

SESSION IV

CASE STUDIES B

China's Nontariff Trade Barriers

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Presented at the APEC Symposium sponsored by USITC

September 11-12, 1997
Washington D.C.

ABSTRACT

During the Pre-reform period in China, planned economy determined the policy and practice in foreign trade sector which is used as a means to balance shortage and surplus. Trading companies were not profit oriented. Examples of allocation distortion are given. The State-ownership exacerbate these distortions. After reform began, restructuring in trading sector gradually removed these distortions, but still a lot to be done. Major non-tariff barriers are discussed, especially regarding entry and foreign exchange. All forms of non-tariff barriers are counted according to the "General list of tariff and non-tariff measures for import/export." A section focusing on the efficiency loss due to these barriers are expounded. Finally, the prospect of future changes are expected, particularly on the problem on equity and efficiency in international trade.

I) Introduction

To understand China's current trade barriers, one must go back and review the trade principle found under the "Planned economy" or "Mandatory Economy" before China's reform began in 1979. The current practice in international trade sector is a modification of what occurred under the previous regime.

According to the Marxist economic theory, the value of products is solely determined by the labour consumed during the production process. As a result, the consumers' willingness to pay is ignored. Price is calculated by the "value" of input elements, not affected by demand. Such economics has led to a distorted price system, where resources are allocated not by price signal but by the planners' subjective verdict.

In an ideal market there is no shortage or surplus, since price can iron out all such disequilibrium, if the transaction cost is ignored. In the planned economy, however, price can not stimulate production to meet demand. Due to this, shortage and surplus were prevalent. Although planners made great efforts to ease disequilibrium the results were ineffective. Import and export was used as an additional means to achieve equilibrium. International trade, therefore, was not based upon comparative advantage, but rather upon so called shortage and surplus. China set a low tariff for goods which were in shortage and deemed should be imported, and set high tariff for goods in surplus and deemed should not be imported. Tariff was not used to protect infant industries.

For example, in 1988 the customs office announced that the import tariff of eye glass plate which can change its darkness following the changes of the ambient light would be increased. China by then had acquired German technology which could produce it and as a result the product was no longer in shortage. When the technology had not been imported, a lower tariff was set. The tariff was eventually raised after the technology had matured. So, the intention behind a tariff in a planned economy leads to protect a matured industry.

The price distortion in planned economy has caused huge losses in resource allocation through the international trade sector. High pressure polyethylene is a good example of what happens when the planned price was set too low which creates a serious shortage. In 1987 a certain domestic producer looking for a better price was determined to export polyethylene which he did to Hong Kong. As the demand, however, could not be met, domestic consumers tried to import from the world market. By chance, the same product, without moving an inch, was "exported" then "imported" to and from Hong Kong. The Hong Kong businessman perpetrated this earned hundreds of thousands of dollars. And the vice minister of Ministry of Chemical Industry was sacked. In fact, this is not his fault, but rather the blame should be placed on distorted price. This sort of problem still exists. China exports and imports tens millions tons of crude oil and oil product every year.¹ Probably China is the only country in the world which exports and imports billions dollars of same product.

Price control can only be achieved in an economy dominated by state-owned enterprises. Where private owned enterprises are the norm, firms will look for profit and price will automatically approach equilibrium. In such condition, if government controls price, black market will eventually emerge, and

¹ China exported 18.8 m tones of crude oil and 4.1 m tones of product oil in 1995, and imported 17.1 m tones of crude oil and 14.4 oil products in the same year. --- "*China Energy Annual Report 1996*"

price control would be hard to implement. Previously all firms in China belonged to the State. In this environment price control was easy to achieve.

Price distortion was not the only cause of economic loss in the trade sector. The ownership of trading companies was also a serious problem. Since many of the trading companies were once and still are state-owned, nobody is held responsible for profit generation. Some company staffs consider their personal benefit to be the number one priority. Reaching a business agreement often brings personal benefit in the form of commission, free visit to foreign country, etc. This encourages company staffs to give up lucrative terms during bargaining. As a result, many trading companies are suffering great loss, and some of them have gone bankrupt.

The incentive to make a profit is very weak in these state-owned companies. The principle behind management is not to make a profit but rather the idea of bureaucratic hierarchy, i.e. the high rank officials make the final decision regardless of whether it is rational or not. On many occasions a trading partner might provide a very favorable business condition which all staffs involved in bargaining reckon the deal should be agreed. If the deal does not have the consent of a high ranking official then ultimately it might fail. The opposite is also true; the condition of a deal might be unfavorable, but a high ranking official would see it in his judgment to make the deal go through. This is why some foreign businessmen see the behavior of their Chinese counterparts to be irrational and find them difficult to negotiate with.

In the context of public ownership, in theory every Chinese citizen has the right to say something in decision making process in business management. In reality the decision is made by the relevant governmental authority. Due to the vague ownership, however, no single body, individual or group, can say the final word and assume the full responsibility. Therefore, the decision process takes long time that is needed for negotiation among ministries and departments. In international trade sector, many groups may involve and their interest are concerned, to reach an agreement is usually difficult.

II) Nontariff barriers in China

A) Barriers on entry

In the international trade sector business was conducted by State-owned import/export firms. No private firm was involved in the trade business at that time. Trade was effectively controlled by the governments at central level and provincial level. Owing to the barriers in entry, little competition was encountered and many trade opportunities were lost.

There are two kinds of trading companies conducting export business: one purchase goods on domestic market then export, the other involve in trading business only as agent.. For small scale producers who make tools and small machinery, etc. they have little ability to communicate the consumers in foreign countries. So they sell their product to trading companies. These companies are State-owned and of small scale. Owing to limited scale, their management costs are usually high, and they can hardly follow the changes on the foreign market. Along with the introduction of market economy into China, competition has forced these small trading companies to restructure even to close down.

For industrial manufacturing factories, they are urged to conduct export through agent trading companies,² so as to establish a closer relationship with final consumers. Such a change requires less entry barriers in trading business. For large manufacturing factories in steel making, coal mining, petro-chemical sectors, they are trying to establish their own trading companies, because they want to follow the market promptly and to reduce transaction costs, especially for those who make products that need maintenance service. Along with the reform in trade sector in China, these large factories have been given the rights to involve in trading business.

According to the Law of International Trade, only approved trading companies have the right to engage in the business of trading.³ Since reform began in 1979 the number of trading company has risen sharply and correspondingly the trade volume has increased by more than six times. At the moment there are about 14,000 domestic trading firms engaged in the import and export business, 2,000 of which are at the county level (China's State-owned-firms are classified according to bureaucratic level, the ministerial, provincial, municipal, and county levels) exporting agricultural and local special products. Most of them have not acquired their own production base and conduct business only as a middle-man. Due to their small scale and limited capital, many are losing money. At a recent conference they were urged to merge with the big trading companies or to engage in domestic trade, which they were barred from till the early 1990's.⁴

In addition to the trading companies, there are about 150,000 foreign funded firms conducting processing export, i.e. import raw materials and export processed products. The share of processing trade, which is about 45-50% of the total trade, against general trade has been falling a little in the current year, showing a development of comparative advantage other than the low labor cost.

Foreign trading companies were not allowed to engage in the international trading business in China. This regulation, however, has gradually been removed. In October 1995, Mr. Jiang, the Chinese president, attended the third meeting of the Asian Economic Co-operation Organization, where he announced that joint-venture foreign trade companies would be set up. Recently three joint-venture trade companies have been allowed to be established.⁵ An official from the Ministry of Foreign Trade and Economic Cooperation (MOFTEC) announced that within three years of China's accession to WTO, foreign businesses in China would be allowed to deal in international trade through an automatic

² China should promote agent companies in trading business. *Economic Highlights*. August 15, 1997. (in Chinese).

³ The Law of International Trade requires five conditions to apply trade license, which are: 1) has set up organization with a trading name; 2) has its specific trading category; 3) has the capacity to trade in terms of space, capital, and professionals; 4) those who have been involved in trade business through agent company have reached a certain quantity of turnover; 5) other conditions according to related laws and rules. On *International Business Daily*, August 6 and 7, 1997, a detailed rules for the approval of trading companies are issued.

⁴ "Small trade firms need revival" *China Daily*, July 19, 1997.

⁵ "First foreign trade JVs set up" *China Daily*, July 12, 1997. In one of the JVs, the foreign capital comes from Mitsubishi Corp. of Japan and Continental Grain Co. of the U.S.A. The other comes from Daewoo Group of Republic of Korea. These JV's are located in Pudong, Shanghai. Another news appeared on *China Daily*, August 3, 1997, reports a third JV firm to open in Shenzhen dealing foreign trade business. The foreign side partner is Dow Trading PRC Inc.

registration system.⁶ For domestic trade companies a similar policy has also been promulgated. Some requirements will remain, however, such as a minimum trade volume which accomplished in previous years.

B) Barriers in Foreign Exchange

Control of foreign exchange is the most critical barrier to international trade business.

In China, before reform began in 1979, foreign exchange was provided only to assigned import/export corporations. All foreign exchange earned by exporters had to be sold to the People's Bank, and importers had to purchase foreign exchange from it as well. Domestic currency was always valued too high, might be 50% higher than equilibrium rate, so as a consequence, foreign exchanges became very scarce.

After reform had been enacted, the control on foreign exchange has been gradually relaxed. The first major step was to create a parallel market for foreign exchange where the exchange rate was closer to the equilibrium rate. Trading companies could retain certain proportion of foreign exchange they earned to be exchanged on the parallel market. This not only revealed the true value of foreign exchange, but also provided a relatively free market for those who buy and sell foreign exchanges. This additional option improved economic efficiency. The same foreign currency, however, has two exchange rates resulting in manipulation and corruption. Officials who control the allocation of foreign currencies can change the quota allocation and exchange for personal benefit. The second major step was the merging of the two markets in 1994. The market of official rate was done away with, but the floating market had been retained. The floating of the exchange rate is now due to supply and demand change, but with intervention from the central bank. The exchange rate is currently very stable; the day to day fluctuation has been less than 0.5%, but has steadily declined from 8.7 to 8.28 (RMB/USD) in the past two and half years. The US dollars has been strong in the past year relative to Japanese yen and German marks, however, Chinese yuan has still gained ground. Currently the persistent surplus found in foreign trade and in the huge foreign exchange reserves (\$120 billion), indicates a further possible appreciation of RMB.⁷

For current account governmental control has been greatly reduced. Chinese people may receive foreign currency, keep it in their own possession or in banks, and withdraw from banks still in foreign currency freely without showing any certificate. People can sell their foreign currency to bank and may also change foreign currency from one form to another. Some people speculate on foreign exchange market and earn a profit.⁸ To buy foreign currency, however, one has to show some sort of documentation, such as passport with visa signed.

⁶ "China to reform trade practice in WTO bid." *China Daily*, June 13, 1997.

⁷ "Yuan hits record high from dollar oversupply." *China Daily*, July 6-12, 1997.

⁸ "Ordinary people play forex game in Beijing." *China Daily*, July 6-12, 1997. The newspaper reports the story that growing number of Beijing residents trade foreign currencies through banks according rates on the international market. This has caused annual transaction values to rise sharply. The average value for each deal is USD3,000 to 5,000 and the maximum is \$200,000. In Beijing, 82.6% of its residents own foreign currency. Foreign exchange savings for individuals in Chinese banks has surpassed more than \$20 billion and continues to grow.

In terms of foreign exchange, Chinese companies do not enjoy as much freedom as individuals; they have to change all their foreign exchange earnings into RMB. Only foreign invested companies and trading companies can keep a foreign exchange account. Import trade companies can buy foreign exchange by showing approved customs declaration form. They can also buy foreign exchange in advance for import purposes, but have to show the approved customs declaration form later. Some importers buy and import foreign goods but pretend it as a gift so as to avoid import taxation. They have to swap foreign currency through various channels, for example: direct buying from companies who export without dealing with bank. But these deals incur a higher transaction cost of a few percent. In terms of capital accounts, strict control is still in effect; only small changes have been made, and up to the year 2000 no fundamental change is expected. To remit the profit of JVs abroad is under control; it is possible only if the profit is in foreign currency. This is why most of JV companies are involving export business.

It is prohibited for Chinese organizations to keep an account in foreign countries, unless special permission is issued.

To turn Chinese RMB into a fully convertible currency, it must be stable, and, especially, can resist the influence of drastic fluctuation of exchange rates. The financial crisis happened in Mexico and Thailand warned China to take a more cautious step.

The maximum amount of foreign currency that one can carry out of the country has increased to US\$2,000 freely, and without limit if he shows a certificate that the foreign currency was withdrawn from the bank.

C) Import and Export Quota, License, Registration, Commodity inspection, and Quarantine, etc.

Prior to economic reform, all goods that could be substituted by domestic products were not allowed to be imported. After economic reforms were implemented, this policy was replaced by licensing or quota control. Export goods were also under similar control. The rationale behind this is to satisfy domestic demand and to maintain the price on the world market. This was especially true for those products which were mainly produced in China, such as tungsten, magnesium and related products.

The year of 1994 saw a major reform in international trade which included tariff reduction. Non-tariff treatments were also reduced but still a lot remained. Currently the total number of eight digit tax code is 6554, among which the number of various kinds of controls are as follows:⁹

⁹ General Customs Administration: General Catalog of Import and Export Tax, and Non-tariff Measurements. This is an official document with 562 pages released on April 1994 and valid up to now. The number of each control in all categories was counted item by item. (in Chinese, also available in English).

Various Kinds of Trade Control

Import license (I)	308
Export license (E)	626
Quota subject to general control (G)	97
Quota subject to electric and machinery control (C)	145
Register at the State Council (S)	454
Quota auctioned at the Electric and Machinery Control Office (T)	116
Import commodity inspection (I)	831
Export commodity inspection (E)	1631
Quarantine inspection (R)	791
Import food hygiene inspection (F)	613
Medical inspection (M)	117

Source: Ministry of Foreign Trade and Economic Cooperation

Many goods are subject to several controls at the sometime, for example, grain subject to I, S, R, F, and commodity inspection; chemical fertilizer subject to G, license, and commodity inspection. Among 6554 eight digit items there are 3372 items, or 51.4%, free of any kind of restriction.

In addition to these, some other kinds of control also are in effective. The “Chamber of Commerce” of various sectors, a semi-governmental organizations, impose export discipline. For example, if metallurgical coke is exported at a too low price due to price competition in domestic market, then the exporter will be deprived of his coke exporting rights.¹⁰ The Chamber of Commerce is a very powerful authority which is in charge of auction, to set lower limit of export goods and impose sanction.

Some times quarantine controls set restriction on import and may cause significant economic impact.¹¹

¹⁰ Authorities won't tolerate undercutting. *China Daily*, July 20, 1997. The news report that coke export by China has increased from 400 tone in 1986 to 4 million tone in 1994, and 8.86 m tone in 1995 mainly bought by U.S.A., Brazil, India and Germany. The coke exports in the first five months of 1997 increased by 54.9% as compared with the same period last year, however, export earnings rose only 40.2%. Many coke producers (about 5,000 in Shanxi Province alone) are competing by undercutting price. Therefore, the China Chamber of Commerce of Metal, Minerals, and Chemicals Importers and Exporters made such a decision. But the real problem here is the social cost of severe pollution caused by coke processing is not included in the production cost. Most of the coke producers are using very primitive technology and emit tremendous black smoke covering the full sky. Such a scene can be seen in Shanxi Province frequently. In addition to coke, MOFTEC criticized two trading companies exported alumina at a price lower than normal price by 16% and 31%. The losses accounted for were \$12,000 and \$10,800 respectively, as reported by *International Business Daily*, August 2, 1997. (in Chinese)

¹¹ China bans imports of poultry from Britain. *China Daily*, July 30, 1997. For fear of New Town Disease might hit China's poultry industry, the country decided to suspend imports as of May 8, 1997. All approval lists issued by the bureau are invalid, and all poultry and related products should be sent back to Britain or destroyed.

In some countries, product standards are used as a means of protection, which may include environment standards, labor standards. But standards for manufactured goods are not used as a means of protection in China, who is generally moving towards adoption of international ISO standards.

The rejection rate of commodity inspection is lower in the first six months this year than that in the same period last year. For export commodity inspection of 870,000 batches valuing \$28.4 bn, the rejection rate is 0.72% in terms of number of batch, or 0.76% in terms of value, lowered by 0.47% and 0.38% than that in the last year respectively. For import commodity inspection, the rejection rate of 168,000 batches valuing \$22.1 bn in the first six months this year is 4.3% in terms of batch, or 3.3% in terms of value, lowered by 8.0% and 1.4% than that in the last year respectively.¹²

Currently, the commodity inspection has to be carried out by the National Commodity Inspection Bureau and the entrusted local bureaus. Only a few foreign invested companies under special permission by the National Bureau and MOFTEC can conduct the inspection on their own exports, but not allowed to do inspection committed by other firms.¹³ According to the Commodity Inspection Law, foreign inspection agencies will be accredited and entrusted by the National Bureau to undertake inspection in China and abroad.

Another non-tariff barrier is related with taxation. The Tax Rule Commission under the State Council recently issued a circulation that the import/export tax reduction plan is restricted to a specific category for a specific quantity and specific purpose. This is a combination of quota control and tax reduction. The quota should be allocated by the principle of Fairness, Publicity, and Transparency. Companies who hold the quota and have the import right can import by themselves; who do not have the import right can import through agent trading companies base upon competition. No extra fee is allowed to be charged. This policy is effective from January 1st to December 31, 1997.¹⁴

According to a specific study, the nominal average tax rate of 25 most heavily protected goods in China on 1994 was 21.7%, and the average equivalent tax rate of non-tariff barrier of these 25 goods was 21.6%. So the average total tax rate was 43.3%. The study shows that the tax was almost equally divided between tariff and non-tariff barriers¹⁵. As a comparison, the total tax for goods of five categories in Japan in 1989 was 178.2%, among which the equivalent tax of non-tariff barriers took 173.5%¹⁶. In the U.S.A. the average total tax rate of the selected 21 categories of goods in 1990 was 35.2%, among which 31.7% was due to non-tariff barriers¹⁷. Here we see a big difference in trade practice among countries.

¹² Result of commodity inspection shows that both quality and quantity have raised. *International Business Daily*, August 7, 1997. (in Chinese)

¹³ Sanction applied to foreign companies who set up commodity inspection business. *International Business Daily*, July 11, 1997.

¹⁴ Preferential tax rate is restricted to a specific purpose and quantity. *China Economic Daily*, August 12, 1997. in Chinese)

¹⁵ Zhang Shuguang, Zhang Yansheng, Wan Zhongxin: *Cost of Protection in China*, a project sponsored by the Institute of International Economics. 1997. (both in Chinese and English).

¹⁶ Yoko Sazanami, Shujiro Urata, Hiroki Kawai: *Measuring the Costs of Protection in Japan*. 1995. Page 7.

¹⁷ Gary Clyde Hufbauer and Kimberly Ann Elliott: *Measuring the Costs of Protection in the United States*. 1994, published by the Institute for International Economics.

In China, however, the real tax collected is much less than the nominal tax rate. For the year 1994, the average nominal tax rate was 35.9%, while the real collected tax rate was about 5% (processing trade is excluded), which is much less than the nominal tax rate. This is because of broad tax exemptions and reductions, and weak tax administration, let alone large quantity of smuggling. At the same time, the non-tariff trade barriers was not reduced. Therefore, in general, the non-tariff barriers in China have played a main role in protection. In the coming years both tariff and non-tariff protection are scheduled to be reduced. However, non-tariff barriers seems to be more difficult to remove, since it is less apparent and not easy to be detected.

D) Quota and efficiency loss

The whole trade control system listed in **Table 2** is very complicated. The import quota system will be described as an example to illustrate its effect on efficiency.

The import quota is usually distributed through three channels: those through central ministries, those through provincial companies, and those for special users. The share of each of them depends on the specific commodity. The final users apply import quota through these three channels, and get approved quota not necessary equal the applied quantity. The allocation of import quota does not always in consistent with the final demand, some have surplus quota and some do not have enough quota. So trade of quota happened very often, though prohibited by government. Since there is no quota market and it can not be exchanged efficiently, it often happens that quota surplus and deficit exist simultaneously. Therefore, if the quota is distributed to a great number of consumers, to increase quota volume may be not as effective as to establish a quota market.

Quota establishes a price difference between foreign market and domestic market and thus a extra profit for quota holders. The price difference depends on the efficient use of quota and the size of the quota; the larger the quota, the lower the quota price.

Quota has no nominal price but often bears a value in reality. So, quota system may cause illegal profit and corruption, if the officials in charge of quota distribution exchange quota for personnel benefit. According to WTO requirements and the “Memorandum of Understanding” (MOU), a bilateral governmental agreement between US and China, most of quota restrictions will be removed¹⁸. Chinese central government tends to eliminate quota distribution by gradual increasing quota size. But negotiation with ministries representing the benefit of producers is hard to proceed, and some import quota are getting smaller to protect domestic producers’ benefit.

According to Chinese practice, the final users may not have the import rights, so they have to consign importation to trading companies. On the other side, trading companies do not have quota allocation, they import or export according to the order placed by final consumers who know very little about the price changes on the world market. Thus some opportunities of profit creation have been lost; sometimes they purchase at high price and push the world market price even higher. Trading companies, therefore, are requesting quota allocation, but has not been approved by the State Council yet.

¹⁸ The U.S. Embassy, Beijing, China: *China Commercial Guide 1994-95*.

Based on the idea of planned economy, the quota control sometimes creates subsidy but not profit for the quota holders. For instance, the import of chemical fertilizer is subject to quota control, but most of the imported fertilizer should be sold to peasants at a subsidiary price. Since peasants sell their produce to the State at a low price, so they are entitled to enjoy a low price fertilizer. However, such low price fertilizer is supplied only at a limited amount, and a high price market operates in parallel to satisfy the remaining demand. This high price market supports the production of local small fertilizer factories which produce chemical fertilizer at a low efficiency and high cost. Currently the market price of urea is about RMB1,600/tonne, and the imported urea is only MB1,300/tonne.¹⁹ The difference of RMB300(\$38)/tonne becomes the price of quota and the source of illegal income. Moreover, very often peasants can not purchase fertilizer at the subsidiary price, since there is no mark on the fertilizer itself, and nobody can identify a specific bag of fertilizer should be sold on subsidiary price or on market price. It is easy to get illegal profit by adding RMB300/tonne to the imported fertilizer and sell it to peasants. It has been frequently urged on the newspaper to sell fertilizer to peasants at official price, however, whether it is implemented is difficult to be monitored.

The import subsidy described in the preceding paragraph only happened in planned economies. This incident illustrates the following facts:

- A) Price distortion may propagate. Low grain price entails low price of chemical fertilizer. And low price of fertilizer deserves its producers to enjoy low price of its input elements, such as electric power and oil or gas. Finally there would be an expanding distortion leading to a confusion in the price system.
- B) The peasants who get low price fertilizer would use more fertilizer than those who get it at high price, when other conditions are equal. Then the marginal output of fertilizer will be different, which means violation of optimal allocation of fertilizer.
- C) Quota creates the opportunity of corruption, and the benefit of peasants were infringed.

Quota system, particularly the import subsidy, damages both efficiency and equity, a result just in opposite to the original purpose.

Another kind of import subsidy is over-valued domestic currency, which distorts the measurement of comparative advantage and results confusion in international trade business. Before 1994, the year of merging two foreign exchange systems, China imported grains without reckoning the difference of prices between domestic market and international market. Superficially, world market price was always higher than domestic price, because domestic grain price was an officially depressed price. But at the same time the value of RMB was over-valued. Therefore, nobody knows should China import grain based on

¹⁹ Problems grow for fertilizer industry. *China Daily*, August 15, 1997. The article reports that the domestic demand is 32 m tonnes for 1997, and domestic production is 26.6 m tonnes, import is expected to reach 6.5 m tonnes, plus last year's surplus of 8 m tonnes. So supply surpasses demand by some 9 m tonnes, which caused several newly commissioned large fertilizer factories to stop production. The article does not specify these supply and demand are based on what price. The article also implies, because of the lower price of imported fertilizer, import of fertilizer can not be stopped even at a great surplus on domestic market.

comparative advantage, and if China should, then how much. In other words, if the domestic price of grain would be raised to the international market price, and domestic production response correspondingly, should there be any shortage of grain? At the moment, the exchange rate in China is close to equilibrium rate, but the grain price is still heavily intervened by the government. There are a lot of debate on how much grain should China import.²⁰

Because of the price distortion, the State trading companies did not take profit as their operation objective, but to earning foreign exchange as the objective, regardless how much is the cost. The State made foreign exchange earning plan every year and this plan was carried out through out the country. After reform went deeper and broader, most of price distortion was gradually eliminated and profit becomes the most important objective of these companies²¹. Since January 1994 the State Planning Commission stopped to make foreign exchange earning plan. Since then trading companies have found their import/export structure was seriously distorted and many of them were losing money. The restructuring of trade is a serious task to be carried out in the coming years, and market force will be the main driving force of such adjustment.

Export quotas began to be distributed by auction but only on a trial base. No import quota has been distributed this way.²²

III. The Prospect

China has gradually moved toward to eliminate non-tariff barriers. On 1992, the number of commodities under quota control was reduced from 212 to 183, and at the same time import licensee for 16 categories was removed. On December 31, 1993, import license for another 9 categories of 16 kinds of commodities including steel, medicine, civil aircraft, BW television set was removed. On May 1994, the import license and quota for 195 kinds of commodities was removed; beginning from April 1st, 1996 the number of quota control was cut by 30%.

In the recent negotiation with WTO's officials in August 1997, Chinese government promised to make drastic and across-the-board reduction of the phase-out schedule of nontariff measures. The phase-out period for 86 items of quota control will be shortened from twelve years to eight years, which include automobiles and auto parts. To ensure a smooth elimination of the non-tariff measures, China has proposed annual growth rates of the quota volume, ranging from eight percent to twelve percent, during the transition period.²³ The trade policy and practice in China has been undergoing some fundamental change in the past two decades, especially in the past three years. Along with China becoming a big player in international trade and acknowledging international norm, China will more and more follow the principle of

²⁰ Dr. Guoqing Song: *Grape, Walnut, and Money*. Manuscript of working papers, Center of Chinese Economic Studies, Peking University. June 1997. (in Chinese)

²¹ Distribution system responds to market, *China Daily*, August 19, 1997. The report said that a market pricing system has been formed, with 90-95 per cent of the prices under market regulation.

²² The auction of export quota can be seen frequently on the newspaper *International Business Daily*, an official newspaper published by the MOFTEC. Price limits are set for some products for auction such as honey, but others no price limit is set.

²³ WTO entry smoothed by lower tariffs. *China Daily*, August 4, 1997.

free trade. A big country that changes its trade practice in such a scope and speed successfully has rarely happened in world history.

In national context, equity and efficiency are two basic principles to formulate policy. In international context, these two principles also are guiding considerations. However, since there is no international government, the principle of equity has been followed with some difficulty, and efficiency has been preponderated. To be treated with same rules, is an example of efficiency first. In the international trade aspect, free trade is a commonly accepted principle, which will lead to a better allocation of resources utilization. But developing countries are situated on an inferior situation in terms of capital, professionals, and information, thus the equal rules of free trade lead to unequal results. Particularly, there are a set of rules to reach free trade, but no generally accepted rules to reach equity. Equity is achieved only based on concession. Therefore, efficiency is a hard constraint and equity becomes a soft constraint. If we are pursuing to narrow the difference of income distribution among countries, some hard rules have to be founded in international trade negotiation.²⁴

What people in developing countries are particularly distressed is the fact that some businessmen from developed countries take the advantage of corruption in developing countries to achieve their interest. Such kind of deed adds difficulty to combat corruption in developing countries and even fosters corruption. To establish a healthy international trade relationship, it is better to have all kinds of irregular behaviors be punished by international law.

²⁴ Yushi Mao: Efficiency and Equity in International Economic Relationship, *International Economic Review*, Nov.-Dec. 1996. (in Chinese).

Response by Yu-Shi Mao to Dr. Will Martin's comment on China's Nontariff Trade Barriers

I agree that problems in foreign trade sector arising under the pure planning system are different from those under the transition period. Under pure planning system, price did not function as an allocative signal, or price changes (if there were any) did not change resource allocation. But an accounting system based on planned price affects the macroeconomic equilibrium, i.e. the aggregate supply equals aggregate demand. This is why there was no inflation nor deflation under planned economy, although individual goods are not in equilibrium; some in great shortage and others in great surplus.

Another characteristics with pure planning economy is the "non-conflict of interest among participants in the economy". Producers are not maximizing their profit, and consumers are not maximizing their utility. Everyone in the economy is striving under one goal, that is maximizing "output". Such an economy seems to be in high harmony, but in fact, it creates great confusion, because no correct price signal could be established, which would be established by negotiation between producers and consumers based on self-interest. So the output is not measured by value but by material. All kinds of former socialist economies produced a great deal of steel, cement, coal, etc. but little value. The whole nation is running at a loss, although it produces a large output. The trade sector might be losing money, though it relieves "shortage", since it is conducted by certain "proportion among sectors" not by comparative advantage as indicated by price signal.

Then came the reform period in which price control was relaxed and decision making power was decentralized. Governmental officials began to respond according to distorted price signals, and some chaos did happen. Only after such chaos was the price adjusted towards equilibrium level. This is the lesson that we learned from the past. However, during the reform, the policy was "crossing the river by touching the stones", and few people, even economists, could analyze in a clear way.

Now China's reform has entered a new phase in which the ownership structure has to be changed. This is a more profound and comprehensive change involving political arguments, since the State ownership is a component of the communist orthodoxy. Before reform, all business belonged to the State with almost no exception, and the State was the only employer. The State assumed all the profits and losses. In such a condition, competition makes little sense, because managers are agent of the State property and do not assume the economic responsibility. Managers of trading companies conduct trade business not only according to price signal, but also to the order of their boss, the higher rank officials, or according to their own individual interests. This is why many of the trading companies are losing money and even going to bankruptcy.

I also agree that monopoly in trading of specific products deteriorated efficiency. This is a problem not only regarding the trading sector, but also regarding other sectors. Monopoly is one of the major sources of price distortion now.

I can not understand why low wages is a source of bias in tariff equivalents as mentioned in the comments. As long as wage level is at equilibrium, there is no bias to speak of. China is an under-developed country and can not offer high wage. If wage is deliberately set high, then there will be a real bias.

The grain price in China has been set free several times. But because of the State-ownership of storage and transportation, an integral part of grain transaction, free price gave opportunity of windfall profit for these monopolized storage and transportation businesses, but little profits were directed to individual farmers. So price was put under control once again. Unless private businessmen join storage and transportation, no real market for grain could be established.

Barriers to Trade in Selected Sectors by ASEAN Members: How Important are NTBs?¹

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Introduction

Background

Recent liberalization in the Asia-Pacific region has reduced the level of market distortions attributable to tariffs and other border measures. Not only have tariffs been lowered unilaterally and multilaterally, but trade protection has become more transparent and predictable via extensive bindings in the World Trade Organization (WTO) and voluntary action plans for liberalization in APEC. In the case of ASEAN members--Brunei, Indonesia, Malaysia, the Philippines, Singapore, and Thailand--such liberalization has often been part of sweeping economic reform programs that include substantial privatization and deregulation of state-led economic activity. In 1996, for example, Indonesia issued two deregulation packages that have opened the country to greater trade and investment.

Even so, the degree of liberalization in East Asia is arguably lagging that of other developing regions,³ and recent Commission research suggests that important obstacles remain to commerce among Asia-Pacific economies. For example, a 1993 USITC study on East Asian economic integration found that numerous non-tariff barriers (NTBs) to trade and investment hamper the efficient flow of resources among APEC economies, particularly in such sectors as basic petrochemicals, automobile manufacture, and electronics.⁴ A 1996 public hearing conducted in conjunction with a study conducted for USTR revealed considerable interest by the U.S. business community in tapping the APEC region's potential and identified remaining barriers to U.S. exports and investment.⁵

¹ The authors are grateful for the research and expertise provided by the following USITC staff: Paul Gibson, Diane Manifold, and David Flynn.

² The authors are with the Office of Industries and the Office of Economics, respectively of the U.S. International Trade Commission. Office of Economics research papers presented at the Symposium are the result of the ongoing professional research of USITC Staff and are solely meant to represent the opinions and professional research of individual authors. These papers are circulated to promote the active exchange of ideas between USITC Staff and recognized experts outside the USITC, and to promote professional development of Office staff by encouraging outside professional critique of staff research. These papers are not meant to represent in any way the views of the U.S. International Trade Commission or any of its individual Commissioners or the U.S. government.

³ See, for example, Inter-American Development Bank, "Trade Liberalization," in *Economic and Social Progress in Latin America: 1996 Report*, (Washington, D.C.: Johns Hopkins University Press, November 1996) and Judith M. Dean, Seema Desai, and James Riedel, *Trade Policy Reform in Developing Countries since 1985: A Review of the Evidence*, World Bank Discussion Paper No. 267, 1994.

⁴ U.S. International Trade Commission, *East Asia: Regional Economic Integration and Implications for the United States*, USITC Publication 2621, May 1993.

⁵ U.S. International Trade Commission, *U.S. Interests in APEC Trade Liberalization*, (confidential report for USTR on Inv. No. 332-365), May 1996.

Many of the obstacles identified were NTBs. While most quantitative restrictions have been or are being converted to tariffs, procedural barriers persist--in the form of cumbersome and arbitrary customs procedures, non-transparent or restrictive import licensing requirements, discriminatory government procurement procedures, distorting conditions on foreign direct investment, and poor intellectual property rights protection. Commitments undertaken in the WTO should improve the situation somewhat, but key industries--such as agriculture, automobiles, and chemicals--often have not been included in recent liberalization plans (e.g., Indonesia).

APEC has indeed resulted in some important breakthroughs. Not only did members lay out plans for liberalization in the November 1996 Manila Action Plan for APEC (MAPA) that indicate recent market opening is on track or will be accelerated, APEC was instrumental in building the "critical mass" for the Information Technology Agreement announced at the WTO's December 1996 Singapore Ministerial. APEC may again jump start worldwide liberalization: in May 1997, APEC Trade Ministers announced that they were investigating additional sectoral liberalization initiatives. At the Vancouver Ministerial meeting in November 1997, APEC Ministers selected 9 sectors for immediate work on trade liberalization and six others for additional development of proposals. The nine sectors selected by APEC Ministers and endorsed by APEC Leaders were: chemicals, energy, environmental goods and services, fish and fish products, forest products, gems and jewelry, medical equipment and instruments, toys, and the telecommunications mutual recognition arrangement.

The work on trade liberalization is to include identification and reduction of non-tariff barriers as well as reduction or elimination of tariffs. For example, in the chemical sector, the tariff measures proposed are for APEC economies and others with significant chemical industries to bring tariffs into conformity with the rates established in the Chemical Tariff Harmonization Agreement which was completed during the Uruguay Round. Once this harmonization has been accomplished, additional tariff reductions are to be negotiated. The work program for non-tariff measures includes facilitation and liberalization of customs and regulatory procedures, harmonization of chemical standards and testing, and reduction of non-tariff barriers that have not yet been identified.

Purpose

This paper identifies some remaining barriers to trade and investment in particular sectors in the APEC region and then quantifies NTBs that occur across selected petrochemical products within the ASEAN region. First, the results of a comprehensive multi-industry survey of remaining barriers to U.S. trade and investment in individual ASEAN members are presented. Then, those industries that face NTBs in multiple ASEAN markets are identified and discussed. Finally, results to date of Commission efforts to estimate the tariff equivalents of the remaining barriers in several product categories in the petrochemical sector are presented. Ultimately, it is hoped these results may prove useful to modelers seeking to assess trade liberalization within APEC, particularly since existing models contain limited information on the NTBs most frequently cited as posing obstacles to U.S. exporters.

Approach and Methodology

Price Gap Method

A common practice for estimating the effects of non-tariff trade barriers involves calculating the gap between world prices and domestic prices in the country or countries having such restrictions. These price gaps (or the tariff equivalents of the non-tariff barrier share of the price gaps) can then be used in the framework of a partial or general equilibrium analysis to estimate the economic effects of the non-tariff barriers.⁶ The Commission has previously used the price-gap method to estimate tariff equivalents and economic effects of U.S. import restraints⁷ and the tariff equivalents for U.S. and foreign agricultural programs.⁸

The price gap method used in this paper utilizes the average import unit value of a product in the country as a proxy for the world price of that product. This approach eliminates the need to consider transportation costs and other fees necessary to move the product from the exporting country to the importing country. This approach minimizes complications where multiple products in multiple countries and imports from multiple sources are being considered. This import price is then compared with a domestic wholesale price for the same product in an attempt to observe any difference that might occur at approximately the same point in the distribution process. The difference between these two prices is then examined to deduct the amount of any tariffs and taxes. The remaining gap is expected to reflect the effects of any non-tariff barrier(s) affecting that product.

There may be factors other than NTBs, tariffs, and taxes that contribute to differences in prices between imported and domestic products. For example, product quality or other physical characteristics, product differentiation, and location in time and space have been identified as potentially distorting factors.⁹ These factors are in addition to any margins or inventory costs charged by handlers of the imported product. The existence of these, and other factors, influenced the choice of products for this study. Specifically, those commodities were selected where it is believed that differences in physical characteristics, quality, and product differentiation of the products should be minimal.

Review of Selected Studies

Three recent reports have been released by the Institute for International Economics which estimated the costs of protection in East Asian countries, although none of the studies involved the ASEAN countries that are the subject of this paper. These studies all used variations of the price-gap

⁶ In percentage terms, the price gap = $100[(P_d - P_m)/P_m]$, where P_d and P_m stand for the price or unit value of the domestic good and the imported good, respectively.

⁷ USITC, *The Economic Effects of Significant U.S. Import Restraints*, USITC Publication 2699, 1993.

⁸ USITC, *Estimated Tariff Equivalents of U.S. Quotas on Agricultural Imports and Analysis of Competitive Conditions In U.S. and Foreign Markets for Sugar, Meat, Peanuts, Cotton, and Dairy Products*, USITC Publication 2276, 1990, and USITC, *Estimated Tariff Equivalents of Nontariff Barriers on Certain Agricultural Imports in the European Community, Japan, and Canada*, USITC Publication 2280, 1990.

⁹ Papillon, Benoit-M., "Measuring Non-Tariff Barriers to Differentiated Import Products," *Contemporary Economic Policy*, Vol. XII, July 1994, pp 67-78.

method to estimate the economic costs of protection, and it is the price gap portion of their methodology used in those works that is reviewed here.

A study of protection levels in Japan compared the C.I.F. import unit values with the domestic producers' unit values for similar products.¹⁰ The import unit values also included the application of tariffs. Both the import unit values and the producers' unit values are intended to exclude any markup by wholesalers and thus be at the same level in the distribution process.

Since the objective of Japanese study was to measure the cost of protection across the entire economy, the study examined each of the 420 categories in the input-output table using a minimum level of imports of 1 billion yen and a minimum unit value differential of 5 percent with 1985 data. The sectors that met their criteria, plus some additional categories involved in trade controversies, were reevaluated using 1989 data, yielding 43 categories that accounted for about 19 percent of Japanese imports. The authors noted that since "the unit value differentials for Japanese imports far exceed Japanese tariff rates, it seems likely that nontariff measures are a more substantial cause of protection in Japan than tariffs."¹¹

The second study evaluated the protection levels in Korea and estimated the costs of the major trade measures.¹² This study did not cover all measures of protection or sectors but focused on tariffs and known quotas. What the author called opaque non-tariff barriers were not addressed, as the only non-tariff barriers effects estimated were those involving agricultural quotas covering 16 product categories (at the 4 digit HS level). These tariff equivalents were taken from a review of the Uruguay Round Text by Korea's Economic Planning Board and from Korea's Uruguay Round Schedule LX which covers agricultural products.¹³ The approach used for these agricultural products was to measure the total difference between domestic and foreign prices minus the tariff rate.

Similar to the case in Japan noted previously, the apparent tariff equivalents of the non-tariff barriers addressed were substantially higher than the collected tariff rates. For example, the tariff for pork was 20 percent while the tariff equivalent of the quota was 30 percent. In the case of rice, the tariff was 5 percent and the tariff equivalent of the quota was 590 percent.¹⁴

The third study examined the cost of protection in China for 25 products with either high tariff and/or non-tariff barriers.¹⁵ The products evaluated covered a wide spectrum and included such things as agricultural and forest products, fuels, metal products, automobiles, and computers. The tariff equivalents of the non-tariff barriers for each of the 25 categories were estimated by comparing the C.I.F. import price of the product and the wholesale price of the imported product. These wholesale prices were collected through a survey of companies and government departments.

¹⁰ Yoko Sazanami, Shujiro Urata, and Hiroki Kawai, *Measuring the Costs of Protection in Japan*, (Washington, D.C.: Institute for International Economics, 1995).

¹¹ Sazanami, p. 19.

¹² Namdoo Kim, *Measuring the Costs of Visible Protection in Korea*, Institute for International Economics, Korea Institute for International Economic Policy, November, 1996.

¹³ Kim, p. 63.

¹⁴ Kim, p. 30.

¹⁵ Zhang Shuguang, Zhang Yansheng, and Wan Zhongxin, *Measuring the Costs of Protection in China*, Unirule Institute of Economics and Institute of International Economics, 1996.

In most cases, the resulting tariff equivalents of the non-tariff barriers were significantly lower relative to the tariff levels than in the two previous studies.¹⁶ However, direct comparisons are not truly appropriate given the differences in methodologies of the studies. In most cases the tariff equivalents of the non-tariff barriers were less than the tariffs for the same products. The highest NTB tariff equivalents of about 70 to 110 percent were associated with basic commodities such as wheat, ammonium phosphate, rapeseed oil, and sugar. The tariffs on those products ranged from 0 to 30 percent.

Identification of NTBs in Selected APEC Countries

After settling upon the ASEAN region as being both the fastest-growing market for U.S. exports and least studied in terms of quantifying remaining barriers, the research team conducted a scan to identify sectors that faced barriers across multiple ASEAN markets. The scan did not include Singapore, given its generally open market, nor Brunei, given its small size and dearth of available information. Thus the focus was on Indonesia, Malaysia, the Philippines, and Thailand. The material reviewed included information contained in the Commission's country/regional and industry files, as well as various authoritative public sources of information: USTR's *National Trade Estimate Report on Foreign Trade Barriers*, APEC Individual Action Plans, hearing transcripts and written submissions for the record in connection with the Commission's May 1996 report to USTR on *U.S. Interests in APEC Trade Liberalization*, Customs Guides contained on the APEC Tariff Database, the UNCTAD TRAINS database, WTO Trade Policy Review Mechanism reports, World Bank and IMF country studies, the 1995 Pacific Economic Cooperation Council (PECC) report, *A Survey of Impediments to Trade and Investment in the APEC Region*, and other specialized reports. A variety of information sources, with their differences in industry definitions and levels of detail, were used to identify areas for further investigation. We used the information as reported (e.g., if one source said there was an NTB in "processed foods" and another reported NTBs in "canned fruits and snack foods" all three entries were registered. However, in many cases we benefitted from direct industry input and a standard set of illustrative questions distilled from Commission trade agreement expertise to identify whether NTBs likely exist.

Although a large number of U.S. industries/sectors (some 60 overall) were found to face tariff or non-tariff barriers in the 4 ASEAN markets under study, only a fourth of them appeared to face barriers in multiple ASEAN markets. Specifically, 5 of the 61 sectors faced barriers in four ASEAN country markets, 12 faced barriers in three ASEAN markets, and 17 faced barriers in two ASEAN country markets (Table 1). For example, the sugar industry was among those facing barriers in 4 ASEAN countries, notably NTBs in all 4 countries and high tariffs in one country (Table 2). The petrochemical and wood pulp and paper industries appeared to face barriers in 3 ASEAN countries, including NTBs in all countries but Malaysia.

¹⁶ Ibid, p. 8.

Data for Price Gap Analysis

Next, we focused on obtaining the data needed to conduct a price gap analysis for products within the sectors identified as facing barriers in three or more ASEAN markets. For pricing information, sources of data consulted included national statistical authorities, international organizations, commodity organizations, U.S. government agencies, trade associations, and industry contacts. For import price data, that is, the unit value of imports, UNCTAD trade statistics and national statistics were consulted. As can be imagined, locating price data and ensuring its comparability with trade data and across ASEAN countries proved time-consuming and fraught with difficulties. Tariffs, import surcharges, taxes, and institutional features that could be factors in explaining the calculated gaps were then identified.

Results of Price Gap Analysis

The initial objective was to estimate and then compare price gaps for several factors across several countries. Initial data searches were focused on non-agricultural sectors for which at least three of the four countries are alleged to have trade barriers. We focused on sectors such as petrochemicals, chemicals, and pharmaceuticals. However, these searches revealed a paucity of domestic price information, particularly wholesale prices, for the primary products of these sectors in these ASEAN countries. As an alternative, we selected a set of secondary or intermediate products of the petrochemical sector: low density polyethylene (LDPE), linear low density polyethylene (LLDPE), high density polyethylene (HDPE), polypropylene (PP), general purpose polystyrene (PS-GP), and high impact polystyrene (PS-HI). Data for these products were also limited, and we were able to obtain the necessary data only for Thailand.

The petrochemical industry in Southeast Asia, particularly the ASEAN countries, has been expanding owing to an increasing demand for the industries output. Demand is currently stronger than supply in the ASEAN countries. Thailand was selected as the focus of this paper because its industry is developing faster than the others in Southeast Asia and data are more available. Thailand gained both investment and capacity during the 1990s (figure 1). As detailed later in this paper, the government has encouraged the development of the petrochemical sector through a variety of means, including via direct ownership, restricted entry and expansion, and import protection. The major development in Thailand was the discovery and commercialization of natural gas and the subsequent increase in feedstock use of ethane and propane. Thailand's petrochemical industry is still dominated by former state-controlled firms, such as the National Petrochemical Public Co., Ltd. (NPC).

The refining of the natural gas increased the supply of chemicals, known as monomers, such as ethylene, propylene, and styrene. Meanwhile, use of petroleum as a feedstock for monomer production has grown. Some of the principal products derived from these basic building block chemicals are the polymers polyethylene, polypropylene, and polystyrene that are the subject of this paper. These polymers are used in a wide variety of applications by downstream industries.

Table 1: Sectors facing barriers in multiple ASEAN markets

Barriers in 4 ASEAN countries	Barriers in 3 ASEAN countries	Barriers in 2 ASEAN countries
Animal feed	Fruits and nuts	Cement
Sugar	Processed foods	Explosives
Alcoholic beverages	Rice	Film
Motor vehicles and parts	Chemicals	Household appliances
Textiles and apparel	Coin-op games	Office furniture
	Computers and software	Precision instruments
	Iron and steel	Corn
	Leather	Meats
	Petrochemicals	Milk/dairy products
	Pharmaceuticals	Poultry
	Pulp and paper	Canned fruits
	Toys and games	Snack foods
		Salt
		Soybeans
		Vegetables
		Wheat
		Agricultural machinery

Source: Compiled by USITC staff.

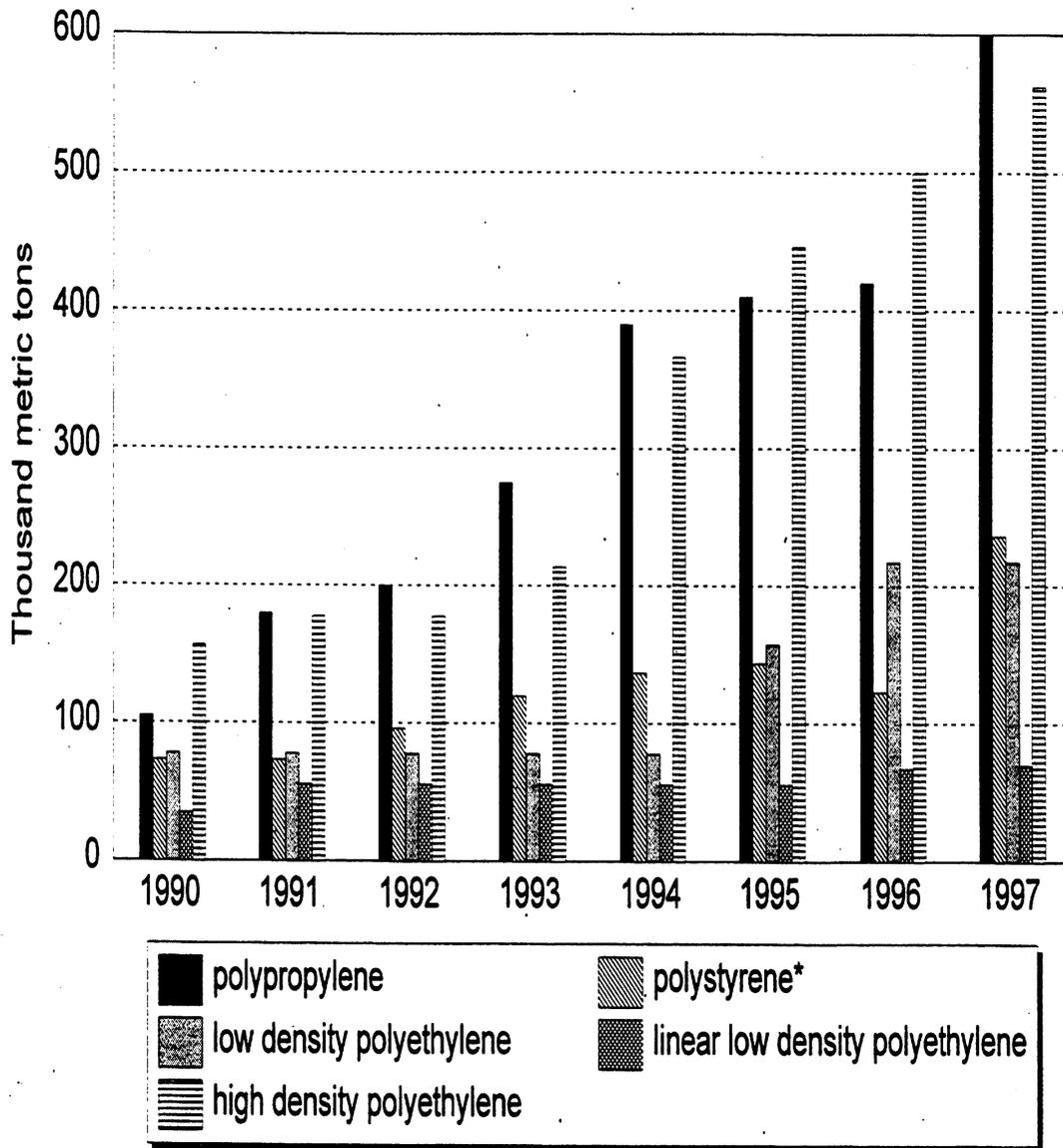
Table 2. Tariff and non-tariff barriers in selected ASEAN members, by industry

Industry	Malaysia		Indonesia		Philippines		Thailand	
	Tariffs	NTBs	Tariffs	NTBs	Tariffs	NTBs	Tariffs	NTBs
Agriculture								
Animal feed	x			x	x	x	x	x
Coconut								x
Coffee						x		
Corn					x	x	x	x
Flour		x				x		
Fruits and nuts	x				x	x		x
Meats		x			x	x		
Milk/dairy products				x			x	x
Oranges								
Potatos								x
Pork				x				
Poultry				x	x	x		
Processed Foods		x			x		x	x
Canned fruits	x				x			
Snack foods	x				x			
Rice				x	x	x	x	x
Salt				x				x
Soybean				x				x
Soy meal				x				
Sugar		x		x	x	x		x
Sweetners				x				
Vegetables	x				x	x		

Industry	Malaysia		Indonesia		Philippines		Thailand	
	Tariffs	NTBs	Tariffs	NTBs	Tariffs	NTBs	Tariffs	NTBs
Wheat				x		x		
Agricultural Machinery			x	x	x			
Alcoholic beverages	x		x	x	x	x	x	x
Aircraft				x				
Aluminum	x		x	x				x
Cement		x				x		
Cereals					x	x		
Chemicals			x	x		x		x
Coin-op games			x			x		x
Computers and software (keyboards)			x			x		x
Construction equipment	x							
Cosmetics								x
Electronics				x				
Engines				x				
Explosives	x					x		
Film	x							
Hand tools			x					
Household appliances						x	x	
Household furniture			x					
HVAC machinery				x				
Iron and steel	x	x	x	x	x	x		
Leather	x			x	x			
Medical Equipment				x				

Industry	Malaysia		Indonesia		Philippines		Thailand	
	Tariffs	NTBs	Tariffs	NTBs	Tariffs	NTBs	Tariffs	NTBs
Motor vehicles and parts	x	x	x	x	x	x	x	x
Office furniture	x				x	x		
Petrochemicals				x		x	x	x
Pharmaceuticals			x	x		x		x
Plastic resins		x						
Precision Instruments			x	x		x		
Printed matter						x		x
Pulp and paper	x		x	x		x		x
Shipbuilding				x				
Refined Copper			x	x				
Soda ash & rel. chemicals			x	x				
Straw and wicker	x							
Telecommunication Equipment								
Textiles and apparel	x	x	x	x		x	x	x
Tobacco	x	x					x	x
Toys and dolls			x			x		x
Video game software								x
Wood products			x	x				

Figure 1- Thai production capacity, 1990-97



* Production capacity is not separately reported for the various forms of polystyrene.

Source: Adapted from Parpinelli TECNON database.

Polyethylene

Polyethylene plastics resins are produced in variety of forms. Low-density PE (LDPE) has, by industry definition, a density of less than 0.940 grams per cubic centimeter. It is the softest and least crystalline of these resins. High-density PE (HDPE) is defined as products having a density equal to or greater than 0.940 grams per cubic centimeter. Within these ranges there is a broad spectrum of density combination. For example, linear low-density PE (LLDPE) has a more crystalline structure than LDPE but they compete in the same markets.

LDPE (and LLDPE) resins are used principally to manufacture blown and cast plastics films. Blown films are used for packaging, lamination, and shrink films. Cast films are used to manufacture containers for food such as bags for bread and frozen foods. LDPE resins are non-toxic and have low flammability characteristics, however, as with all disposable packaging the environmental impact of waste disposable is a concern; however, these products are fully recyclable because they are thermoplastics (i.e., the products can be heat softened and reformed.)

HDPE resins are utilized for their physical toughness, high melting temperatures, and chemical resistance. HDPE resins can be used in melt forming applications such as extrusions, injection molding, blow molding, and powder coating. The largest use for HDPE resins is for milk bottles and other food liquids. In addition, containers for household chemicals, motor oil, pharmaceuticals, cosmetics, fuel tanks, large trash containers, and pails are common uses. Injection molding applications include the manufacture of crates, pallets, and cases. Disposal of these durable plastic items is an environmental concern.

Polypropylene

Low melting grades of polypropylene are used for sheets, films, profile forms, and extrusions. However the largest use is in synthetic fibers for carpet yarn, upholstery, and undergarments. With additives, polypropylene fibers with good dimensional stability, strength, low-flammability, thermal, and ultraviolet light resistance can be obtained. The good working ability of PP fibers makes them suitable for use in active, athletic sports wear.

Other applications for polypropylene resins are as substitutes for cellophane in packaging. Molded applications include appliance housings, battery cases, medicine bottles, and syringes.

Polystyrene

The largest use polystyrene resins is for packaging. Polystyrene is available in three forms, general purpose crystal, high impact, and expandable. General purpose polystyrene resin is used for clear polystyrene film used for food packaging. High impact PS is used for such products as smoked detector cases, toys cathode ray tube housings, and electrical appliances. The expandable is used in home insulation, siding and exterior wall sheathing.

We obtained monthly wholesale price series for the six products in Thailand for the period January 1994 through December 1996. These series consisted of the high and low local prices for each of the six polymers. We compared the monthly averages of these local prices against the import prices for the same products for the same period (figures 2 and 3). We used the spot prices, delivered basis, for Southeast Asia as the estimates of the import prices in Thailand. The local prices reflect the grades of the products closest to those for which the spot prices were reported. By inspection, one can see that the local polymer prices in Thailand generally track the spot prices.

The local prices for the polyethylene products rose sharply in the second half of 1994 and then decreased irregularly during 1995, with the prices in 1996 generally around the level of prices in the first half of 1994 (figure 2). The spot prices peaked in the middle of 1995 before generally leveling off in 1997. The local prices and the spot prices for polyethylene converged over the period. The local and spot prices for polypropylene and polystyrene followed a similar pattern (figure 3). Prices rose over the first part of 1994, dropped off a bit in late 1994, peaked in mid-1995 and then settled in 1996. Two major factors were China, which purchases largely on the spot market, and the start-up of additional production. China's purchases fell off substantially after the first half of 1995, but resumed again in 1996,¹⁷ exerting a major influence on East Asian prices, given its role in polymer, monomer, and intermediates consumption.)¹⁸

To estimate the price gaps between the local and import prices, we first calculated the annual average local and import prices for each product using the data noted above (table 3). The differentials between the import unit values and the domestic wholesale prices were adjusted by the level of the tariffs (table 4).¹⁹ Note that the table indicates that the applied tariff rate was reduced at the start of 1997 but reports indicate that the planned tariff cuts have been delayed until at least 1998,²⁰ which in any case does not affect our price gap calculations for 1994-96.

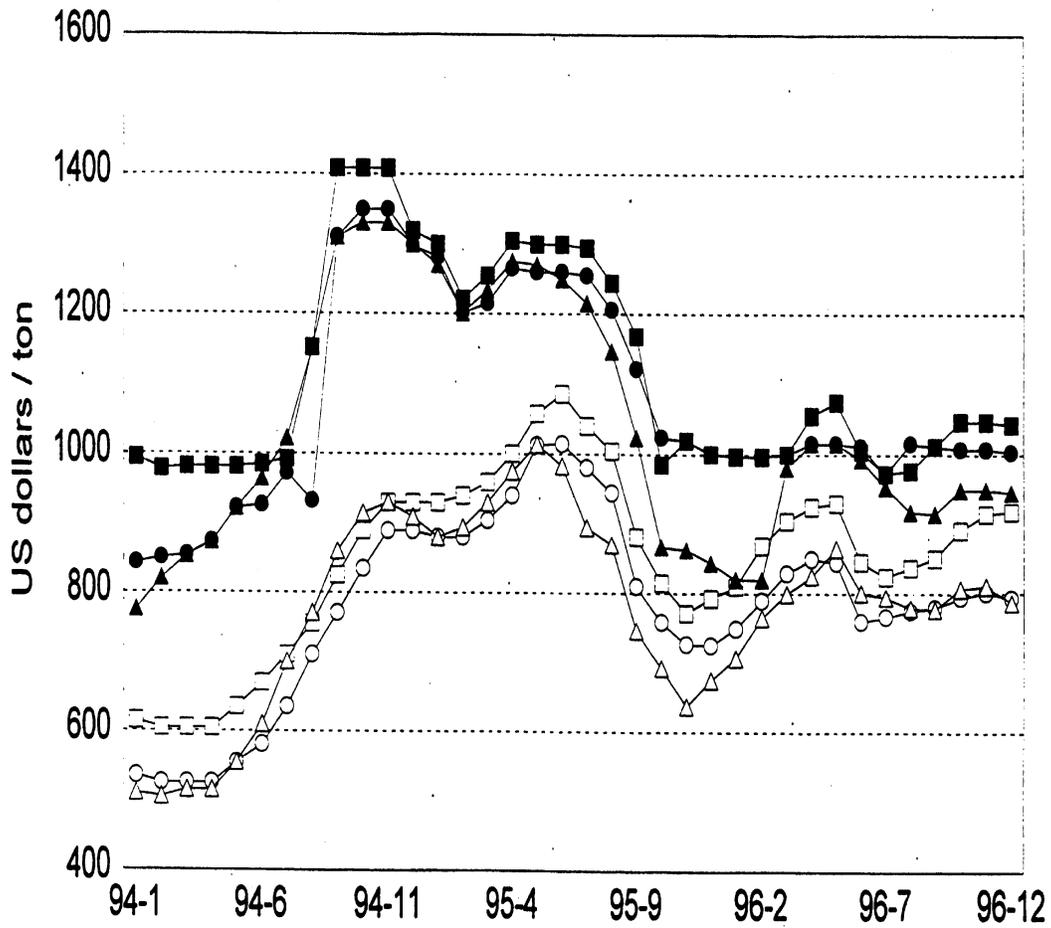
¹⁷ Jean Francois Tremblay, "Asia Pacific: Slowing Economies Mean Less Growth for Chemicals," World Chemical Outlook, *Chemical and Engineering News Record*, [date].

¹⁸ Ian Young, "Asian Agitation: Capacity Additions Shake Markets," *Chemical Week*, Mar. 20, 1996, p. 41.

¹⁹ USITC staff understand that the reported wholesale price series for these polymers in Thailand do not include the reported 10 percent consumption tax and thus the tax need not be added to the import price.

²⁰ **Need to confirm that the tariff is still 30% for the polymers and was throughout 94-96.**

Figure 2- Polymer prices, 1994-96: Polyethylene



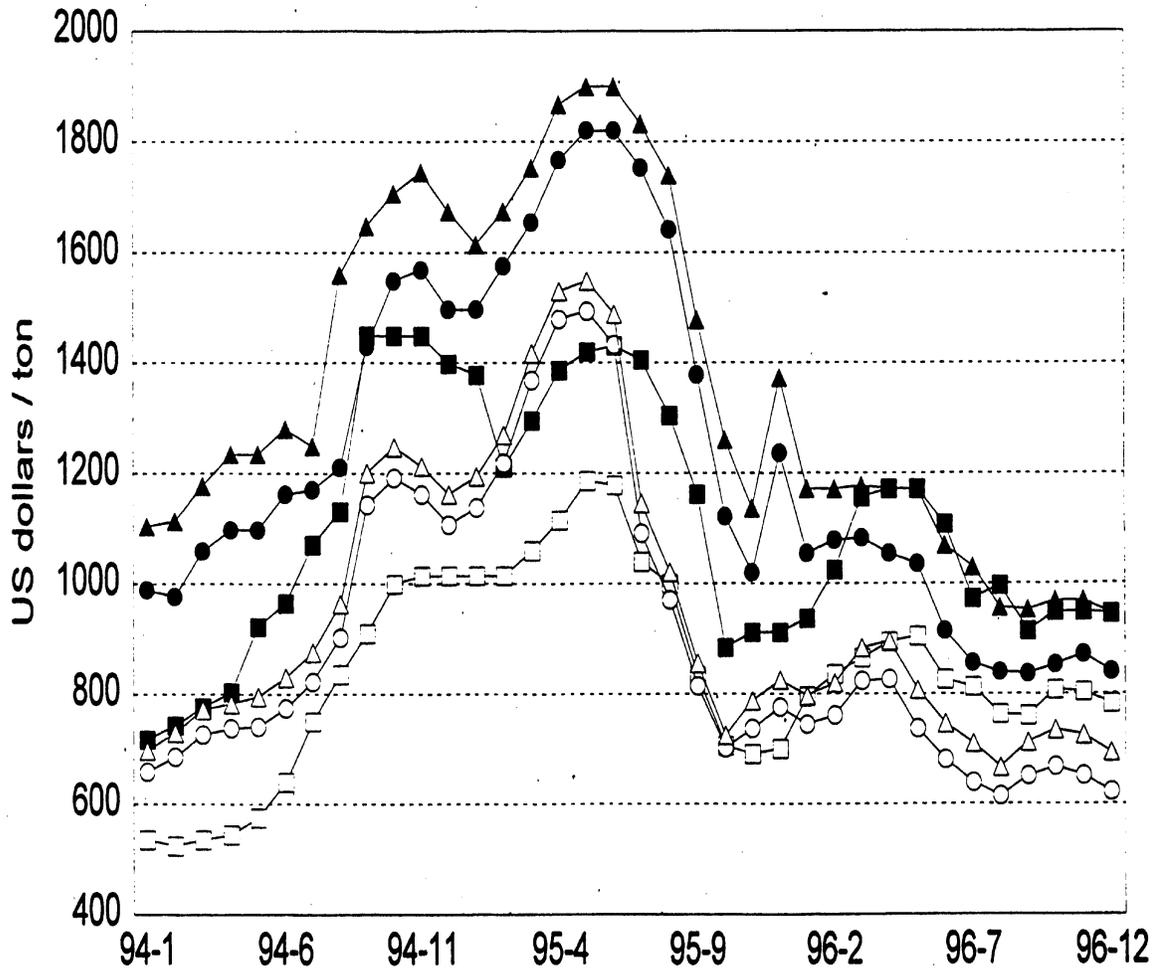
Prices in Thailand

Spot prices, delivered SE Asia

- low density polyethylene □ low density polyethylene
- linear low density polyethylene ○ linear low density polyethylene
- ▲ high density polyethylene △ high density polyethylene

Source: Adapted from Parpinelli TECNON database.

Figure 3- Polymer prices, 1994-96: Polypropylene and Polystyrene



Prices in Thailand

Spot prices, delivered SE Asia

- polypropylene
- polystyrene (general purpose)
- ▲ polystyrene (high impact)
- polypropylene
- polystyrene (general purpose)
- △ polystyrene (high impact)

Source: Adapted from Parpinelli TECNON database.

Table 3.

PRICE GAPS, USING SPOT PRICES						
Product	Year	Local	Import	IMP + TAR	LOC-IMP,\$	LOC-IMP,%
LDPE	1994	1132	731	950.3	181.7	24.856361
	1995	1200	940	1222	-22	-2.340426
	1996	1019	876	1138.8	-119.8	-13.6758
LLDPE	1994	1040	665	864.5	175.5	26.390977
	1995	1176	882	1146.6	29.4	3.3333333
	1996	1005	794	1032.2	-27.2	-3.425693
HDPE	1994	1054	691	898.3	155.7	22.532562
	1995	1122	849	1103.7	18.3	2.155477
	1996	940	793	1030.9	-90.9	-11.4628
PP	1994	1073	740	962	111	15
	1995	1225	962	1250.6	-25.6	-2.661123
	1996	1025	821	1067.3	-42.3	-5.152253
PS-GP	1994	1234	888	1154.4	79.6	8.963964
	1995	1524	1102	1432.6	91.4	8.2940109
	1996	944	702	912.6	31.4	4.4729345
PS-HI	1994	1426	939	1220.7	205.3	21.863685
	1995	1627	1151	1496.3	130.7	11.355343
	1996	1063	766	995.8	67.2	8.772846

Table 4.
Thailand's tariff on polyethylene, polypropylene, and polystyrene²¹

SITC	HS Sub-heading	Description	Rate of duty						
			Rate under decree			Applied rate			
			Ad Valorem	Specific rate Unit	Boht	Ad Valorem	Specific rate Unit	Boht	
57111	3901.10	Polyethylene having a specific gravity of less than 0.94							
		- For polyethylene used in the manufacture of telephone or electric wire	40	Kg	8.00	10	Kg	2	
		- Other							
		- Imported before January 1, 1997	40	Kg	8.00	30	Kg	6	
		- Imported after December 31, 1996	40	Kg	8.00	20	Kg	4	

²¹ Need to add polypropylene and polystyrene tariffs to this table - the applied rates are the same as above, and I believe the other rates for these polymers are the same as for polyethylene. SITC numbers are as follows:

57111	polyethylene < .94	LDPE AND LLDPE
57112	polyethylene > .94	HDPE
57211	polystyrene (expansible)	PS
57219	polystyrene, other	PS-GP
57511	polypropylene	PP

HS numbers:

3901.10	polyethylene < .94	LDPE AND LLDPE
3901.20	polyethylene > .94	HDPE
3903.11	polystyrene (expansible)	PS
3903.19	polystyrene, other	PS-GP and PS-HI
3902.10	polypropylene	PP

Table 4—Continued
Thailand's tariff on polyethylene, polypropylene, and polystyrene

SITC	HS Sub-heading	Description	Rate of duty							
			Rate under decree			Applied rate				
			Ad Valorem	Specific rate Unit	Boht	Ad Valorem	Specific rate Unit	Boht		
57112	3901.20	Polyethylene having a specific gravity of 0.94 or more								
		- For polyethylene used in the manufacture of telephone or electric wire	40	Kg	8.00	10	Kg	2		
		- Other								
		- Imported before January 1, 1997	40	Kg	8.00	30	Kg	6		
		- Imported after December 31, 1996	40	Kg	8.00	20	Kg	4		

Source: APEC CD ROM 1995 Database.

The resulting price gaps for each of the six products follow the same trend. The price gaps for each product are the highest in 1994 and decline in both 1995 and 1996. The steepest declines are for the polyethylene and polypropylene polymers. Note that many of the calculated price gaps for these two polymer forms are negative in 1995 and 1996. The price gaps declined less, both absolutely and relatively, for the two forms of polystyrene.

The calculated price gaps for 1994 and the subsequent declines appear to indicate both the existence of non-tariff barriers such as those noted below and evidence that such barriers are decreasing. A possible explanation for the negative values is that the spot prices are higher than prices for comparable products and grades would be under the normally longer term contracts between producers and buyers.

Thailand's tariffs, import surcharges, taxes, and NTBs

Tariff data was obtained from the APEC tariff data base (1997 Internet version and 1995 CD-ROM (pilot) version). Information on import surcharges, taxes, and NTBs was obtained from specialized publications. The information reviewed to identify barriers includes several useful but somewhat dated analyses as well submissions made by U.S. industry alleging the existence of policies or practices that restrict U.S. exports and investment. *Before the final paper is completed, we plan to verify and update this information, which reveal numerous NTBs in these sectors.*

Though some liberalization is underway, various policies by Thailand appear to have distorted the market for petrochemicals during the period under review. Among these policies were (1) extensive government involvement as both a producer and a consumer, (2) government support for local investment, and (3) tariff and non-tariff barrier (NTB) protection. Data prepared by the Pacific Economic Cooperation Council in 1995 is suggestive, showing that more than 15 percent of the tariff lines in the petroleum refining sector were subject to NTBs.²²

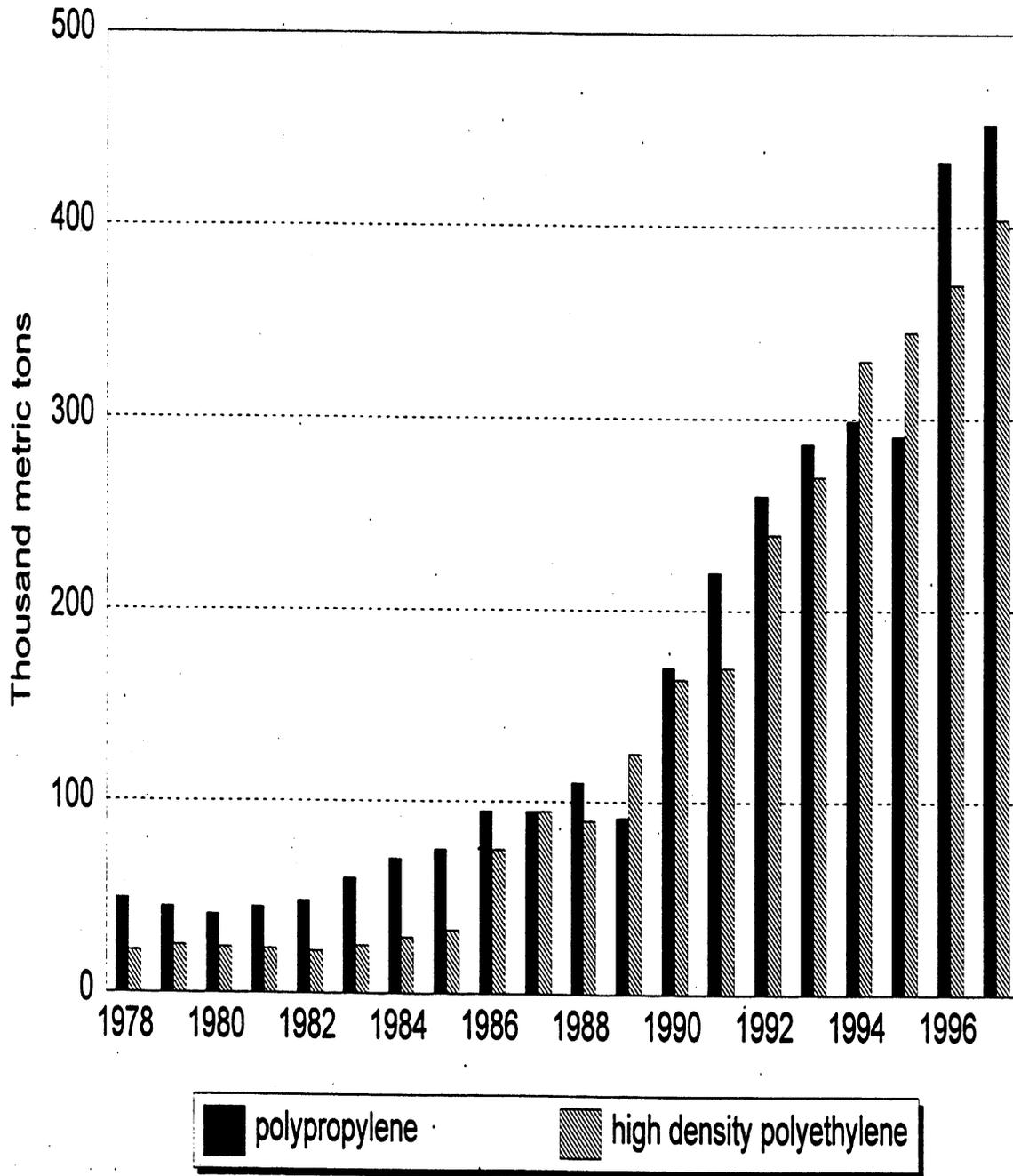
Thailand's remaining barriers have important implications for APEC liberalization, as realization of current expansion plans could make Thailand ASEAN's biggest petrochemical producer. The bulk of Thailand's petrochemical production is sold on the domestic market (figures 4 and 5). Expanded capacity has been built to meet growing domestic demand for plastics and by the agro-industrial, electronics, and textile industries. By 1995 Thailand had become self-sufficient in basic petrochemical products²³ and a net exporter of polyethylene, polypropylene, and polyvinyl chloride (figure 6).²⁴ U.S. imports from Thailand, meanwhile, rose from \$7,000 in 1994 to just under \$1 million in 1996.

²² Pacific Economic Cooperation Council (PECC), *Survey of Impediments to Trade and Investment in the APEC Region*, (Singapore: Pacific Economic Cooperation Council), 1995, p. 234.

²³ "Super Thailand: Industry Grows Rapidly to Meet Soaring Demand for Plastics," *Asian Business*, June 1996, p. xiv.

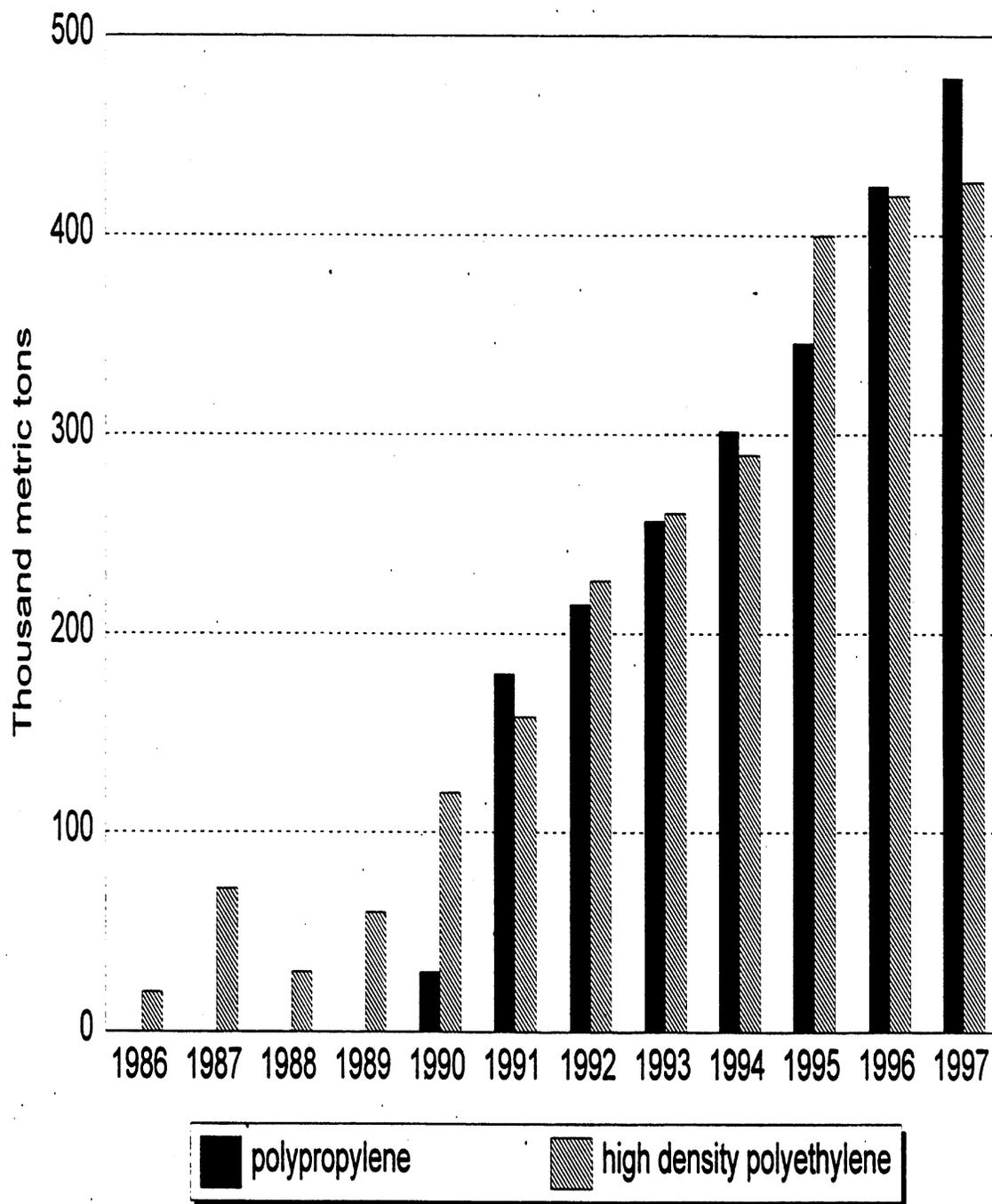
²⁴ "Country Report of Thailand: Petrochemical Industry in Thailand," Prepared by National Petrochemical Public Co., Ltd.

Figure 4- Thai consumption, 1978-97



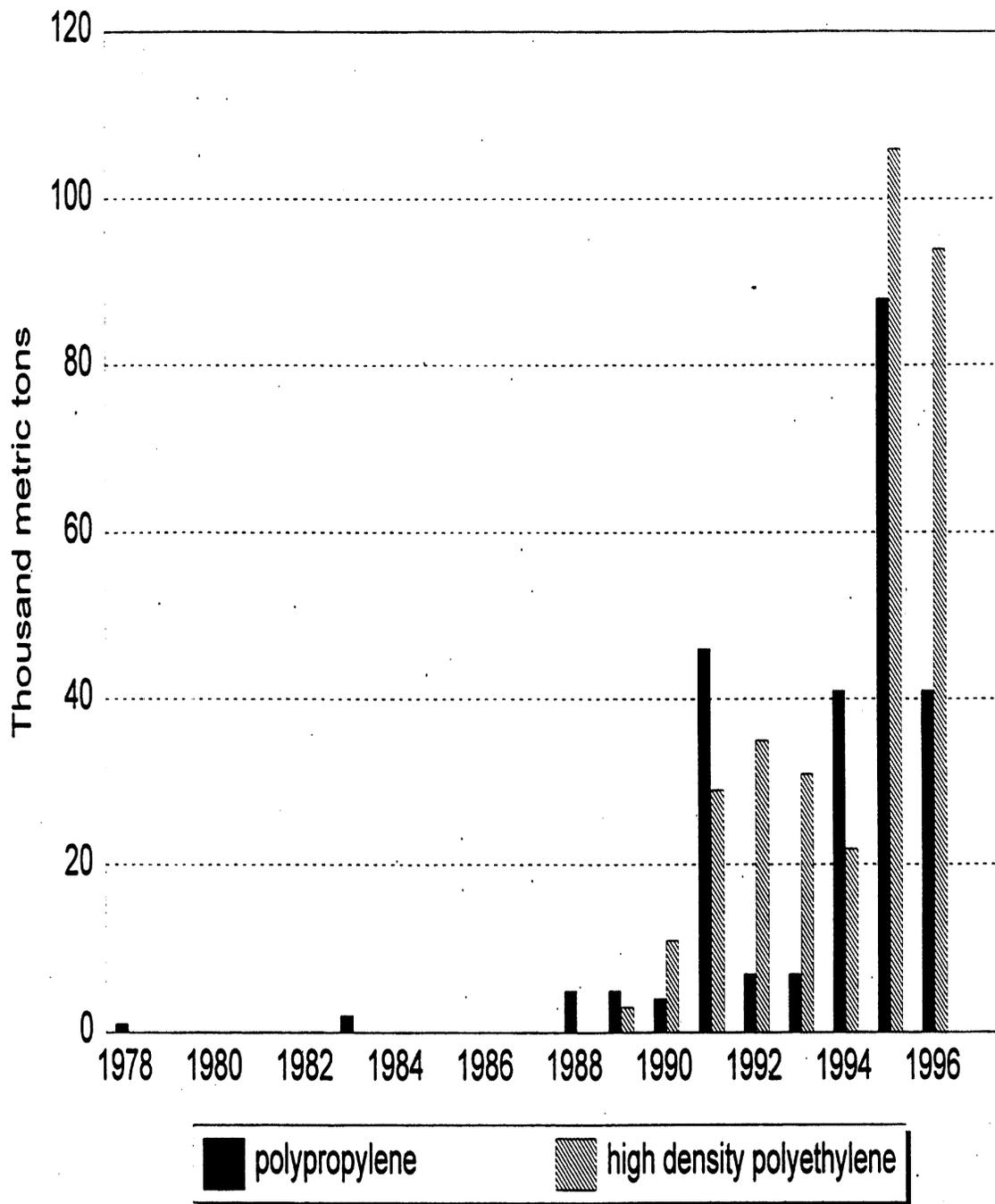
Source: Adapted from Parpinelli TECNON database.

Figure 5- Thai production, 1986-97



Source: Adapted from Parpinelli TECNON database.

Figure 6- Thai exports, 1978-97



Source: Adapted from Parpinelli TECNON database.

Government ownership

The state plays a major--though not exclusive--role in the production of petrochemicals in Thailand. One analyst reported, "Most investments have been under government sponsorship, but future activities are to include more private sector sponsorship and initiation."²⁵ Indeed, the largest players in the industry are essentially state-owned firms that either have moved upstream or downstream into petrochemical production.

- The state oil company, PTT, engages in petrochemicals via its National Petrochemical Corporation (NPC), Thai Olefins Co. (TOC), and Thai Aromatics (TAC) subsidiaries.²⁶ PTT's stake of NPC was initially 49 percent; today, PTT owns about 38 percent of NPC. Six firms that operate downstream facilities own the remainder,²⁷ including the State firm Siam Cement, which owns a 12 percent stake and is also a petrochemical producer via its Thai Polyethylene subsidiary. NPC's pricing for these downstream firms is cost-plus.²⁸
- TOC, which brought major new capacity online in 1995 and 1996, is 49 percent owned by PTT. TOC's pricing is reportedly based on U.S. Gulf Coast prices.²⁹
- TAC, which did not produce during the period, started out being 100 percent owned by PTT, but that share was to decline to 49 percent.

Thai Petrochemical Industry Co. (TPI), a producer of basic petrochemicals, is a privately owned, family-run, publicly-traded company that formerly served as Thailand's largest rice dealer.³⁰

²⁵ Ronald E. Hagen, *The ASEAN Petrochemical Industry: A Preliminary Survey*, East-West Center Working Paper, Energy and Minerals Series, No. 10, Dec. 1997, p. 22.

²⁶ Fereidun Fesharaki and Kang Wu, "Energy Policies in Asian-Pacific Developing Economies," *Asian-Pacific Economic Literature*, Vol. 6, No. 2, Nov. 1992, p. 33.

²⁷ Ronald E. Hagen, *The ASEAN Petrochemical Industry: A Preliminary Survey*, East-West Center Working Paper, Energy and Minerals Series, No. 10, Dec. 1997, p. 22.

²⁸ Ronald E. Hagen, *The ASEAN Petrochemical Industry: A Preliminary Survey*, East-West Center Working Paper, Energy and Minerals Series, No. 10, Dec. 1997, p. 23.

²⁹ Ronald E. Hagen, *The ASEAN Petrochemical Industry: A Preliminary Survey*, East-West Center Working Paper, Energy and Minerals Series, No. 10, Dec. 1997, p. 23.

³⁰ Jean-Francois Tremblay, "Thailand Aspires to be A Petrochemical Power," *Chemical Engineering News Record*, [date].

Government support

The government also provides less direct income support to the petrochemical industry.

- According to an official of Thailand's Ministry of Industry, policies "to protect and nurture the industry," such as restricting construction in order to assure the profitability of new entrants, were pursued at first.³¹
- More recently, entry into the industry had been promoted via the designation of the petrochemical industry as among six basic industries eligible for favored tax treatment by the Thai Board of Investment; investors in the sector are granted an 8-year corporate income tax exemption.³² Some joint ventures, particularly with Japanese firms, have been established.
- Yet, 100 percent foreign ownership is discouraged in favor of joint ventures with local partners, according to press reports.³³ Moreover, with the industry facing overcapacity and with very slim profit margins on polypropylene, only new entrants with ready markets and that are able to attain downstream output of 500,000 metric tons a year can hope to be viable, one analyst suggested.³⁴ In part due to concerns about overcapacity, in early 1997, the Thai government postponed NPC's plans to begin building a large new petrochemical complex,³⁵ the first of three new crackers expected to be built in Thailand within the next several years.³⁶ If realized, these projects are expected to quadruple Thailand's ethylene capacity.³⁷
- The government long controlled ex-refinery prices for domestic oil and oil products. These price controls were formally lifted for most products during 1991. Still, 1997 trade press reports indicated that the Thai government was considering lowering gas and electricity prices for petrochemical producers to help them control overhead costs.

Tariffs

- Thailand did not participate in the Chemical Tariff Harmonization Agreement, under which members agree to harmonize tariffs at relatively low levels and to reduce and eliminate certain NTBs affecting chemical trade.³⁸

³¹ Ibid.

³² WTO, *Trade Policy Review Mechanism: Thailand*, Report by the Secretariat, WT/TPR/S/9, p. 61.

³³ "ASEAN Interest High," *Chemical Week*, July 31, 1996, p. 38.

³⁴ Baldave Singh, "Petrochemical Overcapacity Looms," *Chemical Week*, Mar. 5, 1997, p. 37.

³⁵ "NPC3: Delayed but Not Canceled," *Chemical Week*, Mar. 5, 1997, p. 18.

³⁶ "Learning the Lessons of Overcapacity," *Chemical Week*, Mar. 19, 1997, p. 43.

³⁷ Anne K. Rhodes, "World Ethylene Capacity Jumped 5 million mt/y or 6.5 % in past year," *Oil and Gas Journal*, May 19, 1997, p. 50.

³⁸ Chemical Manufacturers Association, *Statement before the U.S. International Trade Commission regarding U.S. Interests in APEC Trade Liberalization*, Inv. 332-365, Apr. 10, 1996.

- The latest WTO Trade Policy Review of Thailand points out that just 8 percent of Thailand's tariff lines in the petrochemical sector are bound, making petrochemicals the sector with the fewest bindings.³⁹ Nevertheless, the World Bank estimates that in terms of value, more than half of Thailand's total chemicals imports benefit from tariff bindings as a result of the Uruguay Round, versus less than 3 percent prior to the Uruguay Round.⁴⁰
- Specific (rather than ad valorem) tariff rates are applied to petroleum products and in 1995, 87 percent of Thailand's plastics imports are subject to the higher of a given ad valorem and a specific rate.⁴¹
- Thailand began reducing tariffs on products of the chemicals or allied industries in 1993 and on mineral fuel and petrochemicals in 1995.⁴² However, because it was "regarded by the Government as unable to compete with imports," petrochemicals was among the sectors that was to have tariff rates reduced in two phases, with half of the planned decrease going into effect Jan. 1, 1995 and the other half to go into effect on Jan. 1, 1997.⁴³
- Later, some petrochemicals were temporarily exempted from the tariff liberalization scheduled to take effect on Jan. 1, 1997; tariffs still range from 30 to 60 percent.⁴⁴ Specifically, the proposed cut in polymer duties, from 30 percent to 20 percent, was delayed by one year. Duties on ethylene and propylene were reduced, as planned, from 12 to 5 percent; those on aromatics were cut from 30 percent to 20 percent. The Thai Board of Investment, which retains broad authority to impose emergency prohibitions,⁴⁵ reportedly weighed in in support of the postponement out of fear that the lower tariffs could harm local producers.⁴⁶

³⁹ WTO, *Trade Policy Review Mechanism: Thailand*, Report by the Secretariat, WT/TPR/S/9, p. 40.

⁴⁰ J. Michael Finger, Merlinda D. Ingco, and Ulrich Reincke, *The Uruguay Round: Statistics on Tariff Concessions Given and Received*, (Washington, DC: The World Bank, August 1996), p. 40.

⁴¹ WTO, *Trade Policy Review Mechanism: Thailand*, Report by the Secretariat, WT/TPR/S/9, p. 39.

⁴² IMF, *Thailand: Statistical Appendix*, IMF Staff Country Report 96/83, August 1996.

⁴³ WTO, *Trade Policy Review Mechanism: Thailand*, Report by the Secretariat, WT/TPR/S/9, p. 37.

⁴⁴ USTR, *1997 National Trade Estimate Report on Foreign Trade Barriers*, p. 361.

⁴⁵ "Thai Customs Guide," APEC CD-ROM 1995 Tariff Database. In addition, under certain circumstances, the Minister of Finance can issue notifications to raise or lower tariffs and the Ministry of Commerce may impose import surcharges.

⁴⁶ "Asian Locations Gain in Popularity," *Chemical Week*, Mar. 26, 1997, p. 46.

Other non-tariff barriers

- Conditional import prohibitions and import licensing requirements still apply to most of Thailand's imports,⁴⁷ including imports of petroleum and natural gas-related products, such as liquefied petroleum gas (LPG) and kerosene.⁴⁸

In addition to reviewing published sources of information on Thailand's barriers, we contacted a limited sample of a dozen U.S. chemical companies that export to Asia to discuss their experiences. Generally speaking, the two key issues identified were tariffs, which remain high but are applied equally to all suppliers,⁴⁹ and governmental sponsorship of local competitors, either through direct ownership or informal protection. This governmental support was seen as instrumental in underwriting and absorbing substantial additions to local capacity. Whether this came at the expense of imports is not clear. As table 5 indicates, the value of U.S. exports to Thailand have exhibited an erratic pattern over the period, but unit values tended to rise. However, when excess supply and unprofitably low prices prevailed in Asia generally, the result was a U.S. retreat from most basic petrochemical exports in favor of sales of specialty petrochemicals, U.S. firms reported.

Liberalization Steps

As the recent financial crisis in East Asia makes clear, such policies of government direction and protection may have had important costs for Thailand itself. Even before the crisis broke, the Thai authorities appeared to recognize the desirability of weaning the petrochemical industry from government protection. As noted above, the country's second major petrochemical facility was to price its output in line with U.S. Gulf Coast prices, indicating a *de facto* requirement to meet competitively set world prices. The government began to restructure the national petroleum authority to improve its competitiveness and increase its responsiveness to customers in such industries as plastics, which face growing competition from China and other suppliers. Liberalization plans were announced in mid-1995 that permit up and downstream integration by existing producers. Petrochemical companies are now permitted to produce or invest in any petrochemical product except aromatics, while upstream companies are permitted to invest in the production of feedstocks. Deregulation of the aromatics sector was also announced.⁵⁰ Investment restrictions were thus removed, as were investment incentives.⁵¹

These changes, as well as the more far-reaching ones associated with IMF-backed assistance, may go some way towards making the Thai market more open to foreign suppliers and more competitive generally. If so, the trends witnessed in this paper--of a close relationship between Thailand's internal prices and spot prices; lower, albeit still volatile prices; and a diminishing "price gap"--may well continue.

⁴⁷ WTO, *Trade Policy Review Mechanism: Thailand*, Report by the Secretariat, WT/TPR/S/9, p. 45.

⁴⁸ WTO, *Trade Policy Review Mechanism: Thailand*, Report by the Secretariat, WT/TPR/S/9, p. 32.

⁴⁹ Thailand did not provide preferential rates to ASEAN suppliers during the period under review as part of its commitments to attain an ASEAN Free Trade Area, according to data obtained from one of the companies.

⁵⁰ WTO, *Trade Policy Review Mechanism: Thailand*, Report by the Secretariat, WT/TPR/S/9, p. 37.

⁵¹ Jean-Francois Tremblay, "Thailand Aspires to be A Petrochemical Power," *Chemical Engineering News Record*, [date].

Table 5: U.S. Exports to Thailand of Selected Petrochemical Products, 1992-96

HTS No.	Description	1992	1993	1994	1995	1996
Value, in thousands of dollars						
3901.10	Polyethylene having a specific gravity of less than 0.94, in primary forms	2,171	1,755	3,008	3,878	5,525
3901.20	Polyethylene having a specific gravity of 0.94 or more, in primary forms	2,258	1,672	3,061	4,916	2,255
3902.10	Polypropylene, in primary forms	3,611	573	1,493	1,954	1,327
3903.11	Polystyrene, expandable, in primary forms	511	642	106	53	0
3903.19	Polystyrene, not elsewhere specified, in primary forms	368	1,179	306	2,934	263
Total, listed items		8,919	5,820	7,974	13,735	9,370
Unit value, in U.S. dollars per kilogram						
3901.10	Polyethylene having a specific gravity of less than 0.94, in primary forms	0.763	0.820	0.845	1.100	1.010
3901.20	Polyethylene having a specific gravity of 0.94 or more, in primary forms	0.545	0.609	0.736	1.012	0.914
3902.10	Polypropylene, in primary forms	0.578	0.600	0.775	1.169	1.085
3903.11	Polystyrene, expandable, in primary forms	0.838	0.836	0.798	0.923	n.a.
3903.19	Polystyrene, not elsewhere specified, in primary forms	0.864	0.742	1.444	2.487	4.095
Source: Compiled by the staff of the U.S. International Trade Commission from official statistics of the U.S. Department of Commerce.						

Comments by José Tavares de Arujo on

**China's Nontariff Trade Barriers by
Yu-Shi Mao**

and

**Barriers to Trade in Selected Sectors by ASEAN members: How Important are NTBs? By
David Ingersoll and Kim Frankena**

The presentations made by Prof. Yu-shi Mao and Dr. Ingersoll have highlighted the importance of measuring non-tariff trade barriers. But they also have shown us how difficult is to accomplish this task.

My comment will be focused on these difficulties. Normally, the assessments of trade barriers, protection costs and related subjects are based on the concept of market distortion. However, in order to use this analytical instrument, we have to accept a series of conventional assumptions, such as that we are dealing with an open market economy, running in a more or less stable macroeconomic environment, wherein most sectors are exposed to international competition, while some others are temporarily protected. If there are subsidies in that economy, they are targeted to some industries or activities, but not spread throughout the economy.

These assumptions – trade openness, macroeconomic stability and selective protection – are quite reasonable when we are dealing with the OECD countries, or some developing countries such as Chile, for instance. In these cases we can easily apply conventional instruments like the price gap method: the difference between domestic prices and the prices of imported goods give us a good estimate on the amount of existing market distortions. And then we may go ahead and calculate the rates of effective protection, welfare losses, and so on.

But most transition economies are marked by those peculiarities so well described by Prof. Yu-shi Mao: exchange rate appreciation; dual, triple or multiple exchange rates; state firms producing basic inputs with prices established through political criteria, etc. In this context, price gaps can be meaningless. Besides, those countries often provide very limited information on the existing protection mechanisms. This is not to deny the importance of price comparisons, but just to stress that some precautions are needed. In fact, the starting point of the discussion is always a price comparison. The only caveat is that in the case of transition economies – and, I must say, also in some developed economies like Japan – we need to add other variables, such as profit rates and productivity indexes.

To get reliable data on these variables can be even harder than estimating price gaps. But they provide some preliminary indication on how domestic prices are structured. In other words, with some general information on profit rates in the most important sectors of the economy, some aggregate data on productivity growth and a rough idea of the innovative efforts made by the leading firms in the country, we can get a broad view of the present conditions of competition in that economy. And then we will be better prepared to check the quality of our price gaps estimates.

Perhaps, instead of focusing our attention on prices gaps we should look at *profitability gaps* measured by international comparisons. Under this approach, we should try to explain the difference between domestic and international profits in some selected sectors, using the above mentioned indicators as explanatory variables.

Comments by Will Martin on

**China's Nontariff Barriers
by Professor Yu-shi Mao**

This paper contains a great deal of valuable information on China's trade regime, and its implications for China's trade. I understand that the paper was prepared under very tight time constraints, and it is very impressive given the time that was available for it. At times, the current draft leaves the policy messages a little unclear and it would be very useful to revise it so that the main messages become easier to understand.

The discussion of the planning system in the Introduction is very useful. I think it would be useful, however, to distinguish the problems arising under the pure planning system with those arising under partial reform. Under the pure planning system, pre 1978, my reading is that the tariff, and all other price-based measures, had only an accounting function. Since the dozen or so foreign trade corporations (FTCs) had monopoly control over their product lines, and the planners told them how much to import and export, the key problem was not of excessive price response to domestic-world price differentials. The problem was that, absent any system to reflect scarcity, the traders had no real idea of what mix of products should be traded, or how much. Only after reform began, and the trading companies were urged to respond to price incentives, did the distorted prices create the incentives for distorted trade that Professor Mao describes on page 2.

The large gross imports of oil and oil products do not fit my hypothesis, however, because they are covered by a state trading monopoly. Are there different types of oil-- heavy and light crude, for example-- that might justify some two-way trade?

The problems of ownership and control that Professor Mao describes on pages 2 and 3 seem to be persistent. They may be alleviated by the delegation of foreign trading rights to lower levels of government, and the increased competition between firms that arises now that there are many thousands of trading firms. In this situation, firms that engage in uneconomic trades face the risk of going out of business. However, reforming corporate governance seems a high priority problem.

On page 3, section IIA, the first paragraph seems to refer to the pre-reform situation, where the dozen trading firms were huge, unresponsive entities. The next paragraph refers to the post-reform situation, where there are thousands of state-owned FTCs and even more joint ventures with trading rights. Some thousands of state-owned industrial firms have direct trading rights-- but this does not mean they have their own trading firms; these industrial firms have the right to trade only their own products. The commitment to free trading rights within three years of entry into the WTO is extremely important, although the environment is currently quite competitive in terms of the number of firms active.

The listing of kinds of trade control on page 7 is very useful. One other measure that I would suggest including is the continuing monopoly State Trading in products such as grains, chemical fertilizers, oil and oil products. This form of trading has the same dismal results as were observed under the pre-reform trade regime. The wrong quantities of goods are imported-- the recent World Bank study on agricultural trade found that grain imports actually destabilize domestic grain prices. Further, because of their isolation from the needs of buyers and sellers, these traders trade the wrong mix of products-- the same World Bank study found that imports of potash fertilizers have consistently been too low. It also seems worth mentioning Designated Trading, which covers some important products like steel, and restricts trade to 50 odd firms, frequently with geographical limitations on trade that probably create

some degree of market power. China has committed to abolishing Designated Trading after WTO entry, but plans to retain state trading, which is GATT legal, albeit very costly for China's economy.

The key results on nontariff barriers are discussed very briefly on page 8. Readers of this paper need much more of the information from the underlying paper on *Measuring the Costs of Protection* if they are to evaluate the results. Even there, the details are sometimes a little sketchy on exactly what prices are being compared and how reliable they are. Professor Mao points out that the tariff collection rates in China are greatly below the applied rates. Does this mean that the nontariff barriers are understated? It seems worth mentioning another possible source of bias in the tariff equivalents that arises from the much lower level of wages in China. Since goods prices typically include some local services, price comparisons between high and low income countries typically understate the level of protection in low-income countries and overstate it in high income countries. This may contribute to explaining the surprisingly high estimates for the USA and Japan reported from the related Institute for International Economics studies.

The selection of highly protected commodities tends to raise the estimated tariff equivalent of protection. In the recent World Bank study *China Engaged*, we drew on the price estimates from Professor Mao's study, and some from the ICP project, and concluded that the average tariff equivalent of Nontariff Barriers was about 9 percent. Even this was sufficient to greatly increase the benefits from liberalization.

p10-11. The problem of artificial prices for planned goods is important. It's important to mention that the size of these distortions seems to have decreased in recent years. I understand that official prices for grains were frequently above market prices during the past year. However, while fixed official prices are retained, there will be the problems of gaps between market and plan prices, and consequent scope for corruption.

Comments by Agapi Somwaru on

Barriers to Trade in Selected Sectors by ASEAN Members: How important are NTBs? by David Ingersoll and Kim Frankena

This study attempts to identify and empirically assess the impact of trade barriers in the APEC region other than tariff barriers and quantitative restrictions. As the authors clearly state in the paper, the objectives of the paper are:

- a) to identify any barriers to trade and investment in particular sectors in the ASEAN region, and
- b) to quantify No Tariff Barriers (NTBs).

Although the task seems rather simple and straight forward, only one who has dealt with a subject of this manner can understand the authors' brave decision to tackle such a complex topic. Given the vast number of sectors, the various commodity and trade classification systems, the vast number of industry definitions followed by the various countries, the variety of the measuring units used for the same commodity globally, any attempt to dwell upon the forms of NTBs on ASEAN countries it is truly a courageous effort. In general, the paper meets its primary objective, that is, identifies the various NTBs, it serves as a screening device and it sets the foundation for further investigation.

However, although the authors undertook this great effort, which is of particular importance for modeling activities, they failed to associate the NTBs in the selected ASEAN countries with the size of trade volume involved. The paper on Table 1 and 2 provides aggregated and detailed lists of NTBs in selected ASEAN countries by industry, respectively; however, trade volumes affected by these trade barriers are not reported. Consequently, the evaluation of the magnitude of these NTBs is not easily assessed or thoroughly addressed and furthermore their effects on trade, as trade distortion instruments, is difficult to be evaluated. The importance of the imposition of NTBs on trade depends upon the size of trade volume that affect. If the trade barriers reported affect large volumes of trade, then the NTBs have significant effects and, consequently, greatly distort trade. Thus, the NTBs are important to be further studied and analyzed. Otherwise, if imported commodities in these selected ASEAN countries are facing numerous NTBs but the size of trade volume involved is small, then the consequences of the imposition of NTBs is rather minimal. The list of the number of NTBs for all sectors, by country or by groups of countries that the authors provide in the paper, is rather misleading if the NTBs are not associated with the volume of the tradable goods that are affected by the NTBs.

After the Uruguay Round, many efforts were undertaken to quantitatively evaluate the NTBs. The authors selected the price gap method as an approach to quantify the NTBs. Although this method is not the most suitable, it has its merits due to lack of other more theoretically sound procedures. Furthermore, an incorporation of a review of the methods used in various literary works for quantifying NTBs by the authors, would have been very meaningful and helpful to the reader.

An essential literature review section is also missing from the paper. The section on *Review of Selected Studies* is not sufficient to serve as literature review section. The section is rather misleading and confusing section of the paper, since the focus of the paper is on ASEAN countries. The three Selected Studies are in close geographically proximity to the ASEAN countries but have vast differences in economic and trade activities.

Given that the authors labeled their paper as a draft, I am hoping that the final version will contain a strong summary and conclusion. The paper in its final form should also make distinctions between the domestic *producer* and *consumer* prices (on Table 3), and provide, if possible, insights on the trade that is involved with the NTBs.

SESSION V

BUSINESS NETWORKS

Ethnic Chinese Networks In International Trade

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September 1997

Ethnic Chinese networks, as proxied by ethnic Chinese population shares, are found to have a positive effect on bilateral international trade, especially in differentiated products. Evidence is presented indicating that this effect is unlikely to be attributable to any cross-country taste similarity created by ethnic Chinese populations. Ethnic Chinese networks are estimated to increase differentiated product trade for the typical APEC country pair by 30.2 percent in 1990. Some tentative welfare conclusions and even more tentative policy recommendations are also presented.

*Rauch is also affiliated with the NBER. Financial support was provided by NSF grant #SBR-9709237.

I. Introduction

The economic boom in Southeast Asia has called attention to the role of ethnic Chinese networks in international trade and investment (see, e.g., Redding 1995). Studies show that not only the Overseas Chinese but also many other ethnic groups living outside their countries of origin create formal or informal “societies” to which coethnic businesspeople from both the host countries and the mother country have access. Kotkin (1992) states that “Chinese entrepreneurs remain, in essence, arbitrageurs, their widespread dispersion a critical means of identifying prime business opportunities” (p. 169) and “most of Hong Kong’s Indian businesses--from the tiny two-man operation to the giant conglomerate--fit the classical mold, with extended families providing the linkages between various national markets” (p. 219).¹

The operation and economic importance of coethnic societies has been especially well documented for the special case of trade between countries hosting recent immigrants and these immigrants’ countries of origin. Gould (1994) finds that immigration to the United States increases U. S. bilateral trade with the immigrants’ countries of origin and that this “immigrant-link effect” is stronger for U. S. exports than for U.S. imports, indicating that the effect works primarily through the establishment of business contacts rather than through increased U. S. preferences for goods produced in the country of origin. Chin, Yoon , and Smith (1996, p. 498) give an example of how these business contacts worked to promote Korean wig exports to the United States:²

Korean wig importers’ contribution to the Korean wig import business was far greater than their numbers. From these immigrant wig importers, South Korea wig manufacturers could obtain information on new styles and market trends. Since they were not able to develop new styles of their own (prominent U.S. hair designers continuously developed innovative styles), South Korean wig manufacturers had to depend entirely on Korean immigrant wig importers for information on trends in U.S. wig fashion.

The empirical success of Overseas Chinese networks highlights the shortcoming of the assumption of perfect information embedded in the standard approach to trade in differentiated products (e.g., Helpman and Krugman 1985). It is reasonable to imagine that within a country buyers are informed at nominal cost of all available varieties and their characteristics, and sellers are well aware of how to reach the buyers that form their particular market niches. We argue that these presumptions are much less plausible for the international market, where buying agents for consumer goods distributors and firms seeking inputs to production processes incur considerable costs in discovering the foreign varieties available and their characteristics, as well as the capabilities of the suppliers of these varieties, and sellers incur considerable costs in finding buying agents or intermediate goods demanders that are good matches for the variety they have to offer. As Swedish Trade Council export consultant Kent Goldmann (quoted in Nothdurft 1992, p. 32) stated of his clients that are marginal or failed exporters, “Sometimes their product isn’t right for the market, or the country they chose was not a good fit, or their approach or agents are not right.”

¹ Rauch (1996b) studies a formal society of English-speaking Caribbean-American businesspeople. Unfortunately, the reasons why some ethnic groups form successful societies and others do not are still a mystery.

² Wigs were one of the major items in Korea’s initial drive to break into world markets for manufactures in the 1960s and early 1970s. They were her third largest export item in 1970, accounting for 11.2 percent of *total* exports.

Preferential group ties operating across markets are effective exactly because they overcome these information problems.

In order to distinguish this hypothesis about why coethnic networks matter for trade from other hypotheses, we build on the empirical framework developed in Rauch (1996a). He looks for evidence that variables indicative of the presence of networks should have more impact on bilateral trade in differentiated products than in homogeneous products, since the information problems discussed above should be more important for the former group of commodities. In the next section, we repeat, for the convenience of the reader, the rationale given in Rauch (1996a) for dividing commodities into three (rather than two) groups. In section III we present evidence using a gravity model regarding the impact of overseas Chinese networks on international trade. Section IV presents a tentative welfare analysis of our findings, and section V presents even more tentative policy recommendations. Conclusions and suggestions for further research are presented in section VI.

II. Organized Exchanges, Reference Prices, or Neither

In the empirical work below we will divide internationally traded commodities into three groups: those traded on organized exchanges, those not traded on organized exchanges but nevertheless possessing what we shall call “reference prices”, and all other commodities. In this section we will give the theoretical motivation for this tripartite division.

Let us first consider why some commodities are traded on organized exchanges and others are not. The conventional wisdom is that there is a cost to setting up “markets” (organized exchanges) that is independent of the volume of transactions, and that this non-convexity will not allow a market to open if the expected volume of transactions at the price expected to prevail in equilibrium is too small.³ For the sake of concreteness, let us attempt to apply this conventional wisdom to two commodities at the three-digit level of the Standard International Trade Classification (SITC), which is the least disaggregated level for which we will attempt to categorize commodities in the empirical work below. The two commodities are Footwear (SITC 851) and Lead (SITC 685, not to be confused with Lead Ores and Concentrates, SITC 2874). Suppose we use the dollar values of international trade in 1990 between the 63 countries in the sample of Rauch (1996a) to indicate the “thickness” of the markets in these commodities, admitting that this is a bad proxy because it excludes domestic trade and does not account for the average size of transactions. The figures are \$27.3 billion for Footwear and \$1.3 billion for Lead, of which nearly 90 percent is Lead and Lead Alloys, Unwrought (SITC 6851) as opposed to Lead and Lead Alloys, Worked (SITC 6852). Unwrought lead is traded on the London Metal Exchange while footwear is not listed on any organized exchange. This information appears to contradict the conventional wisdom on formation of organized exchanges. However, one could argue that “footwear” is not a well-defined commodity and needs to be disaggregated into various types of shoes, each one of which may have a volume of transactions smaller than that of lead. As we know, in the limit this process of disaggregation leads to shoes for which there is only one supplier: shoes are “branded” or differentiated products.

³ Much to our surprise, we could not find a formalization of this “conventional wisdom” in the literature. The closest we found is Heller (1993). Market formation involves set-up costs in his model, but his focus is on coordination failure where it is mutually profitable to open markets in complementary commodities but not to open one of them individually.

Without necessarily endorsing this argument, let us explore it further by contrasting Footwear with Polymerization and Copolymerization Products (SITC 583). 1990 international trade in these chemicals for the 63 countries in Rauch (1996a) amounted to \$47.6 billion. Like Footwear, they are not listed on any organized exchange, perhaps because they can be disaggregated into types for each of which the market is too “thin”. Does this mean that Polymerization and Copolymerization Products should be treated in the same way as Footwear in the empirical analysis below?

The answer is no. Polymerization and Copolymerization Products are not “branded”: prices can be quoted for these products without mentioning the name of the manufacturer, and these “reference prices” are found to be sufficiently useful by industry actors to be worth quoting in trade publications. For example, a price per pound of Polyoxyethylene Sorbitan Monostearate is quoted weekly in *Chemical Marketing Reporter* on the basis of surveys of suppliers. Abstracting from transportation costs, it is then possible for traders to assess the profitability of shipping polymerization and copolymerization products between any two countries solely on the basis of the prices prevailing at the ports of those two countries. One or more traders specialized in a given one of these chemicals can keep informed of its prices around the globe and perform international commodity arbitrage, matching distant buyers and sellers just as would traders on an organized exchange. As far as empirical analysis of matching international buyers and sellers is concerned, then, the reason to treat commodities traded on organized exchanges differently from commodities that only have reference prices is that we know the former have specialized traders that centralize price information while the same is only potentially true for the latter.

Shoes, on the other hand, do not have reference prices. Any observed price at another location must be adjusted for multidimensional differences in characteristics, and the adjustment depends on the varieties of shoes available at that location and the distribution of consumer preferences over varieties at that location. We claim that these informational demands are too great to permit international commodity arbitrage,⁴ and therefore traders will instead engage in a sequential search for buyers/sellers that terminates when some “reservation match” is achieved. This search is facilitated by contacts who “know the market”. In this paper we are particularly interested in the impact on trade of ethnic Chinese traders’ networks of coethnic contacts.

For the purposes of the empirical work below, we can summarize the discussion of this section as follows. Possession of a reference price distinguishes homogeneous from differentiated products. Homogeneous commodities can be further divided into those whose reference prices are quoted on organized exchanges and those whose reference prices are quoted only in trade publications. The network/search model should apply most strongly to differentiated products and most weakly to products traded on organized exchanges, with its applicability to other homogeneous products unclear. Thus Overseas Chinese networks should have the greatest effects on matching international buyers and sellers of differentiated products. This hypothesis will be examined in the next section.

⁴ Here we find it helpful to have in mind Hahn’s (1971) definition of markets as activities that transform “named” goods into “anonymous” goods. One could argue that the “anonymity” provided by the price system is what makes international commodity arbitrage possible. It is not possible for “branded” (named) commodities because they have not been transformed into anonymous commodities by “markets” (organized exchanges) or by other means.

II. Evidence From a Gravity Model of Trade

A. The Gravity Model

The standard (indeed, the only) empirical framework used to predict how countries match up in international trade is the gravity model. This model takes its name from the prediction that the volume of trade between two countries will be directly proportional to the product of their economic masses (as measured by GDP or GNP) and inversely proportional to the distance between them. As Harrigan (1994) and others have pointed out, at least two different theoretical foundations can be given for gravity models of trade: the monopolistic competition model and what Harrigan calls the Armington–Heckscher–Ohlin–Vanek model. The careful empirical work of Hummels and Levinsohn (1995) led them to conclude (p. 828) “that something other than monopolistic competition may be responsible for the empirical success of the gravity model,” but the Armington-Heckscher-Ohlin-Vanek model is not strongly indicated as an alternative.

Rather than discuss its possible microeconomic foundations, we would instead like to note that the gravity equation can be derived from the assumption that every country consumes its own output and that of every other country in proportion to its share of world demand. This leads immediately to the equation

$$V_{ij} = s_i GDP_j + s_j GDP_i, \quad (1)$$

where we have used the notation from Helpman (1987): $V_{ij} \equiv$ bilateral volume of trade between country i and country j and $s_n \equiv$ share of country n in world spending. Since under balanced trade $s_n = GDP_n / \overline{GDP}$, where $\overline{GDP} \equiv$ world gross domestic product, then assuming balanced trade yields

$$V_{ij} = 2GDP_i GDP_j / \overline{GDP}. \quad (2)$$

This is the basic gravity relationship, minus the inverse dependence of trade on distance. We would argue that it is most useful to view this relationship as a basic “null” or starting point for further analysis of trade rather than as something that itself needs to be explained.⁵ In other words, it will often be useful for “positive” theoretical and empirical work on trade to focus on explaining deviations from this relationship, just as normative work takes autarky as its starting point and measures gains from trade relative to autarky.

In the empirical work below we will estimate the gravity model separately for each of the three commodity groups distinguished in the previous section. Following the same reasoning that led to equation (1), we write

$$V_{ijk} = s_i w_{jk} GDP_j + s_j w_{ik} GDP_i, \quad (3)$$

⁵ Deardorff (1995, p. 9) states, “any plausible model of trade would yield something very like the gravity equation, whose empirical success is therefore not evidence of anything, but just a fact of life.”

where w_{nk} is the commodity k share of country n output. Substituting for s_n as before yields

$$V_{ijk} = (w_{ik} + w_{jk})GDP_iGDP_j/\overline{GDP}. \quad (4)$$

If w_{nk} varies across n , due for example to comparative advantage, then $w_{ik} + w_{jk}$ is not constant for a given k . In the final gravity model specifications below we will assume that $w_{ik} + w_{jk}$ is absorbed into a multiplicative error term.

Following the usual gravity specification, we assume that factors that aid or resist trade cause deviations from (4) multiplicatively. In addition to distance, we shall include the other factors aiding or resisting trade that were used by Frankel and co-authors in a series of papers on trading blocs (e.g., Frankel, Stein, and Wei 1993). Per capita income has become a standard covariate in gravity models (for example, it is used in the paper by Eaton and Tamura (1994) cited below), and Frankel et al. included the product of per capita GNPs. (They also used GNPs rather than the GDPs that appear in equations (1) - (4)). They added a dummy variable indicating when two countries are adjacent, which is important since the distance between Chicago and Mexico City, say, is a much less complete measure of the physical separation between the United States and Mexico than is the distance between Chicago and London of the physical separation between the United States and the United Kingdom. They included a dummy variable indicating the presence of a colonial tie or common language between two countries. Finally, they added dummy variables indicating membership in two preferential trading blocs, the European Community (EEC) and the European Free Trade Association (EFTA).

To indicate the presence of ethnic Chinese networks, we add a variable equal to the product of the two countries' ethnic Chinese population shares. Note that this variable takes on the value zero if either country has a zero ethnic Chinese population share, and it is maximized for a given total ethnic Chinese population share when the two countries have equal shares. In future research we plan to experiment with other functional forms for this variable.

We were concerned that, if countries with similar tastes tend to trade more with each other (as has been argued by Linder (1961), for example), one could interpret a finding of a positive effect of the ethnic Chinese variable on bilateral trade as indicating that the variable was a proxy for taste similarity rather than networks. We attempt to partially address this concern by splitting the dummy variable for colonial ties/common language used by Frankel et. al into separate dummy variables for colonial ties and common language. The idea is that common Chinese ancestry should have effects on taste similarity roughly equal to those of common language (recall that most emigration from China occurred before World War I), so that if the ethnic Chinese variable has a clearly greater impact on bilateral trade than the common language variable we can discount the taste similarity explanation somewhat.

We can now write our gravity model as follows:

$$\begin{aligned}
V_{ijk} = & \alpha_k(GNP_i GNP_j)^{\beta_k} (PGNP_i PGNP_j)^{\gamma_k} DISTANCE^{\delta_k} \\
& \times \exp(\epsilon_k ADJACENT + \zeta_k LINKS + \eta_k EEC + \theta_k EFTA \\
& + \lambda_k CHINPOP + \phi_k LANGUAGE + u_{ijk}), \quad k=1,2,3,
\end{aligned} \tag{5}$$

where $k = 1$ denotes organized exchange commodities, $k = 2$ denotes reference priced commodities, and $k = 3$ denotes differentiated commodities, and $PGNP$ denotes per capita GNP, $DISTANCE$ equals the great circle distance between the principal cities of countries i and j , $ADJACENT$ takes the value of one if countries i and j share a land border and zero otherwise, $LINKS$ takes the value of one if countries i and j share a colonial tie and zero otherwise, EEC and $EFTA$ equal one if countries i and j are members of the European Community and European Free Trade Association, respectively, and zero otherwise, $CHINPOP$ equals the product of the ethnic Chinese population shares for countries i and j , $LANGUAGE$ takes the value of one if countries i and j share a language and zero otherwise, and u_{ijk} is a Gaussian white noise error term associated with the dependent variable V_{ijk} .⁶

The dependent variable V_{ijk} is bounded below by zero, and some observations achieve this bound. Following Eaton and Tamura (1994), we estimate a modified gravity model in which the right-hand side of equation (5) must achieve a minimum threshold value a_k before strictly positive values of V_{ijk} occur. In the iceberg transportation cost metaphor, we might think of $-a_k$ as an amount of “melting” that occurs as soon as the trip starts independent of the distance traveled. The gravity model to be estimated in subsection C below is then

$$\begin{aligned}
V_{ijk} = & \max[-a_k + \alpha_k(GNP_i GNP_j)^{\beta_k} (PGNP_i PGNP_j)^{\gamma_k} DISTANCE^{\delta_k} \\
& \times \exp(\epsilon_k ADJACENT + \zeta_k LINKS + \eta_k EEC + \theta_k EFTA \\
& + \lambda_k CHINPOP + \phi_k LANGUAGE + u_{ijk}), 0], \quad k=1,2,3.
\end{aligned} \tag{6}$$

Rearranging and taking natural logarithms of both sides yields

$$\begin{aligned}
\ln(a_k + V_{ijk}) = & \max[\ln\alpha_k + \beta_k \ln(GNP_i GNP_j) + \gamma_k \ln(PGNP_i PGNP_j) + \delta_k \ln DISTANCE \\
& + \epsilon_k ADJACENT + \zeta_k LINKS + \eta_k EEC + \theta_k EFTA \\
& + \lambda_k CHINPOP + \phi_k LANGUAGE + u_{ijk}, \ln a_k], \quad k=1,2,3.
\end{aligned} \tag{7}$$

Equations (7) will be estimated by maximum likelihood, where the likelihood function is constructed using what we call a threshold Tobit model. The details of the estimation procedure are given in Eaton and Tamura (1994, pp. 490-492).

Following Deardorff (1995) and Wei (1996), we also estimate a second gravity model in which a variable for the geographical remoteness of the trading partners from the rest of the world has been added.

⁶ The reader might note that it is possible to rewrite equation (5), replacing the product of per capita GNPs with the product of populations, in which case the coefficient on the product of GNPs would equal $\beta_k + \gamma_k$ and the coefficient on the product of populations would equal $-\gamma_k$.

Their argument is that, all else equal, two countries that are very far away from most other large potential trading partners (such as Australia and New Zealand) will trade more with each other than two countries that are close to most other large potential trading partners (such as Denmark and Portugal). The variable *REMOTE* equals the product of the weighted sum of country *i*'s distances from all other countries in the sample and the same weighted sum for country *j*, where the weights are the GNPs of the other countries. Thus we also estimate:

$$\begin{aligned} \ln(a_k + V_{ijk}) = & \max[\ln\alpha_k + \beta_k \ln(GNP_i GNP_j) + \gamma_k \ln(PGNP_i PGNP_j) + \delta_k \ln DISTANCE \\ & + \epsilon_k ADJACENT + \zeta_k LINKS + \eta_k EEC + \theta_k EFTA \\ & + \lambda_k CHINPOP + \phi_k LANGUAGE + \psi_k \ln REMOTE + u_{ijk}, \ln a_k], \quad k=1,2,3. \end{aligned} \quad (8)$$

In light of the theory presented so far, we expect the following relationships to hold among the coefficients of interest: λ_3 should be positive, significant, and greater than ϕ_3 , and $\lambda_3 > \lambda_2 > \lambda_1$. The effects of *CHINPOP* for reference priced commodities are expected to be intermediate because, with regard to matching international buyers and sellers, their homogeneity makes them like organized exchange commodities but their lack of organized exchanges makes them like differentiated commodities.

B. Data

The sample of countries used in the estimation below is listed in Table 1. They are the same 63 countries that were chosen by Frankel and his co-authors. This allows us to use their data for GNP and per capita GNP (in current dollars), great circle distance between principal cities, and dummies for adjacency, European Community membership (see Table 3), and European Free Trade Area membership. A colonial ties dummy variable was constructed on the basis of articles in the *Encyclopedia Britannica*. A common language dummy variable was constructed by assigning countries to language groups on the basis of *Ethnologue* (Grimes 1984).⁷ Data on ethnic Chinese population circa 1980 was collected from Poston and Yu (1990). The same data circa 1990 was collected from the *Overseas Chinese Economy Yearbook 1990* (1991). Table 1 lists the number of ethnic Chinese (column CHIN) and the overall population (column POP) for 1980 and 1990 for all countries in our sample for which this data is available.

Unlike Frankel et al., we use the World Trade Database of Statistics Canada as our source for bilateral trade. The World Trade Database is derived from United Nations COMTRADE data. Its advantages are (1) it is much cheaper, especially important given that data at the 4-digit SITC level are being used, and (2) special care was taken to insure that trading partners were correctly identified (as opposed to listing an entrepôt as the trading partner), mainly by making careful efforts to insure that exports of country *i* to country *j* of commodity *k* equal imports of country *j* from country *i* of commodity *k*.

As discussed in the previous section, commodities are classified into three categories: organized exchange, reference priced, and differentiated, at the three- and four-digit SITC level. Trade reported at a

⁷ Two countries were considered to belong to the same language group if at least ten percent of the population of each country speaks that language at home. While colonial ties and common language often went together, in many cases this was not true. For example, Belgium and France share a common language, but not a colonial tie; Kenya and the UK share a colonial tie, but not a common language. See Table 2.

less disaggregated level was omitted. Fortunately, this accounted for only 0.1 percent of the total value of trade in our sample in each of the two years. Commodities were classified in the following manner. All commodities at the five-digit SITC level were classified by looking them up in *International Commodity Markets Handbook* and *The Knight-Ridder CRB Commodity Yearbook* (to check for organized exchanges) and *Commodity Prices* (to check for reference prices, e.g., price quotations published in trade journals such as *Chemical Marketing Reporter*). Classification of the next higher level of aggregation was then done according to which of the three categories accounted for the largest share (almost always more than half) of the value of its world trade. Since the World Trade Database does not report world trade by five-digit SITC, the sum of 1980 U.S. General Imports and Exports from the U.S. Department of Commerce was used for this purpose. Because ambiguities arose that were sometimes sufficiently important to affect the classification at the three- or four-digit level, both “conservative” and “liberal” classifications were made, with the former minimizing the number of three- and four-digit commodities that are classified as either organized exchange or reference priced and the latter maximizing those numbers. An appendix listing all of the commodities used in the estimation below and their conservative and liberal classifications is available on request.

C. Results of Estimation

Tables 4 - 5 give estimates of equations (7), the first gravity model above, for 1980 and 1990, respectively. It should be noted that no attempt was made to adjust for changes in classification of commodities by the three categories that may have occurred during the period 1980 - 1990. Ethnic Chinese population data are not available for six countries in 1980 and five countries in 1990, reducing the maximum number of observations from $(63)(62)/2 = 1953$ to $(57)(56)/2 = 1596$ and $(58)(57)/2 = 1653$, respectively.

First, we note that the coefficient on *CHINPOP* is positive and highly significant for differentiated products for both years and for both the conservative and liberal aggregations. Second, we note that the coefficient on *LANGUAGE* is not statistically significant for differentiated products in any year and in any aggregation.⁸ It thus appears that ethnic Chinese networks cause an increase in bilateral trade in differentiated products, and that it is unlikely that this effect is simply due to any cross-country similarity in tastes that ethnic Chinese populations might create. Third, we note that the coefficient on *CHINPOP* is largest for differentiated products and smallest for organized exchange products except for the conservative aggregation in 1980, when the coefficient on *CHINPOP* is smallest for reference priced products. However, in a pooled estimation we would probably find that within any year and aggregation we could not reject the hypothesis that these three coefficients are equal.

It is interesting that, comparing any column in Table 4 (for 1980) to the corresponding column in Table 5 (for 1990), the coefficients on *DISTANCE*, *LINKS*, and *CHINPOP* are all smaller in the latter table. This indicates that with global transportation and communication improving, proximity, colonial ties, and coethnic information networks are all diminishing in importance.

⁸ This result is unchanged if we set *LANGUAGE* = 0 for country pairs involving Israel and Arabic-speaking countries.

Tables 6 - 7 give estimates of equations (8), the second gravity model above, for 1980 and 1990, respectively. In 1990, the addition of the variable *REMOTE* causes *CHINPOP* to become insignificant for products traded on organized exchanges. It retains significance (at the one percent level) for reference priced products and differentiated products. These results support even more strongly than do the results of Tables 4 - 5 our contention that the positive effect of ethnic Chinese networks on bilateral trade is due to their ability to overcome informational barriers to trade in differentiated products.

What is the quantitative importance of the ethnic Chinese network effect on bilateral trade? It seems appropriate to evaluate this for APEC. The mean value of *CHINPOP* for APEC country pairs is roughly 0.07, compared to 0.0001 for all other country pairs in the sample. Using this value in conjunction with the smallest estimate for differentiated products of the coefficient on *CHINPOP* (3.77, for the second gravity model in 1990) yields the estimate that ethnic Chinese networks increase differentiated product trade for the typical APEC country pair by 30.2 percent.

We were concerned that our results for *CHINPOP* might be driven by trade among China, Hong Kong, and Taiwan, the three country pairs in our sample with the highest values of *CHINPOP*. This concern was heightened by the possibility that in constructing our trade data Statistics Canada may not have completely allocated to its ultimate origins and destinations the entrepôt trade between Hong Kong and China. We therefore reestimated our gravity models omitting these three country pairs. Far from making the coefficients on *CHINPOP* insignificant, however, this omission actually caused them to grow larger.

IV. Tentative welfare analysis

To our knowledge Casella and Rauch (1997) have developed the only general equilibrium model of the effects of information networks on international trade in differentiated products. It is somewhat risky to apply their conclusions here, however, since there are only two countries in their model and hence they cannot allow for the possibility that, for example, strong network connections between two countries might not only create trade between them but also divert trade that might have occurred between them and other countries. (Indeed, our empirical model needs to be extended to allow for this possibility as well.) The reader should bear this caveat in mind for the remainder of this section.

The results of Casella and Rauch confirm that for both countries an international information-sharing network raises the ratio of trade to GDP, increases (expected) GDP, and makes traders who are part of the network better off on average. Surprisingly, they also find that traders who are not part of the network are not merely unaffected by its presence but are actually worse off on average. The intuition for this result is as follows. Consider two countries that are similar in the sense that a product that sells well domestically (has a large domestic market niche) also sells well internationally. A coethnic trader with a product that is well positioned in his domestic market prefers to trade internationally in an information-rich environment that ensures that he will meet with an appropriate, high-volume distributor. In other words, he will choose to rely on the coethnic network. On the other hand, a coethnic trader with a product that is poorly positioned in his domestic market will avoid the network in the hope of luckily meeting with a distributor with better market access than he deserves whom he can convince to take his product on. Now consider two countries that are dissimilar in the sense that how well a product sells domestically has no predictive power for how well it sells internationally. In this case every trader has an identical international market niche in expectation. Nevertheless, a trader with a favorable domestic market niche has more

negotiating strength in the sense that he has less to lose by simply walking away from an international deal and selling only in his domestic market. A coethnic trader with a product that is well positioned in his domestic market may choose to avoid his international network because it gives his trading partners too many other options and thereby dilutes his bargaining power.⁹ We can summarize with the statement that when countries are similar coethnic traders with the most favorable international market niches rely on their network, while when countries are dissimilar coethnic traders with low bargaining power rely on their network. This self-selection of the more desirable trading partners into the network causes traders without access to the network to lose.

In the present context the results of Casella and Rauch (1997) suggest the following tentative welfare conclusions. (1) Ethnic Chinese networks raise world GDP by overcoming informational barriers to trade. (2) The ethnic Chinese traders themselves capture (more than) all of the increase in world GDP. (3) Other traders are made slightly worse off on average by the existence of ethnic Chinese networks because the ethnic Chinese traders they may meet have been negatively selected.

V. Very tentative suggestions for policy

As long as you have the option whether or not to rely on your network, having access to it can only make you better off.¹⁰ It follows that if governments can improve the access of their citizens to existing international information-sharing networks they should do so if the costs are not too high. It would probably also be beneficial for governments to create parallel networks that can substitute for coethnic ones, though this is less obvious.

What follows is a very tentative list of policy suggestions. It should be emphasized that these suggestions are not mutually exclusive.

The book *Overseas Chinese Business Networks in Asia* (1995) concludes with a number of suggestions for how non-ethnic Chinese businesspeople can take greater advantage of ethnic Chinese networks. Basically these suggestions concern how to make domestic ethnic Chinese more accessible as business partners in international ventures. Lest there be any misunderstanding, we should note that most studies show that ethnic Chinese are quite willing to include non-ethnic Chinese business partners in their network once they get to know them.

Business networks need not have a coethnic basis, of course. Business associations such as Chambers of Commerce are a form of information-sharing network. Governments can help such associations establish or deepen their international presence. Lim (1996) notes that the government of Singapore has been especially aggressive in this regard. She also makes the point that national business associations suffer from a disadvantage (relative to regional associations, say), because by definition they exclude businesses of other nationalities, including those of the host location.

⁹ It has been stated of the overseas Chinese in Asia (Ziesemer 1996, p. 29), "Every key individual among them knows every other key figure."

¹⁰ This is not true if other traders can recognize that you are part of a network and choose to discriminate against you on that basis. In this case traders who would prefer not to rely on their network for the reasons given in the previous section no longer have that option. See Casella and Rauch (1997), section VII.A.

Finally, governments can establish or improve the functioning of their own international information-sharing networks, i.e., trade promotion organizations. The Hong Kong Trade Development Council is widely regarded as one of the most successful examples of such organizations. According to Keesing (1988, p. 20), “HKTDC sees its central task as ‘matchmaking’ between foreign buyers and Hong Kong firms wishing to export.”

VI. Conclusions and suggestions for future research

We have found that ethnic Chinese networks, as proxied by ethnic Chinese population shares, have a positive effect on bilateral international trade, especially in differentiated products. We presented evidence indicating that this effect is unlikely to be attributable to any cross-country taste similarity created by ethnic Chinese populations. Ethnic Chinese networks are estimated to increase differentiated product trade for the typical APEC country pair by 30.2 percent in 1990. We also presented some tentative welfare conclusions and even more tentative policy recommendations.

In the short term we plan to improve our estimation of the effects of overseas Chinese networks on bilateral trade by allowing for the network effect to exhibit diminishing returns as the ethnic Chinese population shares increase. Note that the smallest estimate for differentiated products of the coefficient on *CHINPOP* implies that two countries with 100 percent ethnic Chinese population will trade 43.4 times as much ($e^{3.77} = 43.4$) with each other as two countries with zero percent ethnic Chinese population. Also, we pointed out above that omission from our sample of the three country pairs with the highest value of *CHINPOP* increased the estimated coefficients on *CHINPOP*. Both of these facts indicate the need to allow for the marginal effect of *CHINPOP* to diminish with its size.

In the longer term we need to improve the theoretical basis for both our empirical specification and our welfare conclusions. The most immediate step would be to extend the model of Casella and Rauch (1997) from two to many countries. Less immediately, we need to think about the issue of formation of business networks on a non-coethnic basis, in order to have a firmer foundation for policy recommendations.

References

- Casella, Alessandra, and James E. Rauch. 1997. "Anonymous Market and Group Ties in International Trade." National Bureau of Economic Research Working Paper, forthcoming.
- Chin, Ku-Sup, In-Jin Yoon, and David A. Smith. 1996. "Immigrant Small Business and International Economic Linkage: A Case of the Korean Wig Business in Los Angeles, 1968-1977." *International Migration Review* 30 (Summer): 485-510.
- Deardorff, Alan V. 1995. "Determinants of Bilateral Trade: Does Gravity Work in a Neoclassical World?" National Bureau of Economic Research Working Paper No. 5377 (December).
- Eaton, Jonathan, and Akiko Tamura. 1994. "Bilateralism and Regionalism in Japanese and U.S. Trade and Direct Foreign Investment Patterns." *Journal of the Japanese and International Economies* 8: 478-510.
- East Asia Analytical Unit. 1995. *Overseas Chinese Business Networks in Asia* (Australia: Department of Foreign Affairs and Trade).
- Egan, Mary Lou, and Ashoka Mody. 1992. "Buyer-Seller Links in Export Development." *World Development* 20 (March): 321-334.
- Encyclopedia Britannica*. 1997. Internet Edition.
- Frankel, Jeffrey, Ernesto Stein, and Shang-jin Wei. 1993. "Continental Trading Blocs: Are They Natural, or Super-Natural?" National Bureau of Economic Research Working Paper No. 4588 (December).
- Gould, David M. 1994. "Immigrant Links to the Home Country: Empirical Implications for U.S. Bilateral Trade Flows." *Review of Economics and Statistics* 76 (May): 302-316.
- Grimes, Barbara, ed. 1984. *Ethnologue: Languages of the World, 11th edition* (Dallas, TX: Summer Institute of Linguistics).
- Hahn, Frank H. 1971. "Equilibrium with Transaction Costs." *Econometrica* 39 (May): 417-439.
- Harrigan, James. 1994. "Scale Economies and the Volume of Trade." *Review of Economics and Statistics* 76 (May): 321-328.
- Helpman, Elhanan. 1987. "Imperfect Competition and International Trade: Evidence from Fourteen Industrial Countries." *Journal of the Japanese and International Economies* 1: 62-81.
- Helpman, Elhanan, and Paul R. Krugman. 1985. *Market Structure and Foreign Trade* (Cambridge, MA: MIT).
- Heller, Walter P. 1993. "Equilibrium Market Formation Causes Missing Markets." University of California, San Diego Discussion Paper No. 93-07 (February).

- Hummels, David, and James Levinsohn. 1995. "Monopolistic Competition and International Trade: Reconsidering the Evidence." *Quarterly Journal of Economics* 110 (August): 799-836.
- Keesing, Donald B. 1988. "The Four Successful Exceptions: Official Export Promotion and Support for Export Marketing in Korea, Hong Kong, Singapore, and Taiwan, China." UNDP-World Bank Trade Expansion Program Occasional Paper 2.
- Kotkin, Joel. 1992. *Tribes: How Race, Religion, and Identity Determine Success in the New Global Economy* (New York: Random House).
- Lim, Linda. 1996. "Social Capital and Foreign Direct Investment by Newly-Industrializing Countries: A Perspective from Southeast Asia." Mimeo (February).
- Linder, Staffan Burenstam. 1961. *An Essay on Trade and Transformation* (Uppsala: Almqvist and Wiksells).
- Nothdurft, William E. 1992. *Going Global: How Europe Helps Small Firms Export* (Washington, D.C.: Brookings Institution).
- Overseas Chinese Affairs Commission. 1991. *Overseas Chinese Economy Yearbook, 1990* (Taipei).
- Poston, Dudley L. And Mei-Yu Yu. 1990. "The Distribution of Overseas Chinese in the Contemporary World." *International Migration Review* 24: 480-508.
- Rauch, James E. 1996a. "Networks Versus Markets in International Trade." National Bureau of Economic Research Working Paper No. 5617 (June).
- Rauch, James E. 1996b. "Trade and Networks: An Application to Minority Retail Entrepreneurship." Russell Sage Foundation Working Paper No. 100 (June).
- Redding, Gordon. 1995. "Overseas Chinese Networks: Understanding the Enigma." *Long Range Planning* 28: 61-69.
- Wei, Shang-Jin. 1996. "Intra-National Versus International Trade: How Stubborn are Nations in Global Integration?" National Bureau of Economic Research Working Paper No. 5531 (April).
- Ziesemer, Bernd. 1996. "The Overseas Chinese Empire." *World Press Review* 43 (June): 29.

Table 1
Codes, Countries, Chinese Population (CHIN), Population (POP, millions)
(1980 and 1990)

CODE	Country	CHIN (1980)	POP (1980)	CHIN (1990)	POP (1990)
1	Canada	289245	23.9	550000	26.52
2	France	210000	53.5	150000	56.44
3	W.Germany	20000	60.9	40000	63.23
4	Italy	3500	56.9	6000	57.66
5	Japan	54607	116.8	137499	123.54
6	UK	230000	55.9	230000	57.41
7	US b	806040	227.7	1800000	249.97
8	Austria	4500	7.5	3800	7.71
9	Belgium	4000	9.8	11000	9.84
10	Denmark	2000	5.1	5000	5.14
11	Finland	9	4.9	9	4.99
12	Netherlands	60000	14.1	70000	14.94
13	Norway	600	4.1	950	4.24
14	Sweden	5000	8.3	9000	8.56
15	Switzerland	3200	6.5	7500	6.71
16	Australia	122700	14.5	330300	17.09
17	Greece	186	9.6	120	10.12
18	Iceland		0.23		
19	Ireland	1000	3.3	1000	3.5
20	New Zealand	19248	3.3	30000	3.35
21	Portugal	2500	9.8	4700	10.53
22	Spain	3500	37.4	15000	38.96
23	S. Africa	11000	29.3	20000	35.28
24	Turkey	36000	44.9	60000	58.69
25	Yugoslavia		22.3		
26	Israel		3.9		
28	Argentina	2000	27.7	12000	32.32
29	Brazil b	11213	118.7	100000	150.37
30	Chile	2000	11.1	13000	13.17
31	Colombia	5600	26.7	4000	32.99
32	Ecuador	12800	8	16000	10.78
33	Mexico	20000	69.8	20000	86.15

CODE	Country	CHIN (1980)	POP (1980)	CHIN (1990)	POP (1990)
34	Peru	52000	17.4	500000	22.33
35	Venezuela	14000	14.9	14000	19.73
36	Bolivia	2000	5.6	4000	7.4
37	Paraguay	4000	3.2	6000	4.28
38	Uruguay	250	2.9	350	3.09
39	Algeria		18.9		
40	Libya	300	3	356	4.54
41	Nigeria	1000	84.7	1500	117.5
42	Egypt	20	39.8	110	53.15
43	Morocco	10	20.2	20	25.06
44	Tunisia		6.4		
45	Sudan	45	18.7	45	25.2
46	Ghana	300	11.7	320	15.03
47	Kenya	100	15.9	150	24.03
48	Ethiopia	50	31.1	55	50.97
49	Iran	300	38.4	300	54.61
50	Kuwait		1.4	200	2.14
51	Saudi Arabia	45000	9	30000	14.87
52	Indonesia	6150000	146.6	7260000	179.3
53	Taiwan	17444000	17.8	19943000	20.35
54	HongKong	4947000	5.1	5626000	5.8
55	India	110000	673.2	21000	827.05
56	S.Korea	46192	38.2	23328	42.79
57	Malaysia	3630542	13.9	5202000	17.86
58	Pakistan b	3600	82.2	3600	112.05
59	Philippines	1036000	49	800000	61.48
60	Singapore	1856237	2.4	2038000	3
61	Thailand	4800000	47	4800000	57.2
62	Hungary	24	10.8	24	10.55
63	Poland	77	35.8	77	38.18
64	China b	898564000	976.7	1032608000	1122.4

Sources: 1) Poston and Yu, *The Distribution of the Overseas Chinese in the Contemporary World*, International Migration Review, Fall 1990, 480-508.

2) Overseas Chinese Economy Year Book (in Chinese), Taiwan, 1991

3) Overseas Chinese Business Networks in Asia, Australian Department of Foreign Affairs and Trade, 1995

Table 2 Common Language Groups

English: Canada, UK, US, Australia, Ireland, New Zealand

Spanish: Spain, Argentina, Chile, Colombia, Ecuador, Mexico, Peru, Venezuela, Bolivia, Paraguay, Uruguay

Arabic: Israel, Algeria, Libya, Egypt, Morocco, Tunisia, Sudan, Kuwait, Saudi Arabia

French: Canada, France, Belgium, Switzerland

Portuguese: Portugal, Brazil

German: West Germany, Austria, Switzerland

Italian: Italy, Switzerland

Dutch: Belgium, Netherlands

“Malay”: Indonesia, Malaysia, Singapore

Mandarin: Taiwan, Singapore, China

Note 1: All pairs of countries in the same group receive a 1 for the dummy variable LANGUAGE.

Note 2: A country is considered to belong to a group if at least 10% of its population speaks that language as a native language.

Note 3: “Malay” is actually two different languages, called Bahasa Indonesia in Indonesia and Bahasa Malaysia in Malaysia (and by extension in Singapore). However, the overlap between the two languages is considerable, and the two countries have agreed on a common spelling system to facilitate mutual understandability.

Note 4: The question whether to choose “Mandarin” as a definition of a language, or just “Chinese” (which would include Cantonese, and therefore Hong-Kong), is obviously a little arbitrary. We preferred to use Mandarin, emphasizing mutual understandability (Mandarin and Cantonese are *not* mutually understandable), leaving the link for the Chinese population for the CHIN variable in Table 1.

Table 3 Countries which belonged to EEC and EFTA, circa 1980

EEC: France, West Germany, Italy, UK, Belgium, Denmark, Netherlands, Greece, Ireland, Portugal, Spain.

EFTA: Austria, Finland, Norway, Sweden, Switzerland, Iceland, Portugal.

Note: Luxembourg belonged to the EEC, but is not in our sample.

Table 4
Results of the estimation (1980)

	Eq. WC	Eq. RC	Eq. NC	Eq. WL	Eq. RL	Eq. NL
Intercept	-11.35 (1.27417)	-10.0808 (0.860614)	-11.3803 (0.805646)	-10.0012 (1.11684)	-10.7468 (0.867548)	-11.7767 (0.822486)
GNP _i GNP _j	1.05756 (0.041682)	0.908354 (0.027596)	0.902631 (0.026957)	0.985552 (0.037141)	0.95307 (0.027249)	0.89838 (0.027158)
PGNP _i PGNP _j	0.270813 (0.051161)	0.45088 (0.035147)	0.511695 (0.034469)	0.301279 (0.045467)	0.453211 (0.034962)	0.525564 (0.034940)
DISTANCE	-0.864658 (0.094900)	-0.920732 (0.066362)	-0.7721 (0.062860)	-0.829173 (0.085517)	-0.979745 (0.065565)	-0.75046 (0.063852)
ADJACENT	0.92442 (0.363525)	0.804827 (0.269381)	0.79139 (0.270815)	0.796905 (0.331320)	0.748169 (0.283700)	0.826515 (0.274547)
LINKS	1.06448 (0.235888)	1.06624 (0.171396)	1.31616 (0.161771)	0.979525 (0.211365)	1.10765 (0.171827)	1.31452 (0.162852)
EEC	-0.484365 (0.224827)	-0.098754 (0.158145)	-0.041122 (0.148349)	-0.576963 (0.204180)	-0.15909 (0.158955)	.295400E-02 (0.150341)
EFTA	-1.05727 (0.393205)	0.103814 (0.212574)	0.373211 (0.214623)	-0.749214 (0.299831)	0.132293 (0.200164)	0.404378 (0.219748)
CHINPOP	5.80101 (1.23860)	5.52948 (0.905033)	6.08143 (0.977039)	5.35475 (1.16338)	5.66249 (0.908343)	6.1518 (0.972941)
LANGUAGE	0.25063 (0.324764)	0.149352 (0.236885)	-0.202553 (0.189677)	0.255658 (0.292580)	-0.0343 (0.235715)	-0.165897 (0.191538)
Threshold	138.41 (18.7966)	116.167 (14.8259)	93.9315 (15.5065)	145.464 (20.1321)	119.319 (15.3266)	85.6427 (14.1557)

Note 1: W- organized exchange traded goods R - world reference priced goods N - neither
C - conservative classification L - Liberal Classification

Note 2: "Threshold" Tobit model, with maximum likelihood estimation.

Table 5
Results of the estimation (1990)

	Eq. WC	Eq. RC	Eq. NC	Eq. WL	Eq. RL	Eq. NL
Intercept	-8.23688 (1.09450)	-8.80778 (0.742415)	-9.78335 (0.680247)	-7.57875 (0.982157)	-8.69223 (0.736357)	-10.1819 (0.692222)
GNP _i GNP _j	0.997811 (0.037011)	0.94432 (0.024104)	0.965631 (0.023755)	0.950487 (0.033295)	0.960915 (0.024139)	0.972819 (0.024065)
PGNP _i PGNP _j	0.047043 (0.040045)	0.165534 (0.025773)	0.239462 (0.024205)	0.080775 (0.035467)	0.154936 (0.025610)	0.252983 (0.024373)
DISTANCE	-0.749251 (0.087655)	-0.672455 (0.062855)	-0.65917 (0.060481)	-0.702165 (0.079296)	-0.717876 (0.063609)	-0.671416 (0.60924)
ADJACENT	1.48489 (0.351976)	1.23878 (0.275968)	1.1246 (0.277309)	1.3757 (0.320716)	1.16014 (0.280072)	1.14643 (0.280669)
LINKS	0.896844 (0.208701)	0.745921 (0.146541)	1.23655 (0.138804)	0.917802 (0.188621)	0.687204 (0.147157)	1.24872 (0.142875)
EEC	-0.125506 (0.218793)	0.215173 (0.167943)	0.185192 (0.162864)	-0.125256 (0.203615)	0.147982 (0.165966)	0.186945 (0.164992)
EFTA	-0.780636 (0.433818)	0.038215 (0.203356)	0.218073 (0.231585)	-0.336833 (0.315953)	0.032204 (0.191001)	0.226827 (0.239530)
CHINPOP	3.13078 (1.61683)	3.90733 (0.938079)	4.423 (1.08797)	3.02865 (1.46632)	3.91311 (0.943779)	4.50673 (1.09974)
LANGUAGE	0.697561 (0.309998)	0.732307 (0.227240)	0.035604 (0.205994)	0.545929 (0.283038)	0.807848 (0.234024)	0.033828 (0.205498)
Threshold	99.1358 (13.5065)	128.773 (18.9636)	113.633 (20.5816)	122.367 (16.4509)	113.067 (16.8914)	107.104 (18.7982)

Note: see notes to Table 4.

Table 6
Results of the estimation (1980, with REMOTE)

	Eq. WC	Eq. RC	Eq. NC	Eq. WL	Eq. RL	Eq. NL
Intercept	-43.1865 (3.82788)	-18.9466 (2.78206)	-13.2940 (2.56147)	-34.5982 (3.36358)	-21.3665 (2.68258)	-12.9982 (2.60003)
GNP _i GNP _j	1.09318 (0.040598)	0.917916 (0.027604)	0.904853 (0.026991)	1.01292 (0.036549)	0.964541 (0.027141)	0.899808 (0.027192)
PGNP _i PGNP _j	0.366345 (0.51282)	0.477503 (0.035480)	0.517491 (0.035278)	0.375089 (0.045613)	0.485508 (0.035394)	0.529269 (0.035743)
DISTANCE	-1.41111 (0.111678)	-1.07395 (0.086038)	-0.805357 (0.082206)	-1.25336 (0.102566)	-1.16278 (0.084141)	-0.771694 (0.083406)
ADJACENT	0.079555 (0.360260)	0.569796 (0.277279)	0.740520 (0.286109)	0.145473 (0.330679)	0.467233 (0.288827)	0.794046 (0.290943)
LINKS	0.684553 (0.232029)	0.959215 (0.171408)	1.29364 (0.162899)	0.686537 (0.208235)	0.980595 (0.171273)	1.30016 (0.164068)
EEC	-0.396897 (0.229974)	-0.075647 (0.159757)	-0.036573 (0.148055)	-0.512378 (0.207155)	-0.131343 (0.162184)	0.583489E-02 (0.149917)
EFTA	-0.627179 (0.410722)	0.221814 (0.216406)	0.398546 (0.216421)	-0.420185 (0.304809)	0.273347 (0.206611)	0.420542 (0.221218)
CHINPOP	4.19925 (1.04485)	5.08009 (0.841076)	5.98485 (0.973581)	4.11226 (1.01249)	5.12657 (0.831783)	6.09020 (0.975426)
LANGUAGE	-0.134037 (0.318592)	0.041634 (0.236159)	-0.225650 (0.192651)	-0.043254 (0.288126)	-0.164029 (0.233681)	-0.180639 (0.194865)
REMOTE	1.92464 (0.217866)	0.536931 (0.167352)	0.115730 (0.154558)	1.48816 (0.194236)	0.642500 (0.159996)	0.073858 (0.156822)
Threshold	140.318 (18.8771)	117.259 (14.9429)	94.0737 (15.5334)	147.695 (20.3078)	120.290 (15.4201)	85.7149 (14.1741)

Note: see notes to Table 4.

Table 7
Results of the estimation (1990, with REMOTE)

	Eq. WC	Eq. RC	Eq. NC	Eq. WL	Eq. RL	Eq. NL
Intercept	-46.7381 (3.53268)	-28.0916 (2.49311)	-21.4796 (2.39226)	-39.9171 (3.18487)	-28.8931 (2.44942)	-21.1817 (2.41967)
GNP _i GNP _j	1.03876 (0.035269)	0.965344 (0.023678)	0.978754 (0.023609)	0.985394 (0.031934)	0.982775 (0.023627)	0.985189 (0.023937)
PGNP _i PGNP _j	0.149543 (0.039638)	0.216108 (0.025668)	0.270212 (0.025407)	0.166385 (0.035332)	0.208114 (0.025647)	0.281936 (0.025604)
DISTANCE	-1.40861 (0.103968)	-1.00436 (0.079223)	-0.860826 (0.079418)	-1.25802 (0.096351)	-1.06514 (0.078975)	-0.861082 (0.080456)
ADJACENT	0.493383 (0.330055)	0.74123 (0.262493)	0.822671 (0.266922)	0.540778 (0.303899)	0.639604 (0.264772)	0.862538 (0.271053)
LINKS	0.451281 (0.205606)	0.522699 (0.144322)	1.10177 (0.140853)	0.54489 (0.185921)	0.453402 (0.144823)	1.12213 (0.145204)
EEC	-0.112579 (0.225168)	0.220579 (0.171431)	0.187294 (0.165276)	-0.116421 (0.210720)	0.153934 (0.169721)	0.188756 (0.167276)
EFTA	-0.380749 (0.439519)	0.239204 (0.199248)	0.339376 (0.232060)	-1.19883E-02 (0.315782)	0.242476 (0.185606)	0.340762 (0.239803)
CHINPOP	0.97111 (1.44674)	2.82409 (0.833339)	3.76552 (1.03149)	1.21218 (1.31921)	2.779 (0.839466)	3.88846 (1.04741)
LANGUAGE	0.303682 (0.299224)	0.53137 (0.219396)	-0.084642 (0.200475)	0.212531 (0.276215)	0.597509 (0.222568)	-0.079335 (0.201357)
REMOTE	2.33567 (0.203275)	1.1707 (0.148908)	0.709641 (0.145953)	1.96255 (0.185354)	1.22619 (0.146003)	0.667322 (0.147791)
Threshold	102.153 (13.7415)	132.221 (19.3768)	116.138 (21.0453)	126.369 (16.8430)	116.395 (17.2823)	109.143 (19.1633)

Note: see notes to Table 4.

The Organization of the Taiwanese and South Korean Economies: A Comparative Analysis

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This is a first draft of a chapter to appear in a book, co-authored with Nicole Biggart, to be published by Cambridge University Press. Please note that Robert Feenstra is the principal author of this chapter. Comments are most welcome, though the material should not be quoted.

Summary

Most specialists recognize that business networks are widespread in Asia. The dominance of the *keiretsu* in Japan and of the *chaebol* in South Korea is common knowledge. In recent years, many scholars and journalists have also written about the importance of Chinese business networks in all the Chinese dominated economies (e.g., Mainland, Taiwan, Hong Kong, and several Southeast Asian countries, including Thailand and Malaysia). Despite the recognition that Asian business networks are commonplace, there has been surprisingly little effort to analyze the organization and performance of these networks. In fact, most writers dismiss the importance of business networks as a result of either market failures or state directives, and hence as having no independent effects on the economy in their own right. Such writers would conclude that differences in the organization of business networks are differences that do not make a difference.

In this paper, we argue that business networks are important, that they are not simple reflections of market or state forces, and that organizational differences among networks do make a difference. Our key questions address these differences. How and why does economic organization differ across countries, and does it matter? These questions are, of course, rather general and abstract. To tie down our research empirically, therefore, we are asking these questions of two East Asian countries, Taiwan and South Korea. Most specialists in Asian development (Amsden 1985, 1989; Gold 1986; Wade 1990; Evans 1995) view the economies of Taiwan and South Korea as being organized in **essentially** the same way. Our research (Orrù, Biggart, and Hamilton, 1997; Hamilton and Feenstra 1995) and that of others (Fields 1995; Hyuk-Rae Kim 1993, 1994; Eun Mee Kim 1997), however, have shown that the two economies are actually organized very differently. The rapid growth common to these two countries hides the very substantial, and we believe important, differences in how their firms interact.

This paper describes the organizational differences between the two economies. Simply put, the predominant organizational features of the Korean economy are the very large, vertically integrated business groups called *chaebol*. Of particular significance are the five largest of these groups, which together account for a substantial share of the export output of the Korean economy. In contrast, the most important features of Taiwan's economy are the small and medium-size firms, which dominate export production, and the large business groups, which are on average much smaller than the *chaebol* and are mainly suppliers of intermediate goods and services for the small and medium sized firm sector. We have attempted to describe these differences in industrial structure quantitatively by developing a measure of the vertical integration for the respective business groups and a measure of business group participation in the major sectors in the respective economies.

Having established the organizational differences, we then outline a first step in explaining the organizational configuration. Using a highly stylized model to represent pricing decisions of firms in general equilibrium, we ask whether the organizational differences between the two economies can be explained in terms of simple economic reasoning. The simulation shows that multiple equilibria of interfirm organization are possible, that, in other words, several configurations of inter-firm networks represent stable outcomes of cross-market pricing decisions, and that two of these outcomes approximate the organization of Korean and Taiwanese economies.

One stable configuration is for firms to create enterprise groups in which firms buy intermediate goods and services from other firms in their own group and refuse to sell the same goods and services to competing groups. The configuration, which we call "V-Group" for vertical integration, resembles the

organization of the Korean economy. The model even predicts a division between a stable set of megagroups and an unstable set of smaller groups. The logic here is that, in a vertically integrated economy, there is only so much profit to be made in manufacturing similar products. The larger and more heavily internalized groups have a competitive advantage over smaller groups. This division resembles what has actually occurred in South Korea, where the large chaebol have been extremely successful, but a second tier of chaebol has struggled mightily.

A second stable configuration of firms predicted from the model consists of a relatively large number of enterprise groups producing intermediate goods to sell at a profit to other firms utilizing those goods in the manufacture of final products. This configuration, which we call “U-Group” for upstream, resembles the economic organization of the Taiwanese economy. In another location, Hamilton (1997) has used the metaphor of a gold rush to describe this kind of economic organization. In a gold rush, although a few miners strike it rich, the biggest and most successful firms are those selling goods and services to miners. By analogy, as long as the small and medium-size firms compete with each other to manufacture products for the global market, they create demand for the goods and services that the larger upstream business groups provide. It is important to note that the model predicts the U-Group enterprise networks are stable only at fairly low levels of vertical integration. In other words, it does not make good sense for a manufacturer of shovels to hire miners to use the shovels they produce for mining gold. This logic has counterparts in the Taiwanese economy. It does not make sense for producers of textiles to make garments or for producers of plastics to make toys. It does make sense for such groups to stimulate demand rather than utilize output.

Our equilibrium model shows that, in principle, both V-Groups and U-Groups represent stable solutions to mutually determined pricing decisions reached by firms in an environment of other firms. Our empirical research suggests that the model roughly approximates the organizational dynamics of the Korean and Taiwanese economies. However, even if we assume that the model tells us something about the current organization of the economies, it tells us nothing about how they got that way. The model does not predict which among the stable alternative trajectories a society will take. We conclude with a discussion of our explanation for the different trajectories taken by Taiwan and South Korea.

The Organization of Business Groups

To enable our analysis of economic organization, we have created a database of 43 business groups for South Korea in 1989, and 80 groups for Taiwan in 1994. For both countries we are able to construct a *transaction matrix* for the major business groups. This matrix specifies the sales to other member firms within the group, as well as total sales and other information for each firm. Thus, the transaction matrices can be used to construct measures of the vertical-integration for each business group. We shall first report detailed results for the Korean groups, and then describe the Taiwanese groups. The comparison of these vividly illustrates both the differences in their size and vertical-integration: the largest groups in Korea are huge by comparison with other groups found in Korea or Taiwan, and are integrated through the entire production chain.

Why don't comparable groups exist in Taiwan? This will be addressed in the second half of the chapter, where we outline a stylized model of business groups. We will argue that the economic logic does not restrict the group structure to follow any one, unique or efficient form. Rather, there are several types of groups that can arise in equilibrium, with strikingly different degrees of concentration and integration.

The industrial structure of both South Korea and Taiwan will be seen to arise as viable equilibria: fully consistent with rational calculus, but not uniquely determined by this logic. Therefore, we need to look beyond the economic system to explain the differing industrial structure of each country.

Korean Business Groups, 1989

The primary source for the 1989 Korean data is the volume 1990 Chaebol Analysis Report (Chaebol Boon Suk Bo Go Seo in Korean) published by Korea Investors Service, Inc. This volume provides information on the 50 largest business groups (measured in terms of assets) in South Korea, but for seven of these groups the data on internal transactions within the groups are missing. Thus, the 1989 database for Korea includes only 43 groups, with 525 firms. In Table 1 we show summary information for these groups. The first column of Table 1 reports the group's number, as it is used in the database, followed by the group name and the 1989 sales (in \$million), and the number of firms in each group.

The largest groups have become well known names in the U.S., such as Samsung and Hyundai. These two groups each had total sales exceeding \$25 billion in 1989, while the 43 groups together had sales of \$151.8 billion.¹ This magnitude is sometimes compared to Korean GDP (\$219.5 billion in 1989) to conclude that the business groups control a very large portion of the domestic economy. Such a comparison is incorrect, of course, because GDP is a value-added concept, reflecting the contribution made by each firm over and above its cost of materials. The 1990 Chaebol Analysis Report included the value-added of each group, which are included in the database, and these total \$32.2 billion over the 43 groups. Thus, these groups account for about 15% of Korean GDP in 1989.

Of principal interest is the extent to which business groups' sales go to other firms in the group, or equivalently, the extent to which the group relies on its own firms for intermediate inputs. We will refer to this as the "internalization" of a group, and it can be measured by the ratio of the sales to other firms in each group relative to total group sales.² The internalization ratio for each group is shown in the fifth column of Table 1. It is apparent that larger groups have rather high internalization, exceeding 30% in several cases, and that internalization is correlated with the size of each group. This can be observed in the simple and weighted averages reported at the bottom of Table 1: the simple average of the internal sales ratio is 11.5%, but the sales weighted average is about twice as large, at 22.0%.

There is one feature of the internalization ratio that is somewhat misleading, and that is the fact that it includes the *trading companies* within any group. These are companies who act as intermediaries in transactions between firms in the group, and also sell to and buy from firms outside the group. Including

¹ The dollar values for Korea have been converted from the Korea won using the exchange rate of 679.6 won per dollar at the end of 1989.

² An alternative measure of "internalization" is the ratio of purchases from other firms in the group relative to total purchases of intermediate inputs by all group firms. The internal sales and purchases are equal, but these two ratios differ because of their denominators: the internal sales ratio will be lower than the internal purchases ratio, because the total purchases of intermediate inputs by group firms will be lower than their total sales (the difference between these is value-added of the group). It is possible to construct the internal purchases ratio from each group from the database, but it displays much the same patterns as the internal sales ratio, which we shall focus on.

these firms can artificially increase the internalization ratio when the trading companies are simply transferring products between firms in the group. Twenty-seven out of the 43 groups in Korea – or nearly two-thirds – have trading companies, and these are indicated by an asterisk in column four of Table 1.

In order to correct for the presence of the trading companies, two questions need to be addressed. The first is how to distinguish trading companies. In the Korean database, we relied on three criteria. First, telephone surveys to the 43 Korean business groups were made to find out if each group had a trading company. Second, company descriptions in the Yearbook on the Korean Economy and Business 1991/92 published by Business Korea were used. If a company was described as a trading arm of their business group, it was included as the trading company. Third, along with the company description, if a company was largely involved in the group's internal transactions, it was counted as a trading company. Most of the trading companies are classified in sector 132 (wholesale and retail trade), though only a subset of firms in that sector are designated as trading companies.

The second question is how to correct for the presence of these companies when measuring the degree of internalization. Consider a trading company that purchases from firm A and sells that product to firm B, both in the same business group. Since this firm is simply acting as an intermediary in the transactions, it would be double counting to include both the purchase and sale. But since the product was transferred from A to B, it would be incorrect to exclude both transactions as well. Instead, we should ignore either the purchase or the sale by the trading company. We decided to ignore the *purchases* of the trading companies from other firms within the group.³ This means that when a trading company buys from an outside firm and sells to another firm within the group, the sale will be counted as internal transactions. But when a group firm sells to a trading company that then sells outside the group, no internal transaction is counted at all.

We use the phrase “without trading companies” (or, “no TC”) to mean that we are consistently ignoring the purchases of trading companies from within the group. In the second-last column of Table 1 we report the internal sales ratio, calculated without the trading companies.⁴ This reduces the internalization of the largest business groups by almost one-half. Table 2 provides brief descriptions of all groups with internalization ratios greater than 15%, and section A lists seven groups whose internalization is reduced significantly by the removal of trading company purchases. These include the four largest groups – Samsung, Hyundai, Lucky-Goldstar, and Daewoo – as well as several smaller groups. Overall, the weighted average of the internal sales ratio for all groups is reduced from 22.0% to 13.4%, while the simple average is reduced from 11.5% to 8.3%.

We have excluded internal purchases of the trading company purchases as a way to avoid double-counting the transfer of goods between firms within a group. But the trading companies are also engaged in wholesale and retail trade, so that by excluding their purchases, we are moving towards a measure of groups' vertical integration within just manufacturing activities. To properly measure manufacturing integration, we also need to exclude the purchases of firms within each group that are classified within wholesale and retailing (sector 132) but are not designated as trading companies. While most of the trading companies are classified within this sector, there are some differences between them and other firms that

³ All of the trading companies made purchases from other firms in their group, and most also made sales.

⁴ The purchases of the trading companies are excluded from both the numerator and denominator of the internal sales ratio.

are classified within wholesale and retailing. Most of the trading companies are actively involved in seeking overseas customers, and therefore play an informational role within the business group. In contrast, the other wholesale and retailing firms are engaged in marketing the products domestically, through establishments owned by the group. This distinction is not hard and fast, however, and there is considerable overlap in their activities. Thus, as a natural extension omitting the purchases of trading companies, in the last column of Table 1 we report the internal sales ratio while omitting both the purchases of trading companies and all other firms in the wholesale and retail sector within each group.

Omitting the wholesale and retailing firms has a rather modest impact on the average internalization ratios: the weighted average is reduced from 13.4% to 11.8%, while the simple average is reduced from 8.3% to 6.8%. Still, there are a few groups whose internalization begins high and is reduced quite substantially by the exclusion of the wholesale and retail firms, and these are listed in part B of Table 2. Included among these is Sunkyung, which is the fourth largest group with 1989 sales of \$8.9 billion, and produces fuel oils and petrochemicals. Its retail gas and oil sales are handled by two firms, one of which is classified as a trading company while the other is not. A second group is also in the petroleum sector, Kukdong Oil, but is considerably smaller. A third group, Kangwon Industries, is involved in coal mining, steel and cement products. A common feature of these three groups is that their retail sales are focused on the domestic market, which explains why their retailers are not classified as trading companies.

In part C of Table 2, we list three additional groups that have high internal sales, where these are not accounted for by either trading companies nor other retailing activity. The Ssangyong group is the sixth largest in Korea, with 1989 sales of \$5.8 billion, and produces a diverse range of products including cement, fuel oils, construction, and motor vehicles. Excluding either its trading company or other retailing firms reduces its internalization ratio of 14.8% only modestly. However, the internalization of this group is no larger than most of the biggest groups in Korea. The distinctive feature of the Ssangyong group is that its trading company, Ssangyong Corporation, does not engage in nearly the same extent of the internal transactions found for the top four groups in Korea. Also included in part C are two smaller groups, Sammi and Kyesung Paper, which are producers of iron and steel products and paper products, respectively. The high internalization ratios for these groups, even after the trading companies and retailers are excluded, simply reflects the vertical integration of their manufacturing processes.

Taiwanese Business Groups, 1994

The primary sources for the 1994 Taiwan data are twofold: Business Groups in Taiwan, 1996/1997, published by the China Credit Information Service (CCIS); and company annual reports to the Taiwan stock exchange, for 1994, collected by the CCIS, and supplemented by interviews of selected firms. Business Groups in Taiwan, 1996/1997, provides information on 115 business groups in Taiwan. For the largest 80 of these groups, data on sales to and purchases from other firms in the groups was collected from their annual reports. Thus, the 1994 database for Taiwan includes these 80 groups, with 797 firms, as listed in Table 3.

The largest groups in Taiwan are considerably smaller than their counterparts in Korea, and the total sales of the Taiwan groups is \$76.3 billion, or about half as much as the Korean groups.⁵ In order to do a comparison with Taiwanese GDP, which was \$241 billion in 1994, we need to have a value-added figure for the groups. This was not provided in any of the source materials, but a rough estimate can be obtained by noting that the ratio of value-added to total sales for all the Korean groups is 21.2%. If we apply this same ratio to the total sales of the Taiwanese group, we obtain an estimated value-added of \$16.2 billion, so that the 80 group account for 6.7% of Taiwan GDP. The average number of firms in each group, shown at the bottom of column four, is also smaller than for Korea.

In the fifth column of Table 3, we report the internal sales ratio for the Taiwanese groups. In contrast to the Korean groups, it does not appear that the internalization ratios for Taiwan are significantly correlated with the size of the groups. Thus, the largest group – Formosa Plastics – has an internalization ratio of 15.8%, no larger than that which occurs for a number of other groups of varying size. This can also be seen from the averages reported at the bottom of Table 2. The average for the internal sales ratio is 9.5% and 7.0%, computed as a weighted and simple average, respectively. The difference between these is not nearly as marked as it was for the Korean groups. These internalization ratios are also smaller than they were for Korea. Thus, the groups in Taiwan have less vertical integration on average, and this is also true for some of the largest groups. There are still various groups in Taiwan that have rather high internalization ratios, and these will be examined in greater detail below.

We have corrected for the presence of trading companies in the business groups of Taiwan. Two criteria were used to select trading companies: if the name of the firm from Business Groups in Taiwan, 1996/1997 included the words “trading company”; or if the description of products from that source indicated “buying and selling” as a primary activity. The trading companies in most cases belong to the input-output sectors 89 (domestic wholesale trade), 90 (domestic retail trade) and 91 (import and export trade), though only a subset of the firms with these sector classifications are designated as trading companies. Groups in which trading companies exist are denoted by an asterisk in column four of Table Three, along with the total number of firms in the group.

Of the 80 business groups, 39 or roughly one-half were found to have trading companies, whereas two-thirds of the groups had trading companies in Korea. The extent to which the Taiwan trading companies are involved in the internal transactions of their groups is also considerably less than in Korea. Of the 39 Taiwan groups with trading companies, only 23 of these have any recorded purchases between that company and other firms in the group.⁶ The modest degree to which these companies are integrated with the activities of the business groups can also be seen from the last two columns of Table 3, where we list the internal sales and purchase ratio without the trading companies. By excluding the companies the weighted average of the internal sales ratio declines from 9.5% to 8.4%, and the simple average declines from 7.0% to 6.0%, which is much smaller than the corresponding decrease for Korea.

To gain a more detailed understanding of the role of trading companies in Taiwanese groups, descriptions of all groups that have internalization ratios of 15% or higher are provided in Table 4. These descriptions give information on the major internal transactions, but do not list the complete set of firms

⁵ The U.S. dollar values for Taiwan have been converted from the New Taiwan dollar using the exchange rate of 26.24 NT\$ per US\$ at the end of 1994.

⁶ There might be some other cases of internal purchases that we are not aware of due to missing data.

within the group. In part A of Table 4, we first describe four groups that include trading companies, and whose internalization ratios are considerably reduced by excluding the purchases of these companies. For example, the internal sales ratio for the group Hualon, a producer of synthetic fiber and cotton with 1994 sales of \$2.5 billion, is reduced from 16.4% to 4.7% when the purchases of its trading company, The E-Hsin International Corp., are excluded. The same is true for: Yuen Foong Yu, a manufacturer of paper products with sales of \$1 billion; Aurora, a manufacturer of electronic equipment with sales of \$404 million; and Taiwan Everlight Chemical, a smaller manufacturer of dyeing and bleaching materials. In the latter two cases, the trading companies are active in overseas markets.

In part B of Table 4 we list three other groups that have high internalization ratios. The firms involved in these transactions are retailers that do not fit our criteria for trading companies (i.e. these words do not appear in their name and their primary activity is not “buying and selling”). Three of these groups are very large producers of motor vehicles: Wei Chuan Ho Tai, with sales of \$4.9 billion, Yulon with sales of \$4.3 billion, and Chinfon, with sales of \$3.0 billion. Both of these sell to a domestic market that is protected by tariffs and domestic content requirements, and where export sales are practically nonexistent.⁷ The fourth group, Bomy, is a smaller producer of fruit and vegetable juices, which also sells domestically.

To determine the impact of excluding these wholesale and retail sales from groups’ internalization, in the last column of Table 4 we re-compute the internal sales ratio while omitting the purchases of trading companies and all other firms classified in sectors 89 (domestic wholesale trade), 90 (domestic retail trade) and 91 (import and export trade). The internalization of the three large groups in autos, and the Bomy group in beverages, falls dramatically. The weighted average internal sales ratio now becomes 4.5%, while the simple average is 4.7%. There is evidently no relation at all between sales and internalization once the retail sales of the three large, automotive groups are excluded. The corresponding internalization rates computed without retail sales for Korea are 11.8% (computed as a weighted average) and 6.8% (computed as a simple average). The weighted average in particular is considerably higher than that for Taiwan, indicating the tendency of the largest groups in Korea to have substantial vertical integration even after the sales of trading companies and other retail firms are excluded.

In part C of Table 4, we describe the six remaining groups with internalization ratios of 15% or higher, that cannot be explained by either sales to trading companies or sales to wholesale or retail firms. At the top of this list of groups is Formosa Plastics, with 1994 sales of \$6.6 billion and an internal sales ratio of 15.8%. This is the only group listed in part C that has sales exceeding \$1 billion, and is therefore the only example in Taiwan of a large group with high internalization, not explained by either trading companies or retail sales. Its internal sales ratio is similar to that of some large groups for Korea (once the trading and retail sales are excluded). In contrast to the large Korean groups, however, Formosa Plastics is not vertically- integrated forward into the retail and export sectors, but maintains its presence primarily in chemicals and plastics, while also diversifying into textiles. This tendency to locate primary in the upstream sectors is shared by all six groups listed in part C, three of which are in chemicals, and one each are in food products (for animals), paper products, and plumbing supplies. These groups are supplying intermediate inputs to other firms, rather than selling directly to consumers or to overseas markets.

⁷ Taiwan maintains has a 30% tariff on imported autos, and also a domestic content requirement that 50% of parts and components for sedans be made in Taiwan. Up until 1994 it also banned imports from Japan. Despite these restrictions, imports accounted for one-third of total sales in 1994, with the largest sales coming from Japanese automobiles produced in the U.S.

Cross-County Comparison

An initial comparison of the groups in South Korea and Taiwan can be obtained by looking at the sector sales of the firms involved. For each country, the sales of business group firms are classified according to the input-output sector of their primary product. These sales are then aggregated to twenty-two broad manufacturing sectors, as shown in Table 2. The group sales are expressed as a percentage of total sales of all manufacturing firms in these sectors. For Korea we show values constructed from the 1983 and 1989 databases, while for Taiwan we show values from the 1983 and 1994 databases. Overall, there is a substantial degree of conformity in the sales of the groups between the earlier and later years. The principal change is that groups in both countries have been moving out of several sectors, including garments and apparel, rubber, and non-metallic mineral products (i.e. stone, clay and glass items).

For Korea, about one-half of the sectors have business group sales that account for more than 25% of total sales, and in several cases the business group sales account for more than 50% of total sales, including petroleum and coal, electronic products, motor vehicles and shipbuilding. The groups have a strong presence in both upstream and downstream sectors. Overall, the 43 business groups account for 41% of manufacturing output, together with 13% in mining, 32% in utilities, and 24% in transportation, communication and storage.

In Taiwan, by contrast, the business groups dominate in only a selected number of upstream sectors. Thus, in textiles the business groups account for nearly one-half of total manufacturing sales. These groups are selling downstream to the garment and apparel sector, where business groups are almost nonexistent. This pattern can also be seen from the strong group presence in pulp and paper products, chemical materials, non-metallic minerals, and metal products. In comparison, business groups have a weak presence in downstream sectors such as wood products, chemical products, rubber and plastic products, as well as beverages and tobacco. Overall, the groups account for only 16% of total manufacturing output, along with small shares outside of manufacturing.

In nearly every sector where Taiwanese groups have a significant share of sectoral sales, the Korean groups account for even more. In addition, Korean groups are dominant in heavy industries such as petroleum and coal, basic and non-ferrous metals, and shipbuilding. With the exception of only a small number of sectors (notably, garments and apparel), business groups in Korea spread across nearly the entire manufacturing sector, but this is not true in Taiwan, where groups are principally found in upstream sectors. This difference in the sectoral allocation is consistent with the higher degree of internalization found in Korean business groups, as these groups integrate forward and backwards to span the production process.

The vertical integration of the largest groups in Korea and Taiwan can be compared from Tables 6 and 7. There we report data for the largest five groups in each country, and the number of firms they have supplying in each sector. It is visually apparent that the largest Korean groups maintain a strong presence across a wide range of manufacturing sectors. For example, Hyundai has multiple firms producing in: primary metals, metal products, machinery, electronic equipment, shipbuilding, and motor vehicles. These firms are supplying their products to the other firms located downstream, and ultimately marketing the finished goods to consumers using their trading companies. The Daewoo group has a similar range of activities. An even greater spread is shown by Samsung, which includes firms within: textiles, supplying to garments and apparel; pulp and paper, supplying to printing and publishing; chemical materials supplying to plastics; machinery and electronic equipment, supplying to motor vehicles. Lucky-Goldstar shows a

dominant concentration within electronic products, with nearly half of its firms in that sector, but still maintains a presence in chemical and plastics, metals, and other sectors.

In comparison, the Taiwanese groups tend to be focused on a narrower range of activities, diversifying across one or two areas in addition to their major sector. Thus, Formosa Plastics has its major presence within chemicals and plastics, with some diversification in textiles. Shin King and Far Eastern both have their major presence in textiles, with diversification to chemicals, plastics and non-metallic minerals. In these cases the dominant sector is located upstream, and there are quite limited linkages between that sector and others where the group has diversified. This pattern is typical of the Taiwanese business groups.

Further evidence on the vertical integration of the groups can be taken from the internalization ratios, reported in Tables 2 and 3. In Table 8, we show the summary information on the internalization ratios for all business groups in each country, the largest five groups, and the remaining groups. The largest groups for Korea have 1989 sales ranging from \$8.9 to \$26 billion. These gigantic groups are all larger than the top five for Taiwan, with average 1994 sales of \$5.2 billion. The average internal sales ratio for the top five in Korea is twice as much as that for Taiwan, and three times as much when purchases of the trading companies and retail firms are excluded (though the ordering is reversed when only the trading companies are excluded). Closer inspection reveals that it is the top five groups for Korea that are the outliers in this comparison, measured in terms of sales or internalization. Outside of the top five, Korea has average internalization ratios for the remaining groups that are about 50% higher than for Taiwan, whereas the top five for Taiwan are themselves not much more integrated than the remaining groups for Korea.

Thus, the largest groups for Korea are not only enormous in terms of their sales, but are also substantially more vertically integrated than is typical for other groups in Korea or Taiwan. A scatter plot of the internalization ratios against the sales of each group, for Korea in Figure 1 and Taiwan in Figure 2 dramatically illustrates this conclusion. In each Figure, the black points are the internal sales ratios, while the gray points are the internal sales ratios calculated without the purchases of trading companies or other retail firms from within the groups (the ratios calculated with just excluding the trading companies would lie between these two points). We have quite intentionally kept the scales identical on the plots for each country. The top five groups for Korea stand out on the right-side of the plot, being dramatically larger than the other groups, and also have higher internalization as compared to many (though not all) of the others. The remaining groups are fairly tightly clustered with sales of less than about \$5 billion and internalization ratios mostly less than 20% (computed without the retail firms). The groups for Taiwan display much the same pattern as the remaining Korean groups. The largest group for Taiwan – Formosa Plastics – stands out somewhat with sales exceeding \$5 billion and an internalization of 15.8% whether trading companies and other retail firms are excluded or not. But for nearly all other groups that have high internalization ratios (above 20%), they are reduced substantially when the purchases of retail firms are excluded. There are also more very small groups for Taiwan than Korea. But notwithstanding these differences, the striking difference between the two scatter plots is the presence of the very large and highly vertically integrated groups for Korea. While small in number, these top five or six groups account for nearly two-thirds of the sales of all forty-three groups, and are a dominant presence in the Korean economy and its exports. The complete absence of similarly large groups in Taiwan attests to the difference in the industrial structure of the two countries. Identifying the reasons for this difference is the subject of the rest of this chapter.

A Stylized Model of Business Groups

We will develop a stylized model that abstracts from many of the actual features of South Korea and Taiwan, but nevertheless, is sufficient generate outcomes similar those observed in each country. In this stylized setting, let us divide the economy into two sectors: an upstream sector producing intermediate inputs from some primary factors, and a downstream sector using these intermediate inputs (along with primary factors) to produce a final consumer good. Suppose that both the sectors are characterized by product differentiation, so that each firm retains some limited monopoly power by virtue of the uniqueness of its product, and therefore charges a price, which is above its marginal cost of production. As usual under monopolistic competition, we will allow for the free entry of firms in both the upstream and downstream sectors, to the point where economic profits are driven to zero. Thus, the profits earned by firms through charging prices above marginal cost go to cover their fixed costs of production, where these fixed costs can represent that research, development, marketing or any other lump-sum costs associated with having a differentiated product.

In contrast to conventional treatments of monopolistic competition, we will also allow firms to align themselves, authoritatively, with other firms when this is advantageous. In particular, there will be an incentive for upstream and downstream firms to align themselves, because in the absence of any such integration the market prices for intermediate inputs are above marginal cost, which is a sure sign that agents could do better by internalizing the sale and pricing the input at exactly its marginal cost of production. By internalizing the sale in this manner, the upstream and downstream firms will be obtaining higher joint profits than if the input was just traded at its market price, and we take this to be the definition of a business group: an authoritatively organized set of firms that maximize their joint profits. In the same way that we allow for the free entry of individual firms, we will also allow for the free entry of business groups. We are, of course, abstracting for the moment from the many political and social factors that will influence the configuration of business groups in any setting. Here we simply ask what outcomes we might expect from the pure economics, focusing on the pricing decisions of the firms in general equilibrium.

The economy we have in mind is pictured in Figure 3. The upstream sector produces a range of products indicated by the dots at the top of the diagram. These are used in the production of the downstream products, indicated by the dots in the bottom of the diagram. A group will produce a range of both upstream products and downstream products, where it chooses the number of each to produce so as to maximize group profits. Alternatively, unaffiliated firms can produce individual upstream and downstream products. The equilibrium conditions are that the groups maximize profits, as do unaffiliated firms, and in addition there is free entry of both groups and unaffiliated firms. Whenever economic profits are positive there will be additional entry. This means that in equilibrium the profits of both groups and unaffiliated firms must be forced down to zero through competition, or could even be negative for upstream or downstream unaffiliated firms if they do not exist at all.

Business groups sell the upstream, intermediate inputs to their own firms at marginal cost, while these products are sold to unaffiliated firms at their marginal cost plus a markup. These means that business groups are inherently more efficient in their production than a combination of upstream and downstream unaffiliated firms. What then prevents business groups from taking over the entire economy? We introduce into the model “governance costs”, which represent the costs of monitoring and coordinating the activities of firms within the group. These costs are borne only by groups, and not by the unaffiliated firms. There is a special reason within the model for such agency costs to arise. Because the inputs produced within a group are sold internally at marginal cost, these firms would not be covering their fixed

costs of production, and would therefore need to receive a financial transfer from the rest of the group. The size of this transfer depends on the extent of fixed costs (such as research and development) that is devoted to the creation of new product varieties. Since this would normally be private information of the firm involved, it would be difficult to implement this financial transfer without leading to some inefficiency. For example, the guarantee of the group to cover the fixed costs of the upstream firms could lead to less effort expended by the managers of these firms. We do not model these agency costs in any detail, but simply assume that the groups have a fixed governance cost over and above the costs of unaffiliated firms.

While these governance costs prevent the business groups from taking over the economy, their presence still has an impact on the profitability of unaffiliated firms. Suppose that the governance costs are small. Since a business group is otherwise more efficient than a set of unaffiliated upstream and downstream firms, when free entry drives the profits of the groups down to zero, it must be that the profits of some unaffiliated firms are even lower. This means that a zero-profit equilibrium involving the business groups, and the upstream and downstream firms cannot occur: either the upstream or the downstream unaffiliated firms (or both) will be driven out of existence by the free entry of business groups.

Thus, for sufficiently small governance costs, the equilibrium organization of this stylized economy can only have three possible configurations: (1) business groups dominate in the upstream sector (called *U-groups*) and are vertically-integrated downstream, but also compete with some unaffiliated downstream firms; (2) business groups dominate in the downstream sector (called *D-groups*), while purchasing some inputs internally and others from unaffiliated upstream firms; (3) a situation in which the business groups drive out unaffiliated producers in both the upstream and downstream sectors, and are therefore strongly vertically-integrated (called *V-groups*). These three configurations are illustrated in Figure 4. The first panel shows a U-group selling to unaffiliated firms, and the second shows a D-group buying from unaffiliated firms.⁸ In the final panel, we display two V-groups, that can optimally choose whether to sell inputs to each other or not.

Multiple Equilibria

From this description of the economy, we see the price system itself imposes some structure on the organization of the economy, but equally important, does not necessarily determine which of these equilibria will arise: in principle, an economy with the same underlying conditions (such as factor endowments and consumer tastes) could give rise to more than one possible equilibrium organization. We would need to verify that these equilibria are stable, meaning that once they are established there is no reason for it to change, even as the economy experiences some degree of change in underlying conditions. We will refer to this situation where there is more than one type of equilibrium organization as *multiple equilibria*.

To explore the possibility of multiple equilibria more closely, we need to consider what the incentives are for firms to vertically integrate within a business group. As we have already argued, the gains from integration are that intermediate inputs can be sold at their most efficient price, equal to marginal cost. It follows, therefore, that the incentive to integrate will depend on how far the market price

⁸ Illustrating a *single* business group is just for convenience in the drawing, and in equilibrium there will generally be a number of groups, which we assume are all of the same type.

differs from marginal cost, or to put it simply, on the markup charged for intermediate inputs. This incentive will, in turn, depend on the degree of horizontal concentration in the upstream sector. But now there is a circularity in the argument: the incentives to vertically integrate are strongest when there is a high degree of concentration in the upstream sector, but this concentration can simply reflect that presence of a small number of business groups dominating that market. Conversely, if there were a large number of business groups and unaffiliated firms selling in the upstream market, then the markups would be correspondingly lower, as would be the incentive to vertically integrate. This kind of circular reasoning is precisely what gives rise to multiple equilibria in any economic model, and in our stylized economy we therefore expect to observe both equilibria with a small number of business groups that are highly concentrated/integrated, and those with a large number of groups (and independent firms) that are less concentrated/integrated. The economics of the situation does not select further between these possible organizational structures: both can arise, and would be locally stable.

To confirm this line of reasoning, we have computed equilibria for the economy illustrated in Figures 3 and 4, using specific functional forms for the production of intermediate and final goods, and their demand. By assumption, all firms have access to the same technology, and the demand is identical across all varieties of the intermediate inputs, and of the final products. Thus, the equilibria we consider are “symmetric” in that all business groups are of the same size, and same is true for unaffiliated firms in each sector. The structure of production and demand we shall use are common in models of monopolistic competition, and relies on a constant “elasticity of substitution” between different product varieties. As its name suggests, this parameter measures the degree to which different varieties can substitute for each other, or serve the same purpose. Higher values indicate a greater degree of substitution, while its minimum value is unity. In all of our calculations we use as elasticity of substitution for the final products equal to five. For the intermediate inputs, on the other hand, we consider a range of elasticities of substitution between unity and 3.5. For each value of the elasticity of substitution, we compute the number of groups in equilibrium, as well as the number of unaffiliated firms and the prices charged by each. Our results for the number of groups are shown in Figure 5. To interpret this diagram, for most values of the elasticity of substitution, several possible equilibria are plotted. For example, for an elasticity of three, there are three equilibria: the first is a stable equilibrium with about two V-groups; the second is an unstable equilibrium with about six V-groups; and the third is a stable equilibria with about fourteen U-groups in addition to some unaffiliated downstream firms.⁹ As another example, for an elasticity of substitution of two there are two equilibria: one with a small number of V-groups, and another with a large number of D-groups along with some unaffiliated upstream firms. What this diagram shows is that for most values of the elasticity of substitution, there are two stable equilibria: one with a small number of strongly vertically-integrated groups, and another with a larger number of less-integrated groups, that either buy from or sell to unaffiliated firms.¹⁰

⁹ When we compute the equilibria we allow the number of business groups, and the number of unaffiliated firms, to take on non-integer values. Note that in the V-groups equilibria there are no unaffiliated firms, because they are unprofitable. In the U-group equilibria the only unaffiliated firms are downstream, and in the D-group equilibria the only unaffiliated firms are upstream.

¹⁰ For low values of the elasticity, the D-group equilibria still occur but have not been plotted. The equilibria labeled with a question mark in Figure 5 are computed as D-groups, but have the feature that downstream unaffiliated firms would also want to enter. Thus, these equilibria will involve business groups and unaffiliated firms in both sectors, which is a configuration we have not explored in any detail. The groups do not drive out the unaffiliated firms in this case because their efficiency gains from pricing at marginal cost are smaller
(continued...)

Thus, these computations confirm our expectation that the stylized model gives rise to several different types of group structure. To further understand the nature of these equilibria, in Figure 6 we show the price charged by business groups for intermediate inputs sold to outside firms. Note that the marginal cost of intermediate inputs has been set at unity in the model, which equals the internal price within a group. What we see from Figure 6 is that the stable V-group equilibrium has a high price for the inputs, which ranges from about two up to ten in the diagram. For smaller values of the elasticity of substitution, the price charged in the V-group equilibria takes on even higher values, up to infinity, in which case the groups find it optimal to not sell at all to outside firms.¹¹ Conversely, in the stable U-group and D-group equilibria, the prices charged are relatively low. The unstable V-group equilibria lie in between these two cases. Thus, this diagram confirms our argument above that the structure of the model leads to two stable equilibria, with a high and low price of the intermediate input. The high-price equilibria supports the strongly integrated V-group equilibria, where unaffiliated firms cannot even enter the market, while the low-price equilibria supports the less integrated U-group and D-group equilibria.

Vertical Integration

Our purpose in developing the stylized model has been to see whether it can predict alternative structures of business groups in South Korea and Taiwan. We are especially interested in the vertical-integration of the groups, as was measured by the internal sales ratio using our group data for these two countries. To compare the group data with the theoretical predictions of our model, we compute the internal sales ratio for each of the equilibria plotted in Figures 5. We distinguish between those equilibria with a small number of groups – what we call the *high concentration equilibria* – from those with a large number of groups – the *low concentration equilibria*. In Figure 5 the high concentration equilibria form an “S” shaped path and include the stable V-group at the bottom of the figure, followed by the unstable V-group, followed by the stable U-group equilibria. The low concentration equilibria form a path at the top of the figure, and include the stable D-group, followed by three unstable D-group points, followed by two stable V-group points, followed again by the U-group equilibria. Thus, for each value of the elasticity of substitution, we are choosing the equilibrium with the smaller number of groups as belonging to the high concentration path, and the equilibrium with the larger number of groups as belonging to the low concentration path (when there is a unique equilibrium for that value of the elasticity, then it belongs to both paths).

In Figures 7 and 8 we plot the internal sales ratio against the sales of the business group, for the high concentration and low concentration equilibria, respectively.¹² Recall that for the actual group data,

¹⁰ (...continued)
than their governance costs.

¹¹ There is a dashed line shown in Figure 5, that runs from the north-west to the south-east corner of the diagram. For equilibria above this line, the price charged by a group for inputs sold to outside firms is finite, but for equilibria below that line the price is infinite, meaning that no sales take place. The reason the group can find it optimal to not sell their inputs is because each input variety sold enables the purchasing firm to produce the final good a lower cost. So while the groups earns profits from the sales of the input, it loses profits from the additional competition in the final goods market. For equilibria below the dashed line, the second effect dominates, and any sales of the intermediate inputs is unprofitable for the business groups.

¹² In Figure 7 we have only graphed V-group equilibria that occur for values of the elasticity of
(continued...)

we computed the internal sales ratios over all firms in the group, and then again while excluding the internal purchases of trading companies and of other wholesale and retail firms. Our model does not incorporate any of the informational considerations that would give rise to trading companies, but it does contain a rudimentary distinction between manufacturing and retailing activities. The upstream sector in the model produces and sells intermediate inputs, while the downstream sector assembles and sells the final products. We can conceptually split the downstream sector into its two parts – assembly and retail sales – and treat these as distinct activities. If we suppose that the sales are done by firms other than those engaged in assembly activity but belonging to the same group, then the purchases of the retail firms can be either included within the internal sales ratio, or excluded. These two calculations differ only in an accounting sense in the model, and correspond very closely to how the internal sales ratios were computed for the actual group data.

In Figures 7 and 8, the gray points indicate internal sales ratios that are computed inclusive of the retailing activity of each group, whereas the black points indicate the internal sales ratios computed while excluding the internal purchases of the retail firms. Naturally, the internal sales ratios are higher when the retail purchases are included. We also see in Figure 7 that the internalization ratios for the V-groups are higher than that for the U-groups. If we exclude the unstable equilibria, then there is a noticeable gap between that (stable) V-groups, and the U-groups: the V-groups are much larger, and more strongly vertically integrated. We invite the reader to compare Figure 7 with Figure 1, which displayed the actual group data for South Korea in 1989. The presence of the large and strongly integrated groups is strikingly similar in the two diagrams. Even without any formal statistical comparison, it is apparent that the model is capable of generating equilibria that match the actual structure of Korean groups.

If we take seriously the unstable groups that appear in Figure 7, it would suggest that groups of an intermediate size in South Korea may not last over the long-term. This theoretical prediction appears to be borne out by the financial difficulties that several groups are currently experiencing. The Kia group – which was the eighth largest in 1989 – recently announced a large sale of land to raise cash needed to cover debts.¹³ Its troubles are in part related to the decision of Ford Motor Co. to no longer sell cars through Kia Motors Corp., and instead use its own distribution network in Korea. But Kia is also rumored to be the target of a takeover bid by the larger Samsung group. The Ssangyong group – which was the sixth largest in 1989 – is also selling some assets to cover the losses of Ssangyong Motor Corp.¹⁴ Smaller groups that are in financial difficulty include Sammi and Hanbo, both of which have affiliates that filed for bankruptcy this year.¹⁵

In Figure 8 we turn to the low concentration path, which consist primarily of U-groups and D-groups. This equilibria set has business groups that are considerably smaller than in the high concentration path, and that have smaller degrees of vertical integration. Again, we invite the reader to compare Figure 8

¹² (...continued)

substitution greater than 2.5, meaning that the price charged for group sales of the input to outside firms is finite. In the V-group equilibria for lower values of the elasticity, the sales of each group is even higher than those shown in Figure 7, which their internal sales ratios are in the range of those already shown.

¹³ “Kia Motors Struggles as South Korea’s Auto Underdog,” *Wall Street Journal*, July 25, 1997.

¹⁴ “Troubles of Korean Conglomerates Intensify, Signaling End of Era,” *Wall Street Journal*, April 25, 1997.

¹⁵ “Slowing Down in Seoul: Koreas Inc. Mobilizes to Revive Its Economy,” *Wall Street Journal*, April 17, 1997.

with Figure 2, which displayed the actual group data for Taiwan in 1994. We feel that there is a striking similarity in the two diagrams, especially as compared to the Korean and the high concentration diagrams. Our model gives rise to U-groups and D-groups that are small in comparison with the V-groups, and have lower internalization, which is the same as what we have observed by comparing the Taiwan and Korean groups data. The sectoral information for Taiwan indicated that many of the groups in that country are concentrated in the upstream sector, such as chemicals, meaning that the U-groups may be a better stylized description of that country than the D-groups. But in either case, the low concentration path provides a much better characterization of the Taiwan data, while the high concentration path appears to fit the Korean data.

In summary, our stylized model shows that, even in the absence of other conditions, the price structure among competing, organizationally linked sets of firms is a sufficient condition to push the cross-market organization of an economy in one of several directions. This, of course, suggests that more than one kind of cross-market economic organization not only is possible but would be economic rational and internally coherent. Nothing in the theory itself would suggest that economic factors alone predispose an economy to any one type of economic organization or another. Taiwan has not taken the direction taken by South Korea, which includes organizing extremely large groups integrated backwards and forwards, and we can see the same distinct outcomes arising as equilibria in our stylized model.

References

- Amsden, Alice H. 1989. Asia's Next Giant: South Korea and Late Industrialization. New York: Oxford University Press.
- Amsden, Alice. 1985. "The State and Taiwan's Economic Development." Pp. 78-106 in Bringing the State Back In, edited by Peter B. Evans, Dietrich Rueschemeyer, and Theda Skocpol. Cambridge: Cambridge University Press.
- Evans, Peter B. 1995. Embedded Autonomy: States and Industrial Transformation. Princeton, NJ: Princeton University Press.
- Fields, Karl. J. 1995. Enterprise and the State in Korea and Taiwan. Ithaca, New York: Cornell University Press.
- Gold, Thomas B. 1986. State and Society in the Taiwan Miracle. Armonk, New York: M.E. Sharpe.
- Hamilton, Gary G. 1997. "Organization and Market Processes in Taiwan's Capitalist Economy." Pp. 237-293 in The Economic Organization of East Asian Capitalism, edited by Marco Orrù, Nicole Woolsey Biggart, and Gary G. Hamilton. Thousand Hills: Sage Publications.
- Hamilton, Gary G. and Robert Feenstra. 1995. "Varieties of Hierarchies and Markets." Industrial and Corporate Change. Vol 4, No. 1: 93-130.
- Kim, Eun Mee. 1997. Big Business, Strong State: Collusion and Conflict in South Korean Development, 1960-1990. Albany, N.Y.: State University of New York Press.
- Kim, Hyuk-Rae. 1993. "Divergent Organizational Paths of Industrialization in East Asia." Asian Perspective 17: 105-135.
- Kim, Hyuk-Rae. 1994. "The State and Economic Organization in a Comparative Perspective The Organizing Mode of the East Asian Political Economy." Korean Social Science Journal 20:91-120.
- Orrù, Marco, Nicole Woolsey Biggart, and Gary G. Hamilton. 1997. The Economic Organization of East Asian Capitalism. Thousand Hills: Sage Publications.
- Wade, Robert. 1990. Governing the Market: Economic Theory and the Role of Government in East Asian Industrialization. Princeton: Princeton University Press.

Table 1: Business Groups in Korea, 1989

Number	Group Name	1989 Sales (\$ mill.)	Number of Firms (* TC)	Internal Sales Ratio (%)	Internal Sales (no TC)	Internal Sales (no Retail)
302	Samsung	26175	32*	31.9	18.9	18.8
301	Hyundai	25500	30*	33.0	19.8	19.8
303	Lucky-Goldstar	18807	45*	26.0	16.1	12.5
305	Daewoo	13837	24*	23.5	9.7	9.7
304	Sunkyong	8910	16*	20.6	16.7	10.3
306	Ssangyong	5777	15*	14.8	13.4	11.6
310	Hyosung	4697	20*	7.4	3.3	3.3
319	Kia	4602	9*	25.6	16.0	6.6
313	Lotte	3900	23*	9.2	9.2	7.7
309	Han Jin	3895	11*	2.7	2.2	2.2
308	Korea Explosives	3172	19*	7.7	4.7	4.7
312	Doosan	2417	17*	13.3	11.5	11.5
314	Kolon	2218	14*	10.6	4.0	4.0
318	Dongbu	1978	7*	26.1	17.3	17.3
311	Daelim	1951	12*	4.4	3.5	0.6
324	Dongkuk Steel Mill	1886	10*	5.4	3.4	3.4
321	Dong Ah Construction	1866	12*	1.1	1.1	0.7
317	Sammi	1696	5*	36.6	27.0	27.0
316	Kumho	1430	8*	3.3	0.4	0.4
327	Hanil	1296	12*	7.1	7.1	7.1
325	Miwon	1295	13*	12.5	6.4	6.4
358	Halla	1262	7	10.2	10.2	10.2
335	Kangwon Industries	1256	12*	33.5	33.0	11.4
334	Samyang	1038	5	1.6	1.6	1.6
352	Kohap	1016	6*	18.2	12.5	12.5
351	Poongsan	941	6	3.3	3.3	3.3
359	Woosung Construction	834	6	2.0	2.0	2.0
357	Kukdong Oil	812	3	19.3	19.3	0.0
333	Dongkuk Corporation	689	7*	11.3	1.1	1.1
348	Tongil	685	10	4.4	4.4	4.4
331	Tong Yang	672	5*	9.3	9.3	9.3
340	Byucksan	661	17	0.6	0.6	0.6
344	Daesung Industries	589	8	2.0	2.0	2.0
360	Anam Industrial	537	5	8.7	8.7	8.7
350	Oriental Chemical	528	9	8.9	8.9	8.9
345	Jinro	490	40	2.6	2.6	2.6
332	Taihan Electric Wire	490	3	3.0	3.0	3.0
361	Kyesung Paper	437	5	17.3	17.3	17.3
315	Han Yang	436	4*	6.6	0.7	0.7
343	Hanbo	420	3	2.6	2.6	2.6
362	You One Construction	281	2*	0.3	0.0	0.0
356	Kuk Dong Construction	247	4	0.1	0.1	0.1
355	Life Construction	211	4	3.5	3.5	3.5
	Weighted Average		24.1	22.0	13.4	11.8
	Average	3,531	12.2	11.4	8.3	6.8

Table 2: Korean Groups with Internalization Above 15%

A. Groups that include trading companies, so that internalization ratio is high when they are included, but lower when their purchases are excluded:

SAMSUNG

SAMSUNG CO. acts as the group's trading company. The group includes producers of industrial machinery, consumer electronics and appliances, in addition to construction operations and retail sales.

HYUNDAI

HYUNDAI CO. acts as the group's trading company. The group produces and repairs ships and other motor vehicles. It also has large construction operations and retail sales.

LUCKY-GOLDSTAR

LUCKY-GOLDSTAR INTERNATIONAL, oversees the joint operations of the merged companies LUCKY, and GOLDSTAR. They are producers of consumer electronics and appliances, electrical industrial apparatus, and a variety of chemical products in addition to their retail sales. Lucky-Goldstar International acts as the group's trading company.

DAEWOO

DAEWOO CO., heads this diverse group involved in motor vehicles, electronic products, metal products, as well as shipbuilding and repair. Retail sales are handled by Daewoo Co., acting as the trading company for the group.

KIA (KOREA INTERNATIONAL AUTOMOTIVE)

KIA MOTORS, oversees this group and acts as its trading firm. This group produces some iron and steel forgings but mainly builds automobiles. Retail sales are not only made by Kia Motors, but also by ASIA MOTORS and KEM CO.

DONGBU

DONGBU INDUSTRIAL, manages this group and acts as the trading firm. Group products include: cold rolled steel, iron and steel foundry items, and residential construction.

KOHAP

KOHAP, leads this group. Group products include: chemical fiber fabrics, chemical fiber yarns, synthetic resin products, as well as wholesale distributing. KOHAP INC., is the trading firm and retailer of the firm's products.

B. Groups that have a high internalization ratio, but much of it is accounted for by sales to wholesaler/retailers that are not designated as trading companies:

Table 2: Korean Groups with Internalization Above 15% (cont'd.)

SUNKYUNG

YUKONG, is the central fuel oil producer of this group, and purchases a large amount from other firms. Sunkyong also produces petrochemicals. Retail gas and oil sales are handled by the groups trading company, SUNKYUNG. A substantial amount of retail sales are also made by HUNGKUK SANGSA LTD, which is not classified as a trading company.

KANGWON INDUSTRIES

KANGWON INDUSTRIAL, directs this group. Group products include: coal mining, hot rolled steel, cement, and cement products. The group trading company is SAMPYO INDUSTRIAL. Retail sales are made by SAMPYO CORPORATION, with minor sales by SAMPYO GAS.

KUKDONG OIL.

KUKDONG OIL, leads this group. They produce fuel oils, retailing these products through SEIL PETRO-OIL.

C. Groups that have a high internalization ratio, that is not accounted for by either trading companies or wholesalers/retailers:

SSANGYONG

SSANGYONG CO., governs this diverse group. Its primary industries are cement, fuel oils, construction, and motor vehicles. Ssangyong Co. acts as a retailer and trade company for the group, except in automobiles where SSANGYONG MOTOR is the retailer.

SAMMI

SAMMI CO., heads this group and acts as the retailer/trading firm. Group products include: cold rolled steel, iron and steel foundry items, and some metal products.

KYESUNG PAPER

KYESUNG PAPER, heads-up this group, and buys from the other three firms in the group, especially from POONGMAN PAPER. Group products include: paper, paper products, and road transport.

Table 3: Business Groups in Taiwan, 1994

Number	Group Name	1994 Sales (\$ mill.)	Number of Firms (* TC)	Internal Sales Ratio (%)	Internal Sales no TC)	Internal Sales (no Retail)
1028	Formosa Plastics	6654	16	15.8	15.8	15.8
1063	Shin Kong	5724	25*	0.4	0.4	0.4
1092	Wei Chuan Ho Tai	4889	23*	28.1	28.0	0.4
1026	Far Eastern	4291	26	0.7	0.7	0.5
1095	Yulon	4264	23*	26.6	22.9	5.2
1123	President	3932	31*	6.4	6.1	4.5
1081	Tatung	3634	36	8.3	8.3	6.3
1119	Acer	3243	9*	3.5	2.4	2.4
1062	Chinfon	2986	16*	24.1	24.1	1.1
1141	Hualon	2517	9*	16.4	4.7	4.7
1017	Ho Hsin	2104	15*	0.2	0.2	0.2
1087	Tuntex	1831	16*	8.1	8.1	7.9
1082	Teco Electric & Machinery	1474	17*	2.6	2.6	2.6
1010	Chi Mei	1268	6*	0.3	0.3	0.3
1128	Rebar	1221	9*	1.4	0.9	0.9
1056	Pacific Cable	1214	26	3.2	3.2	3.2
1059	Sampo	1096	11	12.5	12.5	12.5
1077	Tainan Spining	1075	17	2.1	2.1	2.1
1138	Pacific Construction	1032	15	2.8	2.8	2.7
1096	Yuen Foong Yu	1000	8*	18.5	4.5	4.5
1058	Ruentex	997	25*	0.7	0.0	0.0
1078	Taiwan Cement	997	16	3.6	3.6	3.6
1045	Lien Hwa Mitac	900	12*	2.8	2.8	2.7
1115	Walsin Lihwa	881	8	0.1	0.1	0.1
1143	Lite-On	875	10	0.5	0.5	0.5
1125	Kwang Yang	855	7*	6.3	6.3	6.3
1009	Cheng Loong	823	7*	16.3	16.2	16.2
1129	Shih Lin Paper	766	5	0.1	0.1	0.1
1117	United Microelectronics	673	4	8.5	8.5	8.5
1002	Chung Shing Textile	668	5	6.6	6.6	6.1
1131	Yeang Der	618	14	1.0	1.0	0.1
1130	China General Plastics	598	5	12.6	12.6	12.6
1021	Chun Yuan Steel	528	5	4.7	4.7	4.7
1135	Adi	484	9	0.7	0.7	0.3
1139	Shinlee	456	12*	0.4	0.4	0.4
1133	Umax Elitegroup	436	8*	7.2	7.2	7.2
1103	Pou Chen Industrial	434	3	4.5	4.5	4.5
1140	Aurora	406	7*	17.5	8.6	8.6

1124	Ase	404	5*	10.5	1.3	1.3
1097	Great Wall	375	12	21.1	21.1	20.7
1033	Ho Cheng	375	8*	14.5	14.5	14.5
1079	Taiwan Glass	350	9*	2.6	1.3	0.6
1086	Tung Ho Steel	350	4	0.6	0.6	0.6
1118	Lealea	335	7	9.4	9.4	9.4
1090	Vedan	327	8*	8.1	7.5	7.5
1012	Chia Hsin Cement	303	7*	7.0	7.0	7.0
1036	Hwa Eng Cable	303	3	8.9	8.9	8.9
1101	Lily Textile	301	7	0.7	0.7	0.7
1121	Chia Her	293	5	1.6	1.6	1.6
1107	Sun Moon Star	287	5*	7.1	3.8	3.8
1070	Ta Ya Cable	276	6	4.0	4.0	4.0
1065	Shing Nung	256	13*	6.2	5.9	5.9
1025	Tah Tong Textile	235	13*	4.5	3.4	0.7
1137	Dahin	231	5*	12.3	9.9	9.9
1113	Chicony Electronics	217	3	4.3	4.3	4.3
1127	Kenda Industrial	211	8	0.5	0.5	0.5
1075	Lee Tah Farm Industrial	204	5	11.6	11.6	11.6
1011	Fwu Sow Industrial	200	7*	7.1	7.0	7.0
1132	Asia Chemical	180	13*	4.6	2.7	2.7
1050	Men Yi	170	4	1.0	1.0	1.0
1046	China Unique	166	4	2.8	2.8	2.8
1111	Ve Wong	161	3	10.0	10.0	10.0
1122	Hong Ho Precision Textile	159	6*	3.4	3.4	3.4
1020	Chun Yu	158	7*	6.1	5.6	5.3
1114	Ability	157	11	2.2	2.2	2.2
1136	Far Eastern Machinery	156	7	0.3	0.3	0.3
1142	UB	139	8	7.4	7.4	7.4
1013	Chien Shing Stainless Steel	137	6	8.4	8.4	8.4
1068	South East Cement	134	5	8.0	8.0	8.0
1126	Bomy	116	9	29.5	29.5	0.0
1116	Taiwan Everlight Chemical	104	5*	14.2	3.5	3.5
1110	Ching Kuang Chemical	104	3	10.6	10.6	10.6
1134	Nan Pao Resins	104	3	8.4	8.4	8.4
1120	Victor Machinery	101	12*	1.2	1.2	1.2
1014	Ren Hou (Chih Lien)	83	10*	0.0	0.0	0.0
1112	Yung Shin Pharmaceutical	78	8*	2.7	1.8	1.8
1030	Fu I Industrial	77	5*	5.1	5.1	5.1
1061	San Wu Textile	53	3	2.7	2.7	2.7
1207	Fong Kuo	48	4	6.5	6.5	6.5
1084	Tong Hsing	35	4*	2.8	2.0	2.0
	Weighted Average		16.9	9.5	8.5	4.5
	Average	954	10.0	7.0	6.0	4.7

Table 4: Taiwanese Groups with Internalization Above 15%

A. Groups that include trading companies, so that internalization ratio is high when they are included, but lower when their purchases are excluded:

HUALON

HUALON CORP., is a producer of synthetic fiber and cotton. It sell a large amount to THE E-HSIN INTERNATIONAL CORP., which is designated as a trading company.

YUEN FOONG YU

YUEN FOONG YU PAPER MFG. CO. LTD., is a manufacturer of paper products. It sells a large amount to RAY FOONG ENTERPRISE CO. LTD., which is designated as a trading company.

AURORA

AURORA CORPORATION LTD., SANTA SYSTEMS CORP., and AURORA MECHATRONICS CORP., are all producers of electronic equipment. They have transactions between themselves, and also with EOS SYSTEMS CORP., which is a trading company.

TAIWAN EVERLIGHT CHEMICAL

EVERLIGHT CHEMICAL INDUSTRIAL CORP., is a manufacturer of dyeing and bleaching materials. It sells a large amount to the following group companies, all of which are designated as trading companies: EVERLIGHT (HONG KONG) LTD.; EVERLIGHT USA LTD.; ELITE DYESTUFFS & CHEMICALS FOREIGN TRADING CO.

B. Groups that have a high internalization ratio, but most of it is accounted for by sales to wholesaler/retailers that are not designated as trading companies:

WEI CHUAN HO TAI

KUOZUI MOTORS LTD., is a producer of motor vehicles. It sell a large amount to HO-TAI MOTOR CO. LTD., which is an automobile dealer and service center.

YULON

YULON MOTOR CO. LTD., is a manufacturer, buyer and seller of automobiles and auto parts. CHINA MOTOR CO. LTD. produces finished vehicles and auto parts. Both these companies buy from a number of other firms in the same group that are also classified in the motor vehicle sector. Retail sales are handled by NISSAN TAIWAN LTD. and TAIWAN ACCEPTANCE CORP.

CHINFON

SAN YANG INDUSTRY CO. LTD., is producer of motor vehicles. It sells a large amount to NANYANG INDUSTRIES CO., LTD., which is an automobile dealer.

Table 4: Taiwanese Groups with Internalization Above 15% (cont'd.)

BOMY

CHOU CHIN INDUSTRIAL CO. LTD., is a producer of fruit and vegetable juices, sells and rents vendor machines, and manages supermarkets. It sells a large amount to the following group firms, all of which are engaged in selling beverages: CHOU SHANG INDUSTRIAL CO. LTD.; SHIOH HORNG CO. LTD.; CHOU HIS CO. LTD.; CHIA PIN INDUSTRIAL CO. LTD.; CHOU HUEI CO. LTD.

C. Groups that have a high internalization ratio, that is not accounted for by either trading companies or wholesalers/retailers:

FORMOSA PLASTICS

This group is a leading producers of chemicals, plastics, textiles and garments. It includes the following four firms, which have a large amount of transactions with each other: FORMOSA PLASTICS CORP.; NAN YA PLASTICS CORP.; FORMOSA CHEMICAL & FIBER CORP.; FORMOSA HEAVY INDUSTRIAL CORP.

CHENG LOONG

TIEN LONG PAPER MFG. CO. LTD., is a manufacturer of paper products. It sells a large amount to CHENG LOONG CO., LTD., which a producer of paper products, such as boxes.

CHINA GENERAL PLASTICS

TAIWAN POLYVINYL CHLORIDE, is a refiner of petrochemicals. It sells a large amount to CHINA GENERAL PLASTICS CORP.

GREAT WALL

GREAT WALL ENTERPRISES CO. LTD., is a producer of bean oil and animal fodder. It both buys and sell a large amount to the following group companies, the last of which does not have a sector classification, but might be a trading company: PAO FU LIVESTOCK ENTERPRISE CO.; TOTAL NUTRITION TECHNOLOGIES CO. LTD.; COUNTRY FLAVOR FOODS CO. LTD.; CHANNELS POWER CO. LTD.

HO CHENG

HOCHENG POTTERY MFG. CO., LTD., is a manufacturer of porcelain items. It purchases a large amount from (and sells a smaller amount to) the following producers of plumbing fixtures: HCG-MOEN CORP.; YUHONG CO. LTD.

DAHIN

DAHIN CO. LTD., is in chemicals and plastics engineering. It both purchases and sells a large amount with the following firms, the second of which is a trading company: YANIN LEATHER CO. LTD.; ATMOSA INTERNATIONAL CO. LTD.; YISHIN ENGINEERING CO LTD.

Table 5: Group Sales in South Korea and Taiwan

Sector	Korea, 1983 Group Sales /Sector Sales	Korea, 1989 Group Sales /Sector Sales	Taiwan, 1983 Group Sales /Sector Sales	Taiwan, 1994 Group Sales /Sector Sales
<i>Primary Products:</i>				
Agriculture, Forestry, Fisheries	na	0.3	na	2.9
Mining	10.6	12.8	0.0	0.0
<i>Manufactured Products:</i>				
Food Products	33.7	23.8	26.3	13.9
Beverages and Tobacco	27.6	47.3	3.8	1.4
Textiles	38.4	32.5	50.7	45.3
Garments and Apparel	12.6	0.9	12.0	0.4
Leather Products	15.2	7.6	9.1	\1
Lumber and Wood Products	31.5	13.4	4.0	1.1
Pulp and Paper Products	6.7	15.4	20.1	20.8
Printing and Publishing	\2	9.2	\2	0.0
Chemical Materials	54.3	37.5	42.4	35.3
Chemical Products	24.0	26.9	8.4	2.2
Petroleum and Coal Products	91.9	100	0.0	4.25
Rubber Products	76.8	21.9	13.0	1.2
Plastic Products	\3	38.8	5.4	5.0
Non-Metallic Mineral Products	44.6	28.0	47.6	37.6
Primary Metals	28.0	34.3	7.8	2.8
Metal Products	26.7	25.8	6.0	22.5
Machinery	34.9	33.9	3.6	12.3
Electronic Products	50.9	64.3	22.7	24.4
Motor Vehicles and Shipbuilding	79.0	80.4	23.6	34.9
Precision Instruments	14.0	11.1	0.0	0.0
Misc. Industrial Products	5.2	2.88	10.7	0.12
Total Manufacturing	45.4	40.7	19.0	16.4
<i>Non-Manufactured Products:</i>				
Utilities	na	3.6	na	1.2
Construction	66.0	31.7	5.6	8.4
Transportation, Comm. & Storage	23.1	23.6	1.8	3.0

Notes:

1. Leather products for Taiwan are included with garments and apparel.
2. Printing and publishing is included with pulp and paper products.
3. Plastic products for Korea in 1983 are included with chemical materials.

Table 6: Largest Five Groups for Korea

	Samsung	Hyundai	Lucky-Goldstar	Daewoo	Sunkyong
Agriculture, Forestry, Fishery					*
Mining					
Food Products	**				
Beverages and Tobacco					
Textiles	**				*
Garments and Apparel	*		*		
Leather Products					
Lumber and Wood Products		*			
Pulp and Paper Products	*				
Printing and Publishing	*				
Chemical Materials	**	*	*		**
Chemical Products			*		
Plastics	*		**	*	
Petroleum and Coal Products			*	*	*
Rubber Products					
Non-Metallic Minerals	*	*			
Primary Metals		****	*		
Metal Products		**	*	*	
Machinery	**	***	*	***	
Electronic Equipment	*****	**	[19]	*****	**
Shipbuilding and Repair		***		**	
Autos and Other Transport.	**	**		****	
Precision Instruments	*		**		
Misc. Manufacturing				*	
Utilities					**
Construction	**	***	**	*	*
Wholesale and Retail	**	**	*****	*	***
Transportation, Communication		**	**		**
Finance and Insurance	*		*		
Real Estate	*		*		
Other Services	*****	****	****	****	*
Total Number of Firms	32	30	45	24	16

Table 7: Largest Five Groups for Taiwan

	Formosa Plastics	Shin Kong	Wei Chuan Ho Tai	Far Eastern	Yulon
Agriculture, Forestry, Fishery		*			
Mining					
Food Products			***		
Beverages and Tobacco			*		
Textiles	**	****		****	**
Garments and Apparel					
Leather Products					
Lumber and Wood Products					
Pulp and Paper Products					
Printing and Publishing					
Chemical Materials	***				
Chemical Products				*	
Plastics	**	*			
Petroleum and Coal Products	**			*	
Rubber Products					
Non-Metallic Minerals				**	
Primary Metals			*		
Metal Products			*		
Machinery	*				**
Electronic Equipment			**		**
Shipbuilding and Repair					
Autos and Other Transport.			*		[10]
Precision Instruments					
Misc. Manufacturing					
Utilities		**			
Construction		*	***	***	**
Wholesale and Retail		***	*****	**	**
Transportation, Communication and Storage	**		*	**	
Finance and Insurance		*****	*	*****	**
Real Estate		*			
Other Services	****	*****	**	*****	
Unknown			**		*
Total Number of Firms	16	25	23	26	23

Table 8: Group Internal Sales Ratios, Summary

Number of Groups	Group Name	Sales (\$ mill.)	Number of Firms	Internal Sales Ratio (percent)¹	Internal Sales Ratio (no TC)²	Internal Sales Ratio (no Retail)³
(a)	South Korea, 1989					
All 43	Weighted Average		24.1	22.0	13.4	11.8
All 43	Average	3,531	12.2	11.4	8.3	6.8
Top 5	Weighted Average		31.4	28.8	17.0	15.6
Top 5	Average	18,646	29.4	27.0	16.3	14.3
Other 39	Weighted Average		12.5	11.4	8.4	6.6
Other 39	Average	1,593	10.9	9.4	7.3	5.8
(b)	Taiwan, 1994					
All 80	Weighted Average		16.9	9.5	8.5	4.5
All 80	Average	954	10.0	7.0	6.0	4.7
Top 5	Weighted Average		22.1	14.0	13.4	5.2
Top 5	Average	5,164	22.6	14.3	13.6	4.5
Other 75	Weighted Average		14.3	7.2	6.0	4.2
Other 75	Average	673	9.1	6.5	5.5	4.7

Notes

1. Computed as the ratio of sales between firms in each group to total sales of the group.
2. "No TC" means that the internal sales ratio is calculated without including the purchases of any trading companies from within the group.
3. "No retail" means that the internal sales ratio is calculated without including the purchases of any trading companies or other wholesale or retail firms from within the group.

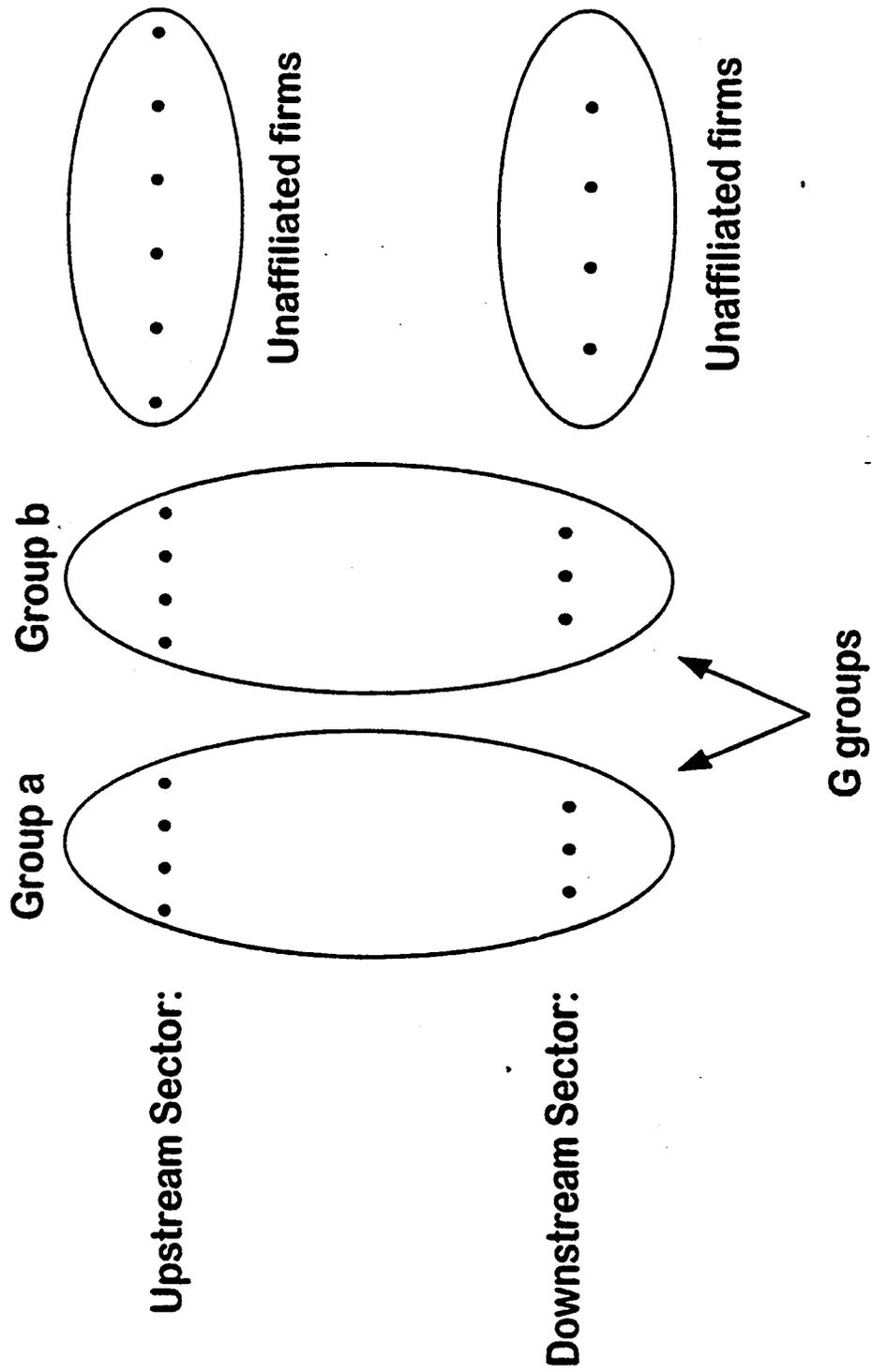


Figure 3: Model of Business Groups

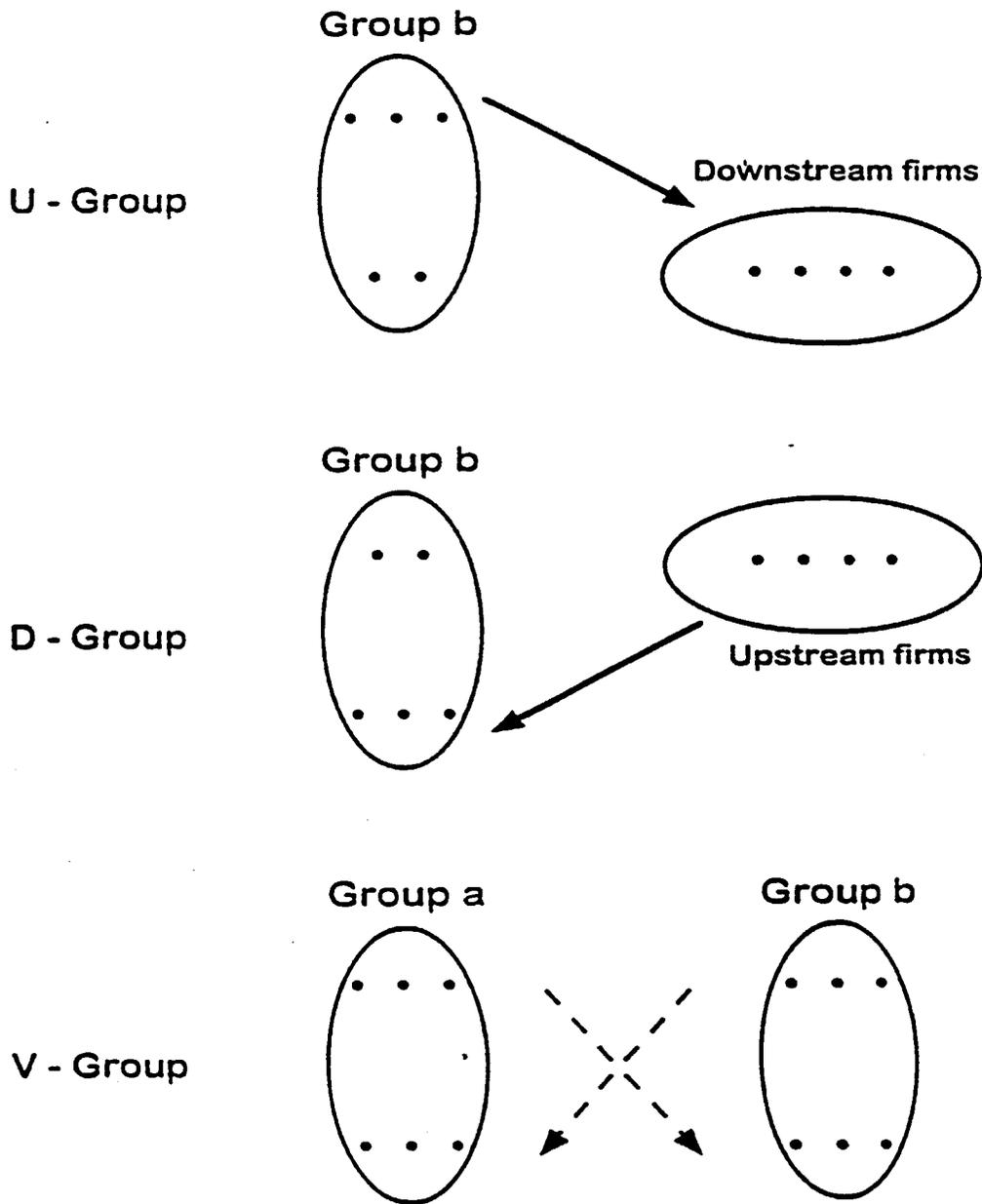


Figure 4. Types of Business Groups

Figure 5: Number of Business Groups

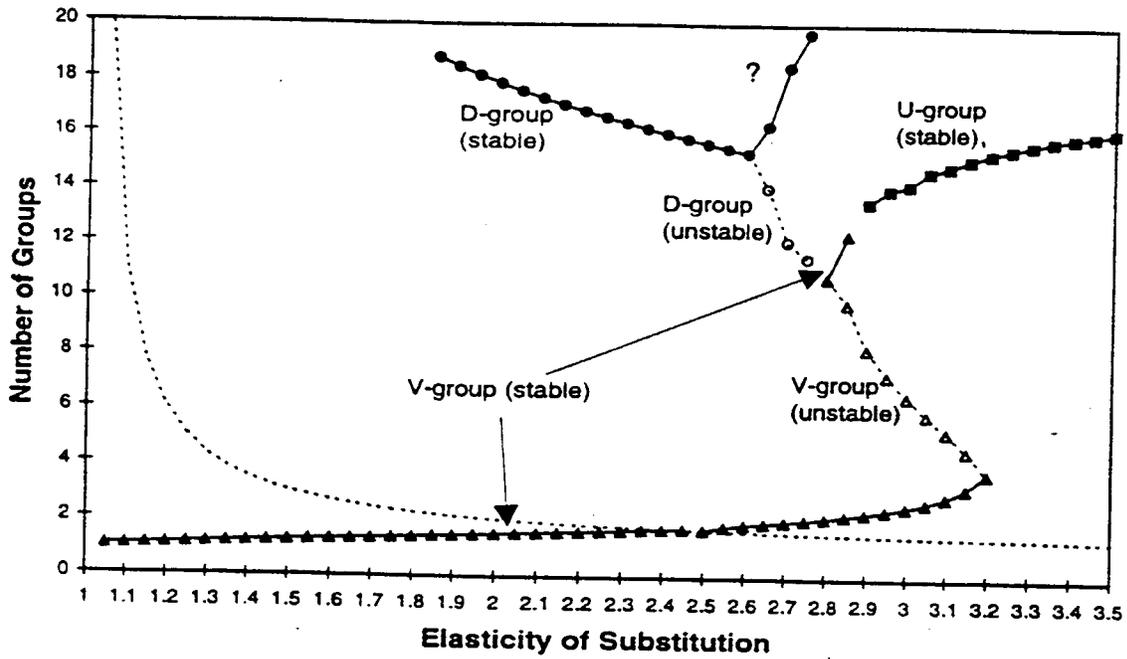


Figure 6: Price of Intermediate Input

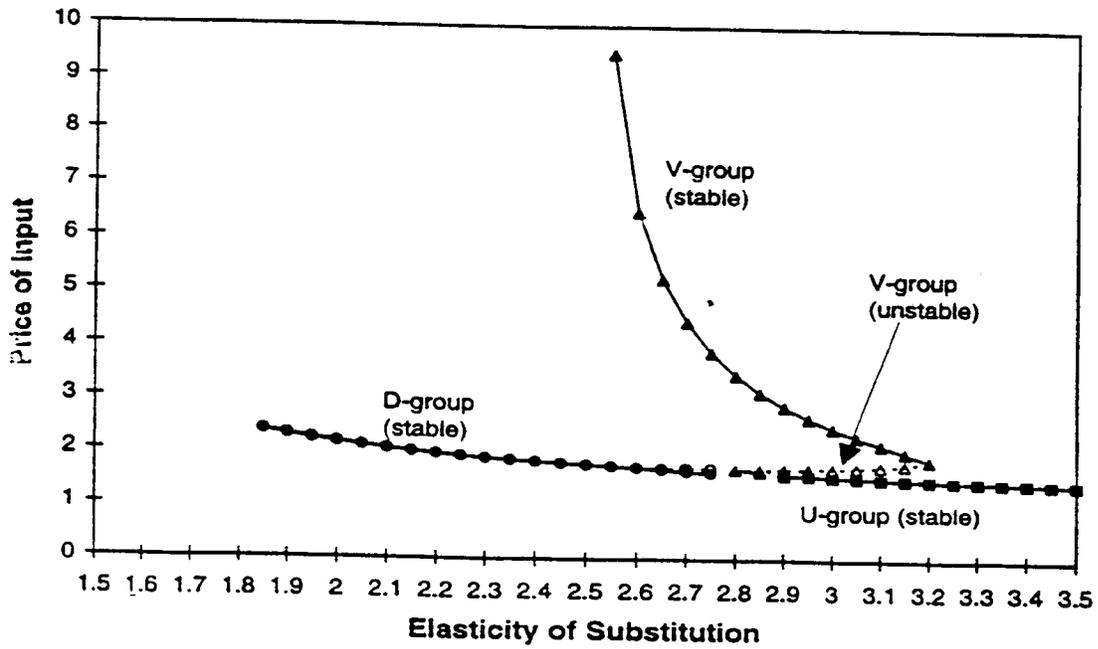


Figure 7: Internal Sales, High Concentration Equilibria

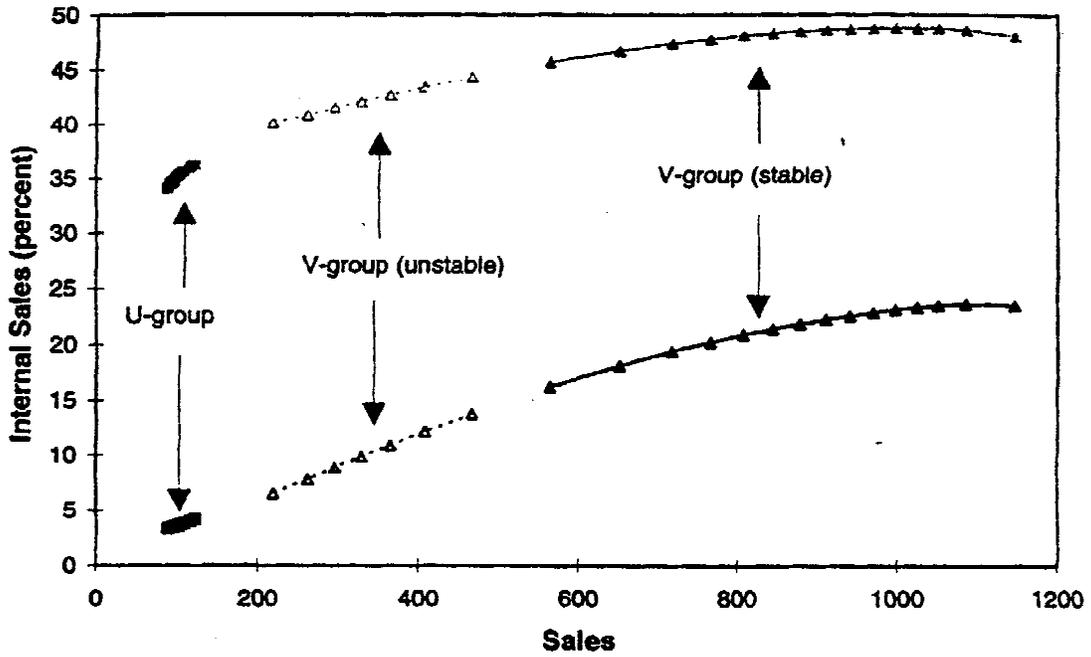
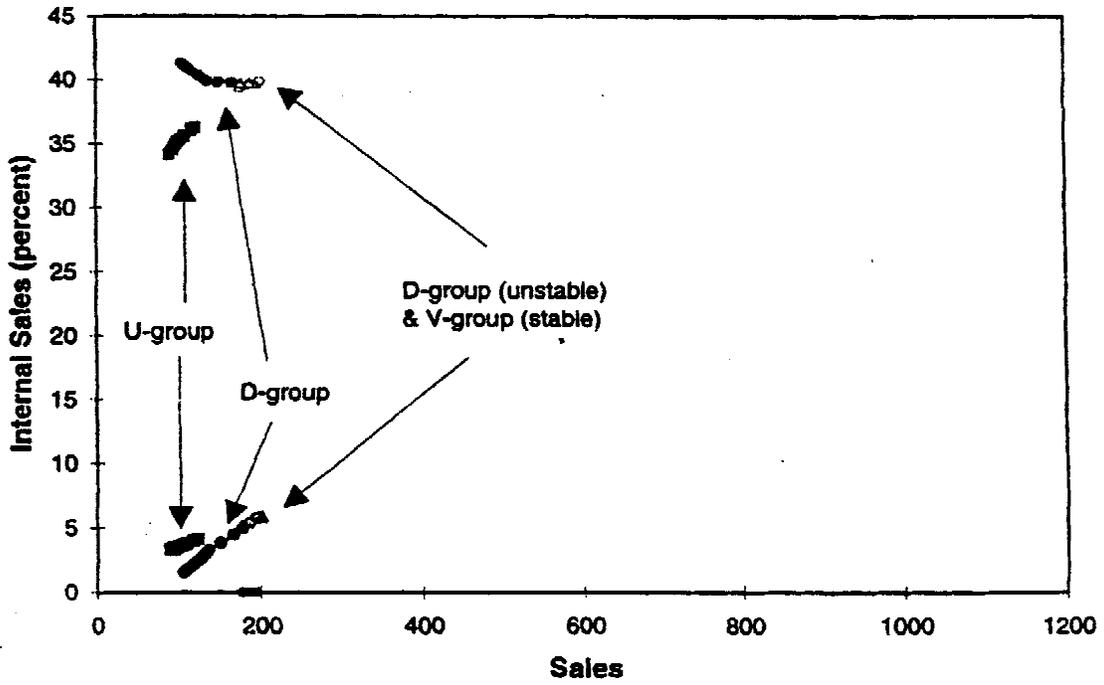


Figure 8: Internal Sales, Low Concentration Equilibria



Comments by Dennis Yao on

**Ethnic Chinese Networks in International Trade by
Victor Trindale and James Rauch
and**

**The Organization of the Taiwanese and South Korean Economies: A Comparative Analysis by
Robert Feenstra and Gary Hamilton**

The Trindale and Rauch paper suggests an information-based explanation for why ethnic groups generate trade between countries. The authors estimate a gravity model to explore these relationships--using a variable for the Chinese population shares. I think the results generally support the information explanation that is proposed in the paper and that the paper is a valuable contribution. However, there are aspects to the results raise questions.

Jim talked about one half of the two sets of models that are reported in the paper. One set includes a remote coefficient, which allows for special situations such as posed by Australia and New Zealand which are relatively isolated from their other trading partners. The other set leaves out the remote variable. The estimated coefficients differ across the various models.

In tables 4 and 5 (estimates without the remote variable) there is not much difference (statistically) in the coefficients for differentiated products versus market reference products versus the other category. In fact, the authors comment that the coefficients may not be statistically different from each other within any year and aggregation. Such a result is not fully supportive of the information argument that is being made.

I also wondered about the differences in the estimates between the 1980 estimations and the 1990 estimations. All things being equal, of course, 1980 and 1990 should have similar coefficients, but they don't. The 1990 data tells a much better story with respect to differentiation, and therefore better supports the proposed theory. The offered explanation is that communications had substantially improved worldwide by 1990 compared to 1980, but other explanation might also explain the differences. Given some of the alternative noninformation explanations for increased trade, it is quite important that differentiated products to produce different results than the other product categories.

One other explanation is that trade policies changed. If trade policies changed in this region between 1980 and 1990, that could alter the trade flows so as to produce differences between the 1980 and 1990 results. Another explanation is that these economist started trading different products during this period of time. Given the rapid growth and emergence of many of these countries during this period, one would expect that the profile of products that were traded on the world market would have changed.

Now consider two other theories of why ethnic networks might lead to increased trade. The first theory is a legal transactions cost argument. It runs like this: legal systems can impact trade especially where the contract enforcement systems are not good, where potential problems in business relationships can develop, and where legal system differ. Legal transactions are not a great problems in the United States. But in two countries with very different legal traditions and laws, trading across country boundaries can be a real problem. In such situation, traders might rely on ethnic background, personal relationships, shared cultural understandings, or other things that help support a relationships, shared cultural understandings, or other things that help support a relationship not fully supported by the legal systems. This theory also predicts that ethnic networks should lead to increase trade.

But does this alternative theory explain the difference in the impacts on differentiated products versus the other product categories? It could be argued that trade relationships involving differentiated products are generally more complex than those involving homogenous products and therefore that trade and distribution relationships involving such products depend even more on contract enforcement systems. In any event this explanation can well be complementary rather than a substitute for the informational theory proposed in the paper.

Another explanation involves government policy. As the ethnic share of the population in a country increases, it becomes easier to influence the government to produce trade policies favoring that ethnic group. This explanation also appears consistent with the results, although this theory also has some difficulty explaining the differentiated versus reference products results. Thus, it would appear that the differentiated product result is pivotal in at least partially ruling out these alternative explanations.

Finally, I will briefly note a policy implication of these results. Because ethnic networks appear to be efficiency enhancing, decision makers that would like governments to take action to offset the workings of such networks must be sure to take into account the positive efficiency-enhancing aspects of the networks.

I now turn to the Feenstra and Hamilton paper, a paper I also found to be stimulating and well done. First, I think the data tell a convincing story about the differences between the organization of the Korean economy and the Taiwan economy. The next question is whether the theory is compelling.

Because the model in the paper is not formally laid out--I understand that it is laid out in another paper--it is difficult for me to assess its strengths and weaknesses. The model produces multiple equilibria (that is, there is more than one stable configuration) Multiple equilibria can be produced, however, as an artifact of modeling assumptions any may not be a feature of a somewhat different, by equally compelling, model formulation. For example, the model appears to assume that each firm in an industry can only offer a single product. This is a simplification for tractability, but could have some impact on the equilibria that emerge. Therefore, a close examination of the actual model would have been useful in assessing the persuasiveness of the theory.

I can, however, examine the intuition that explains the reasons for the stability of the different economy configurations. With respect to the vertically integrated (chaebol) equilibrium more concentration implies higher markups, which imply more benefits to vertical integration, because of the efficiency gains, which imply more concentration, which implies higher markups. This set of self-reinforcing set of factors seems intuitively reasonable. I do not have as clear a sense of the intuition underlying the (Taiwan) equilibrium in which some groups are vertically integrated and others are not. It appears that the answer lies in the tradeoff between "governance costs" that encumber a vertically-integrated firm and the advantage that such a firm has in avoiding incorrect pricing, with the advantage increasing as concentration in the upstream industry increases. Without the actual formal model it is difficult to assess exactly how this works.

Now, I will make a few general comments. First, I do not know much about Korea, but as a business economist, I do wonder how the conglomerate aspect of the chaebols can survive. The vertical integration aspect of the chaebols at least has some identifiable benefits, and the tradeoffs identified in their paper along these lines make a lot of sense. But what advantages exist for the chaebols from their activity in unrelated industries (other than political advantages and advantages that might have emerged from a closed capital market)?

Second, the authors deliberately develop their model without government policy. They ask “with the market alone, what emerges?” The model produces two different kinds of equilibria. That approach is a strength since it indicates a central tendency that does not depend on government policy. Of course, since we are trying to understand Taiwan and Korea in practice and not just in (market) theory, at some point one needs to add back considerations about government policy, particularly in the case of Korea where government policy was arguably instrumental in creating an environment conducive to the creation and maintenance of the chaebol.

Another concern is that the authors’ model is of complete economy, but Taiwan and Korea are economies existing in a larger global trading system. The model ignores the impact of firms that are outside the modeled economy, but which compete with firms that exist within the modeled economy. (For example, Korea and Taiwan--representing different equilibria--compete with each other in many industries.) If there are factors that “isolate” the economies so that the model can be restricted to examining a country’s lone, then one should probably be sure that those factors (e.g., government factors!) can justifiably be left out of the model.

My final comment is about the treatment of business organization in this paper. The model allows for vertically-related firms and unrelated firms, but the real world allows for a continuum of relationships among firms in an economy. Some of the problems that could be partially or fully solved through vertical integration can also be solved through our organization relationships such as contracts. (e.g., contracts can often solve incorrect pricing problems.) These intermediate forms of relationships also change other incentives of firms and could affect the structure of the economy. I would counsel caution, then, on the interpretations based on the results of a model which limits itself to the polar extremes of organizational relationships.

The policy and trade implications are interesting. I believe the major point is that the organizational form that we observe in Taiwan and Korea are sustainable without government intervention. Elimination of the government role in promoting or assisting the organizational form will not, according to this theory, cause the economy to convert to a different organizational structure. Therefore, for example, if the Korean government were to end all policies that differentially help the chaebols, one should not expect that the chaebol form will be dismantled through market pressures alone.

Comments by David Gould on

Ethnic Chinese Networks in International Trade by Vitor Trindade and James Rauch

Overall, I found the paper to provide an informative exposition on the role that Chinese immigrant networks play in stimulating bilateral trade flows. Unlike Gould (1996) where immigrants are found to stimulate trade between their host and mother country, Vitor Trindade and James Rauch examine the hypothesis that Chinese immigrants have networks that enhance trade flows between any two countries which host these immigrant communities. Certainly, there is much causal evidence to suggest that these networks exist, but little or no solid empirical work to quantify how much these networks affect trade. I found most of the authors' arguments convincing, but I have a few comments that may strengthen the conclusions of the paper.

1) In testing the network hypothesis, Chinese immigrant populations in two trading countries are multiplied together to create the CHINPOP variable. For a given stock of Chinese immigrants in the two countries, this variable has the highest value when the populations are of equal size. This assumption implies that the largest network effects are between equal size communities and seems to be correct if the Chinese need a partner in the other country to trade with. But perhaps the Chinese are just good traders because of a culture that places a high value on entrepreneurship. In other words, Chinese immigrants might stimulate trade not just by trading with each other, but with everyone. A way of getting a better grip on this Chinese networks/good Chinese traders question is to examine trade between country i and j relative to their trade with the rest of the world ($V_{ij}/(V_{iw}+V_{jw})$). If this ratio is higher between countries with larger stocks of Chinese immigrants (controlling for everything else) it is more suggestive of the network hypothesis.

2) A more fundamental problem is that of distinguishing between the effects of Chinese immigrants and other immigrants. I suspect that countries that have a lot of Chinese immigrants also have a lot of immigrants from their direct trading partners. So, it may be that immigrants from their trading partners are important to bilateral trade and not Chinese immigrant networks. For example, Canada and the U.S. both have very liberal immigration policies, so they both have many immigrants in addition to Chinese immigrants. Moreover, Canada has a lot of U.S. immigrants and the U.S. has a lot of Canadian immigrants. U.S. immigrants in Canada and Canadian immigrants in the U.S. may be more important to stimulating U.S.-Canada bilateral trade than Chinese immigrants. This question may be tackled by looking at the share of Chinese immigrants in the total immigrant population, rather than just the absolute number of Chinese immigrants.

3) Does the threshold model provide better explanatory power over simple OLS? I can understand why a threshold in the immigrant community would be important, but is it also the case for total trade bilateral trade flows?

4) The REMOTE variable is not necessarily measuring what the authors want it to. In the text, they state that two nations that are close to each other, but are both far away from rest of the world (for example, Australia and New Zealand) might be expected to trade more with each other, *ceteris paribus*. This is reasonable. However, the way REMOTE is measured, it simple captures the point that both nations far away from the world markets. It does not capture whether they are also close together. For example, you could have two nations like New Guinea and Greenland that may be equally far apart from world

markets but are still closer to world markets than they are to each other. In creating the REMOTE variable the authors should divide their measure by the distance between the two trading partners.

5) The intuition in part IV of the paper (tentative welfare analysis) was not clear to me. Perhaps the argument can be flushed out more.

Comments by Bee Yan Aw Roberts on

The Organization of the Taiwanese and South Korean Economies: A Comparative Analysis” by Robert Feenstra and Gary Hamilton

While many researchers recognize the importance of the organization of firms and interfirm relationships in explaining performance, few have been able to give these issues the central place it deserves in any discussion of an economy’s growth and development. This paper fills an important gap in the literature on the role of business networks in the economies of South Korea and Taiwan.

The first half of the paper provides careful documentation of the organizational differences between the South Korean and Taiwanese economies. A measure of the extent of vertical integration is developed and used to quantify the degree of “internalization” within the largest business groups in each economy.

On average the internalization ratio for South Korea is found to be 11.8 in contrast to the corresponding figure of 4.8 in Taiwan. While trading companies owned and operated within business groups are carefully accounted for in arriving at these figures, I wonder if the role of subcontracting firms should be addressed as well. The network of subcontractors has become increasingly important in Korea since 1982 with the passing of The Small and Medium Industry Systemization Law. These firms are more likely to be independent firms in Taiwan and should not affect the internalization ratio. If they can be owned by conglomerates in Korea, (I know that the Hyundai Motor Company group subcontracts out to suppliers within the group) then sales of subcontractors should be accounted for in measuring the extent of internalization. The problem is that, firms that are pure subcontractors often record zero sales (this is the case in Taiwan) implying that the actual magnitude of internalization for Korea may be higher than indicated by the measure used by the authors.

The authors provide an interesting insight into the nature of industrial structure in the two countries, namely that the general perception of Taiwan as an economy of very small firms producing for the world market and of South Korea as a country ruled essentially by very large, vertically integrated business groups called chaebols, the polar opposite industrial structure from that observed in Taiwan, is far too simplistic. The authors provide careful evidence to indicate that the industrial structure in both countries is far more heterogeneous. Taiwan’s industrial structure is more accurately described as dualistic comprising of a large sector of small firms buying intermediate goods from an equally large sector of large business groups. Similarly, the conglomerates of South Korea comprise of the giant top five business groups with the remaining groups that are distinctly smaller and quite similar in characteristics to the biggest Taiwanese business groups.

The second half of the paper describes how the differences in how firms are organized in the South Korean and Taiwanese economies are consistent with a stylized model of business group formation. I found this section somewhat less compelling. In particular, the model appears to be more suitable in the context of explaining why firms have incentives to vertically integrate but less appropriate for the formation of business groups as we understand them. Public policy and financial reasons are often the main factors behind business groups. This is certainly true in the case of the two economies studied here.

One assumption that is worth considering in the paper is that with respect to entry and exit costs. Free entry and exit is assumed in the current model. Detailed studies on the industrial structure in South Korea and Taiwan have pointed to distinguishing differences between the two economies with regards to

the costs of entry and exit as an explanation for the different industrial structures that are observed. The costs of “governance” referred to in the paper is related closely with fixed production costs. Entry and exit costs are related to sunk costs and therefore likely also to affect decisions of incumbents as well as potential entrants in a way that ultimately influences the overall industrial structure in the economy.

As in any work on Asia, it is important to put the results generated by the model in the context of the current crises that has hit the economies in it. In particular, for South Korea, this crises has raised many questions about the economic wisdom of its business groups. The theoretical model in the paper predicts the stability of the large, highly vertically integrated business groups in Korea. However, it is not clear that even the top five business groups in South Korea (the stable V-group) will survive without major changes in the way they are organized. Moreover, since the early 1980s, it is a fact that the average size of firms have been increasing in Taiwan and decreasing in South Korea. Perhaps, in a relative sense, this pattern of convergence in the two economies is still consistent with the low and high concentration paths predicted for Taiwan and Korea, respectively. Nevertheless, a discussion of how some of the key changes that the economies have actually undergone ties in with the authors representation of their respective industrial structures will be useful and interesting.