the parameter estimate for the change
in the slope, though it is negative, is insignificant. This
is also seen from the unchanged value of the coefficient of
determination, R^2, between equation II and equation III. Our
analysis, however, indicates that export are quite responsive
to real price changes. This also implies as a corollary, that
financial incentives to promote supply of manufactured exports
can be effective. Nevertheless, the empirical estimation of
equation III seems to tell us that policy measures to promote
manufactured exports have not produced a positive price effect
on Thailand's export performance in Japan.

V. Market Share and Competition

The next question we try to obtain some statistical
evidence concerns the demand side. The CMS analysis below involves
the competitive term also. To what extent then the price element
in the total competitive power is an important factor determining
Thailand's market share in the Japanese market. This point can
be seen by using the idea of the price elasticity of substitution
for Thai export to the Japanese market. The demand model is then
of the following type.

$$\frac{x_j^t}{x_j^t + x_j^{nt}} = f\left[\frac{p_j^t}{p_j^{nt}}, \quad U\right] \quad \text{-------- (4)}$$

Thailand's share in the total market for commodity j in Japan is inversely related to the change in its relative price vis-a-vis the competitors, given the random factor, U. The demand equation is specifically estimated in this functional form.

$$X_j^t = B_o D_j^{B_1} \left[P_j^t \Big/ P_j^{nt} \right]^{B_2} \ell^u \text{ -------------(5)}$$

Where X_j^t = Thailand's export volume of commodity j

X^{nt} = other countries' export volume of j.

$D_j = X_j^t + X_j^{nt}$

$P_j^t \Big/ P_j^{nt}$ = relative price.

The coefficient B_2 is the price elasticity of substitution in international trade while B_1 is the scale effect. The sign of the price effect is expected tobbe negative. The coefficient of B_1 will tell us the share of Thailand's export in the total market. If B_1 is equal to one, the share stays constant in this commodity market. If it is greater (less) than one then the Thai share increases (decreases) when the size of the market increases.

However, in fitting this demand equation, we will only select some individual commodities or less-aggregated commodities instead of working on the aggregate data. The reason is that prices basing on a broad commodity class will suffer from an usual index number problem. The index so constructed will also entails the Hicksian

composite commodity theorem-the proportionate movement in export
prices in all variety of goods within the same commodity class -
which are unlikely to be the case at hand. Also, there are at
least two major qualifications which we have to keep in mind
regarding equation (4). First, no explicit account is taken of
the income effect (and other non-price factors) in the demand equation.
Alternatively, we can say that omission of the income variable also
implies equal income elasticity of the demand for import of Thai
as well as non-Thai product. Second, the influence of export
supply factor (e.g. that arising from domestic demand pressure)
is also totally ignored.

The results of our estimates, in a double-log functional
form, of some selected individual commodities are presented in
Table 5. Regressions in set (a) are estimated by ordinary-least-
square method. In set (b), data are adjusted to take account of
the autocorrelation problem. In all equations in set (a) for the
commodities selected and shown in Table 5, coefficients for the share
variable as well as the relative price have the correct signs.
In set (b) equations relative price estimates have wrong positive
signs in textile fibre yams and bag and sacks of textiles. However,
their t-statistics are very low.

The parameter estimate of D_j indicates the way the
growth of total Japanese demand affects the share of Thai export

in the Japanese market, after allowing the effect of the relative
price change. The coefficient obtained in all equations are highly
significant. We discussed earlier that Thailand has maintained
a more-than-proportionate share in the rubber import of Japan
relative to the other commodity classes. This fact turns up again
in equation I on rubber. The coefficient estimate indicates that
when Japan imports 10.00 percent more (less) of raw rubber,
Thailand's share will increase (decrease) by 16.25 percent. This
is also true for gray woven cotton fabric. But for other selected
commodities for estimations i.e. maize, castor oil seeds, textile
fibre yarn, as well as bags and sacks of textile, the share
coefficient estimates are lower than one, implying a small share
for all these products under the time span of the estimations.
Thailand then are less reponsive to the growth in the Japanese
markets for these products via-a-vis its competitors.

VI. Summary and Some Conclusions

The foregoing empirical analysis leads us to the following
summary and concluding remarks.

(1) Thailand's total export performance in the Japanese
market for most periods of 1960-1973 is negative. Under our
analysis the major factor contributing to this negative performance
is the unfavourable growth of the pattern of Japanese import

demand for Thai products. Primary product dominates this unfavourable compositional effect well up to 1972. Though after 1972, primary export to Japan as a whole is facing an improved pattern of Japanese demand with an improved competition there seems to be no indication of a sustained growth for primary product in the Japanese market. The favourable primary product export performance in Japan during 1973-1976 was offset by a drastic setback in 1977.

(2) Unlike the primary export trade, Thailand's manufactured exports in aggregate to Japan grew by leaps and bounds relative to its competitors under the period of this study. There were only four cases (1960-61, 1966-67, 1969-70 and 1975-76) of unfavourable export performances out of the total number of seventeen CMS calculations during 1960-77. Both factors i.e. the compositional effect and the competitive effect contributed to its favourable export performances.

(3) There is a distinct upward trand for Thailand's manufactured exports to Japan. The composition of manufactured exports over the primary exports to Japan is affected strongly by its relative price with a lag of approximately one year.

As a corollary it can be inferred that financial incentives can be effective in stimulating manufactured exports.

Though economic policy can be successful in promoting exports, our study neither deals with this problem nor the problem regarding which policy is most effective. Our empirical analysis, however, seems to indicate that the ratio of export of manufactures over that of primary products to Japan is not yet affected sufficiently by the policy change of the Thai government in promoting manufactured exports since 1972. This empirical result seems to be supported by some extra evidence, however meager as it is, of the tax-refund system for exporters fluctuating around an average ad vorolem equivalent of a couple percent of their export value.

(4) Except for a few narrow product categories, the growth of manufactured exports to Japan started from a negligivle or zero base during the the study period. Manufactured export is also a response to the opportunity open abroad of which an important factor is its increasing real price in the 1960's. Though the price relative truns against Thai manufactured exports vis-à-vis primary goods during 1972-1977, it does not decrease the total ratio of manufactures over the primary exports. This results is due mainly to the entry lately of various new manufactured products in the export list to Japan.

(5) For Thailand to expore more to Japan (and in fact to any other market), it is imperative for the Thais to be dynamic. This means that they have to adjust the structure of their exports in such a fashion that they achieve more success in taking advantage

of the growth point in the Japanese (market) demand. This is
much easier to say than done. This is because detailed analytical
exercise must be performed at a much disaggregated level of
commodity classification in order to meaningfully identify the
market as well as the commodities with long-run growth prospect.

Moreover, commodity and market effect are not totally
independent of one and other. It is possible that Japanese market
may be growing fast for certain products which Thailand may not
possess a comparative advantage. It will then be wrong to
suggest or insist promoting that product for export. Promoting
or continuing to promote products e.g. through various financial
measures which do not possess any international comparative
advantage do incur long-run resource cost to the economy. If it is
the desired policy of the Thai government to promote manufactured
exports, the products which come into mind will be those of labour-
intensive and resource-base or raw-material-intensive nature.
These include, for example, textile products, clothings, footware,
various rubber and leather products, frozen meats of various kinds,
some simple engineering and standarized consumer as well as inter-
mediate products.

(6) On the Japanese side it still has certainly a role
to play. Trade barriers in 1974 in tariff and non-tariff together
with imports under Most-Favoured-Nation (MFN) as well as those
under Generalized System of Preferences (GSP) for Thai products

inthe Japanese market vis-a-vis those for the United State and
EEC markets are presented in Table 6 below. By dismantling
trade barriers particularly those non-tariff barriers, Japanese
imports of those commodities will eventually increase. Thailand can
then compete to export some of these products to Japan. Concurrently
some kinds of financial and technical assistance for adjustments
should be given directly to those effected domestic industries from
increased import competition by the Japanese government. This
will speed up the structural adjustment process. If this is done,
we can then see that production and trade between Japan and Thailand
will come closer to an inter-and intra-specilisation resulting
both sides to gain not only from exchange but also from specialisation
in production. But the question on the distribution of gain
internationally and domestically in both countries is, of course,
another important problem, which is far more complicated and
beyond the purpose of this paper.

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Table 1

COMPOUND GROWTH RATES
OF BILATERAL COMMODITY TRADE

(a) Japan's Imports from Thailand (%)				(b) Thailand's Imports from Japan (%)			
Year	Product			Year	Product		
	Primary	Manuf.	Total		Primary	Manuf.	Total
1960-64	4.29 (7.12)	49.54 (10.66)	4.63 (8.12)	1962-64	2.59 (7.44)	11.92 (5.40)	11.75 (5.70)
1965-69	3.46 (10.13)	45.16 (16.01)	5.09 (11.95)	1965-69	40.32 (10.43)	12.67 (12.33)	13.05 (10.15)
1970-74	14.70 (19.29)	54.07 (20.57)	29.29 (19.80)	1970-74	11.99 (19.88)	15.08 (16.61)	15.32 (17.24)
1975-77	-0.04 (7.14)	24.86 (1.96)	0.02 (5.28)	1975-77	0.54 (19.64)	13.47 (8.33)	13.14 (10.77)

Figures in parenthesis refer to imports from all other suppliers.

Source : United Nations International Trade Statistics, various issues.

Table 2

CONSTANT MARKET SHARE ANALYSIS
OF THAILAND'S EXPORT TO JAPAN, 1960-1977

(U.S.$ 1,000.00)

Year	Actual Increase	Hypothetical Share	Net Difference	Compositional Effect	Competitive Effect	
					Pure	Interaction
1960/61	6,008.0	21,767.41	-15,757.41	-18,373.93	1,674.74	1,305.78
1961/62	-6,647.0	-4,546.31	-2,100.69	3,451.69	-4,007.93	-1,544.45
1962/63	19,054.0	88,194.18	-69,140.18	-74,397.33	4,375.93	881.22
1963/64	39,888.0	16,497.24	23,390.76	-1,306.05	20,221.29	4,475.52
1964/65	177.0	236.90	-59.90	1,367.95	-1,725.88	298.03
1965/66	22,303.0	23,530.71	-1,227.71	-5,543.93	3,748.81	567.41
1966/67	6,785.0	33,804.88	-27,019.88	-19,140.64	-7,083.96	-795.28
1967/68	-12,872.0	12,664.33	-25,536.33	-6,120.02	-17,946.12	-1,470.19
1968/69	20,413.0	16,145.43	4,267.57	7,442.89	-3,755.81	580.49
1969/70	22,188.0	57,451.35	-35,263.35	-35,270.06	4,754.91	-4,748.20
1970/71	40,460.0	-232.64	40,692.64	2,227.26	36,138.52	2,326.86
1971/72	21,921.0	43,019.15	-21,098.15	-11,715.91	-5,705.99	-3,676.25
1972/73	140,674.0	173,318.53	-32,644.53	16,158.89	-32,529.93	-16,273.49
1973/74	292,465.0	94,387.75	198,077.25	-1,361.27	146,221.34	53,217.18
1974/75	38,395.0	-91,687.96	130,082.96	35,312.08	101,314.20	-6,570.32
1975/76	124,516.0	96,433.69	28,082.31	16,935.75	28,592.35	-17,455.79
1976/77	-124,128.0	22,567.71	-146,695.71	45,003.69	-187,643.09	-4,236.31

Source :   United Nations International Trade Statistics, various issues.

Table 3: Constant Market Share Analysis of Thailand's Export as Classified by Primary and Manufactured Product, 1960-1977.

(US $ 1,000)

Primary exports	1960/61	1961/62	1962/63	1963/64	1964/65	1965/66
Actual increase	5,684.0	-6,942.0	17,944.0	39,821.0	-376.0	21,310.0
Hypothetical increase	18,309.4	-7,250.36	16,822.44	13,968.15	5,906.47	23,536.7
Net difference	-12,379.55	309.36	1,121.56	25,852.85	-6,282.47	-2,226.7
Commodity compo-sition effect	-15,292.47	6,183.33	-3,155.79	604.42	-4,482.53	-6,142.72
Competitive effect (a) Pure	1,572.82	-4,411.77	3,571.28	20,923.31	-2,397.55	3,397.47
(b) Interaction	1,340.10	-1,463.20	706.07	4,325.12	597.61	518.55
Manufactured exports						
Actual increase	93.0	16.0	76.0	553.0	15.0	742.0
Hypothetical increase	57.56	13.99	22.65	70.64	-76.25	134.87
Net difference	-35.44	1.01	53.35	482.36	91.25	607.13
Commodity compo-sition effect	-33.05	-25.18	8.59	195.03	364.04	127.24
Competitive effect (a) Pure	103.52	93.19	43.46	-25.77	-52.12	416.80
(b) Interaction	-35.03	-67.00	1.30	313.10	-220.67	63.09

Source of data : United Nations International Trade Statistics, various issues.

(US $ 1,000)

Primary exports	1966/67	1967/68	1968/69	1969/70	1970/71	1971/72
Actual increase	2,957.0	-17,502.0	16,868.0	21,367.0	37,423.0	1,012
Hypothetical increase	20,189.0	10,897.0	15,923.36	34,450.32	1,174.28	33,591.34
Net difference	-17,232.0	-28,399.0	944.64	-13,083.32	36,248.72	-32,579.34
Commodity composition effect	-7,152.90	-5,164.40	5,222.31	-15,697.51	814.74	-8,023.85
Competitive effect (a) Pure	-9,060.54	-22,083.90	-4,854.41	7,072.91	33,279.17	-17,398.68
(b) Interaction	-1,018.56	-1,150.70	576,74	-4,458.72	2,154.81	-7,156.81
Manufactured exports						
Actual increase	588.0	5,046.0	3,926.0	827.0	2,209.0	20,362.0
Hypothetical increase	809.15	313.17	607.42	5,727.47	-199.79	3,558.49
Net difference	-221.15	4,732.83	3,318.58	-4,900.47	2,408.79	16,803.51
Commodity composition effect	414.70	-151.01	1,217.43	-3,471.52	215.34	1,422.24
Competitive effect (a) Pure	-332.17	5,081.34	1,978.66	-1,396.64	2,019.41	11,873.75
(b) Interaction	-303.68	-197.50	122.49	-32.31	174.04	3,507.52

Source of data : United Nations International Trade Statistics, various issues.

Table 3(3): Constant Market Share Analysis of Thailand's Export as
Classified by Primary and Manufactured Product, 1960-1977

Primary exports	1972/73	1973/74	1974/75	1975/76	1976/77
Actual increase	82,354.0	250,225.0	65,052.0	119,423.0	-127,496.0
Hypothetical increase	146,341.22	68,040.30	-49,000.48	76,417.78	62,
Net difference	-63,987.22	182,184.70	114,052.48	43,005.22	-190,479.14
Commodity composition effect	9,363.45	5,887.67	29,890.15	-3,617.10	4,162.95
Competitive effect					
(a) Pure	-43,700.00	132,097.42	83,055.63	44,418.95	-180,386.46
(b) Interaction	-29,650.69	44,197.61	1,106.70	2,203.37	-14,255.63
Manufactured exports					
Actual increase	54,229.0	20,523.0	-13,122.0	3,241.0	20,741.0
Hypothetical increase	24,057.44	19,715.54	-21,346.07	12,324.83	7,795.57
Net difference	30,171.56	807.46	8,224.07	-9,083.83	12,945.43
Commodity composition effect	6,221.60	-4,736.54	-8,804.37	24,036.58	7,162.07
Competitive effect					
(a) Pure	11,276.59	1,778.64	26,588.34	-13,917.70	3,751.04
(b) Interaction	12,673.37	3,765.36	-9,559.90	-19,202.71	2,032.32

Source of data : United Nations International Trade Statistics, various issues.

Table 4

CONSTRANT MARKET SHARE ANALYSIS
OF JAPANESE EXPORT TO THAILAND, 1962-1977

(U.S.$1,000.00)

Year	Actual change	Hypothetical change	Net difference	Compositional effect	Competitive Effect	
					Pure	Interaction
1962/63	33,389	20,290.49	13,098.51	-879.74	11,140.62	2,837.63
1963/64	29,417	21,224.87	8,192.13	-4,192.02	11,524.03	800.12
1964/65	25,028	34,898.34	-9,870.34	-8,868.10	-707.39	-294.85
1965/66	74,315	138,643.50	-64,328.05	-42,777.59	-11,114.80	-10,436.11
1966/67	63,267	33,942.44	29,324.56	-19,981.71	52,828.73	-3,522.46
1967/68	27,749	10,213.27	17,536.00			
	10,213	27,749.27	-17,536.27	-3,699.22	-12,368.98	1,465.07
1968/69	59,919	53,921.42	5,997.58	-22,939.17	29,559.15	-622.40
1969/70	25,990	-9,885.55	35,875.55	16,850.86	22,663.07	-3,638.30
1970/71	730	-11,179.11	11,909.11	-16,577.50	28,638.39	-151.78
1971/72	63,619	75,071.17	-11,452.17	-10,919.11	1,607.17	-2,140.23
1972/73	192,320	207,763.46	-15,443.46	23,842.48	-24,588.68	-14,679.26
1973/74	243,665	276,745.56	-33,080.56	21,337.46	-33,843.12	-20,574.90
1974/75	44,765	16,048.19	28,716.81	-1,993.92	33,796.82	-3,086.09
1975/76	125,032	67,263.64	57,768.36	-28,300.25	96,904.05	-10,835.44
1976/77	335,094	355,922.42	-20,828.42	-8,022.88	-7,978.52	-4,827.02

Source of data :   United Nations International Trade Statistics,   various
issues.

Table 5

SHARE EFFECT AND ELASTICITY OF SUBSTITUTION
OF JAPANESE IMPORTS FROM THAILAND

Commodity (j)	Coefficient of		Constant term	R^2 or $(\bar{R}^2)$	D or $(\bar{D})$
	D_j	P_j^t/P_j^{nt}			
I. Rubber (a)	1.625 (2.220)	-2.115 (-1.709)	-9.152 (-0.998)	0.25	0.38
(b)	1.26 (6.155)	-0.342 (-0.702)	-3.40 (-1.284)	(0.93)	(1.58)
II. Caster Oil seed (a)	0.238 (3.820)	-0.979 (-1.365)	7.680 (11.29)	0.52	2.14
(b)	0.862 (5.80)	-0.167 (-0.305	1.012 (0.636)	(0.74)	(1.74)
III. Maize (a)	0.559 (2.312)	-0.905 (-0.291)	4.646 (1.247)	0.28	2.27
(b)	0.573 (2.449)	-1.092 (-0.370)	4.415 (1.221)	(0.33)	(1.93)
IV. Woven cotton fabrics. (a)	0.952 (3.142)	-1.979 (-2.196)	-3.167 (-0.926)	0.49	0.84
(b)	0.761 (1.97)	-1.595 (-2.134)	-1.057 (-0.262)	(0.48)	(1.96)
V. Gray Woven cotton fabrics (a)	1.529 (2.549)	-2.938 (-1.894)	-8.130 (-1.376)	0.69	3.30
(b)	1.659 (4.725)	-3.257 (-3.211)	-9.382 (-2.719)	(0.89)	(2.79)
VI. Textile fibre yam (a)	0.849 (4.234)	-0.132 (-0.605)	0.880 (0.502)	0.72	1.06
(b)	0.781 (8.482)	(0.585) (0.053)	1.667 (2.003)	(0.92)	(2.01)
VII. Bag and sacks of textile (a)	0.906 (4.785)	-0.114 (-0.176)	0.302 (0.176)	0.93	3.02
(b)	0.899 (11.522)	0.237 (0.873)	0.483 (0.663)	(0.91)	(2.41)

The figures in the parenthesis under the coefficient estimates are the t-statistics. $\bar{R}^2$ and $\bar{D}$ refer to adjusted coefficients of determination and Durbin-Watson statistics under Cochrane-Orcutt iterative technique of correction for autocorrection in the residual terms of the regression.

Table 6

TRADE BARRIERS FACING THAILAND'S EXPORT IN JAPAN, EEC,
AND THE UNITED STATES, 1974

Market	Total Imports		Imports subject to MFN			Import under GSP		Imports subject to NTBs ($ million)		
	Value ($ million)	Weighted average tariff rate	Value	Average Tariff Rate		Value ($ million)	Weighted average tari rate	Export restraints	Licencing	Variable levies
				Unweighted	Weighted					
EEC										
All goods	425.3	3.7	357.8	4.8	3.7	29.1	3.7	10.3	5.7	24.8
Primary products	362.0	3.6	317.4	3.3	3.4	9.1	11.5	0.0	0.2	21.9
Manufactures	63.3	3.9	40.3	7.3	5.7	20.1	0.2	10.3	5.5	2.9
Japanese										
All goods	685.8	13.1	643.5	9.3	13.7	42.3	2.8	0	50.0	0
Primary products	586.8	13.4	575.6	8.9	13.6	11.2	2.5	0	24.4	0
Manufactures	99.0	11.1	67.9	8.9	14.8	31.1	3.0	0	25.6	0
U.S.										
All goods	179.3	5.0	165.2	11.5	5.5	14.2	0	23.5	6.1	0
Primary products	123.7	0.9	121.8	5.0	1.0	1.9	0	0.5	6.1	0
Manufactures	55.6	14.1	43.4	15.1	18.1	12.3	0	23.0	0	0

Source : Andrzej Olechowski, "Trade Barriers Facing Individual Developing Countries", in Trade-Barriers Facing Developing Countries, by Alexamder J. Yeats, MacMillan Press Ltd., 1979.

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