# CHAPTER 4

## THE MODEL AND DATA CONSTRUCTION

On the basis of theoretical framework developed in the previous chapter, the effect of import protection policy can be summarized in terms of its impact on domestic relative prices to explore who pays for Note again that the burden of protection here is defined in terms of public finance. The model ignores welfare cost of protection.

### 4.1 The Model

The analysis is based on inter-industry trade for which non-tradables can serve as a numeraire or the point of reference.

By expanding equation (3.10) and rearranging, we get

(4.1)     $(\hat{P}_h - \hat{P}_x) = W(\hat{P}_m - \hat{P}_x)$

Since the shifting model analysis proportional changes in the price of one group of commodities to another, the appropriate estimating procedure is to transform equation (4.1) to a double logarithmic specification,

(4.2)     $\log(P_h/P_x) = a + b \log(P_m/P_x) + \mu_t$

Where $\mu_t$ is a stochastic disturbance term. The estimated coefficient b provides an estimate of W, the shift parameter. This model will be used to estimate the incidence of protection from import sector to traditional export sector, non-traditional export sector and export sector as a whole.

## 4.2 Time Period

Equation (4.2) shows that the principle data inputs are time series data of price indices of importables, exportables and non-tradables. In order to have a desirable picture of the possible effects of the policy, we should evaluate it in a time period which is sufficiently long. In the context of Thailand we have adopted import protection policy since 1962 - 1971 and export promotion policy since the period 1972 onwards. Therefore it is interesting to break time periods into three distinct subperiods; namely, January 1962 - December 1971, January 1972 - November 1984, and December 1984 - December 1987. The first subperiod represents the period of import protection and the last two subperiods express the period of export promotion (1972 - 1987). The latter is split into two subperiods in December 1984 to capture any economic effects of the change in exchange rate regime from fixing with dollar to basket system and the depreciation of Baht. The results based on these three subperiods will provide interesting conclusions whether the shift

parameters will significantly differ for different policy regimes.

## 4.3  Data Set

From equation (4.2) we can see that the major data inputs are price movements of importables, non-tradable home goods and exportables.   The last one is  divided into categories, namely,  traditional  and  non-traditional exports.

Ideally the price should be producer prices.[1] But the producer prices provided by the Department of Business Economics are simply unobtainable in the detail required. Therefore, f.o.b. prices of exportables are employed to construct the  price indices of traditional and non-traditional exportables, c.i.f. prices of import are used to calculate import price index and consumer  price series of services are utilized to compute price index of home goods. However both c.i.f. import prices and services prices are the price faced by producers but f.o.b. export prices are not. Therefore there might be some bias in our estimated parameters. This point will be discussed later in the next chapter. The following sections will explain how all monthly price indices  are calculated.

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[1]Greenaway, D., "Commercial Policy and Policy Conflict: An  Evaluation  of  the  incidence  of Protection  In  A  Non-Industrialized  Economy," The Manchester  School  2(June  1989): 133-134.

The study calculates monthly price indices by employing Laspeyers Index Formula as,

$$I_t = \frac{\Sigma(Q_0 \cdot P_t)}{\Sigma(Q_0 \cdot P_0)} \times 100$$

where : $I_t$ is the index number for particular period (t) with the base period (0) equal to 100.

$Q_0$ is the quantity of products in base period.

$P_0$ is the price of products in the base period.

$P_t$ is the price of products in the particular period.

### 4.3.1 Import price index

It is the Customs Department which is responsible for keeping records of Thailand's commodity trade with foreign countries. The Customs Department has been classifying traded commodities basing on the Customs Co-operation Council Nomenclature (CCCN). The calculation of import and export price indices in this study samples the data from the Customs Department's records. Commodity groups used as samples correspond to the CCCN six-digit level commodity groups. This study classifies importables into 9 categories basing on Standard International Trade Classification (SITC); namely,

0  Foods

1  Beverage & Tobacco

2  Crude Materials

3  Mineral Fuel & Lubricant

4  Animal & Vegetable Oil & Fat

5 Chemical

6 Manufactured Goods

7 Machinery

8 Miscellaneous Manufactured Goods

The main criteria in choosing samples for calculating import price index are the homogeneity of each commodity group, the consistency of the unit used to measure the traded quantity and the high coverage of samples over total import. Because the Department of Customs has recorded only value and quantity of traded commodities, unit price, thereby, is representative of actual traded price. Unit price may fluctuate as either traded quality or value or both change though actual traded price is stable. The former two criteria are employed to overcome this problem. However in practical there still have been some commodity groups whose unit prices fluctuate very much. This problem is solved by 2 ways. The first one is that we keep those samples but try to investigate the reasons of price fluctuation e.g. the shortage of supply in some particular period, the error in data collection etc.. The second is we take them out if we find their unit prices are very much different from their world prices. The less homogeneous product groups will provide a less reliable price index.

To capture the structural changes of Thailand's trade pattern, the study, therefore, calculate three series of import price indices as follows,

(1) The period of 1962 - 1969 with 1965 as its base year

(2) The period of 1970-1979 with 1975 as its base year

(3) The period of 1980-1987 with 1985 as its base year

The samples cover around 60 percent of the total import of each base year.

Any commodities imported by more than 0.2 - 0.3 percent of total import of each SITC sub-group of commodity are picked up as a sample. The number of commodity groups chosen for calculation of the import price indices of all series is presented in Table 4.1.

Since the data requirement are domestic prices, we thereby attain them by multiplying unit price of import by $(1 + t_i)$, where $t_i$ is import tariff rate of imported goods i. For specific rate of import tariff, we divide by its unit price to get the advarolem rate. It is the Royal Government Gazette (various issues) which provides import tariff rates.

Note that because we want to see the impacts of import protection, so only customs duties are concerned since import tariff rates played as a protective device since the First Economic Development Plan, while business tax and Municipal tax are ignored here because it is applied at every stage of transaction. Moreover it has been collected mainly for

Table 4.1

The Number of Sample And The Proportion of Its Coverage

| SITC<br>Classification | Base Year 1965 | | Base Year 1975 | | Base Year 1985 | |
|---|---|---|---|---|---|---|
| | No. of<br>Sample | % of<br>Coverage | No. of<br>Sample | % of<br>Coverage | No. of<br>Sample | % of<br>Coverage |
| 0  Foods | 8 | 78.4 | 8 | 67.0 | 9 | 67.0 |
| 1  Beverage &<br>Tobacco | 1 | 75.0 | 3 | 81.2 | 4 | 73.0 |
| 2  Crude Materials | 5 | 69.9 | 6 | 70.5 | 9 | 74.8 |
| 3  Mineral Fuel &<br>Lubricant | 8 | 97.2 | 4 | 96.6 | 4 | 91.3 |
| 4  Animal & Vegetable<br>Oil & Fat | 2 | 52.1 | 3 | 56.0 | 3 | 76.9 |
| 5  Chemical | 10 | 48.4 | 19 | 49.3 | 28 | 56.3 |
| 6  Manufactured Goods | 20 | 48.0 | 26 | 48.0 | 25 | 50.1 |
| 7  Machinery | 29 | 48.2 | 30 | 47.5 | 35 | 49.8 |
| 8  Miscellaneous<br>Manufactured Goods | 8 | 68.8 | 10 | 78.2 | 8 | 59.0 |
| Total | 91 | 59.2 | 109 | 59.5 | 125 | 59.6 |

revenue purpose not for protective purpose[2]

### 4.3.2  Export Price Index

Theoretically export prices required in the study are producer prices.    But they are unobtainable.    As in the case of import price, export  unit f.o.b.  prices  are obtained from the  Foreign  Trade  Statistics  of The Department  of  Customs. However there might be  some bias about our estimated shift parameter occurring from using f.o.b. prices instead of producer prices of exports. Relying upon some producer prices for examples, rice, cassava, tin, rubber[3], we observed that producer prices are lower than those f.o.b. prices (see figures 4.1-4.4). The bridges among them are transportation costs, profit margin and export taxes.  However they show the same trend then the biasness may not be so high. (The econometric implication of this measurement error will be discussed in an appendix D).

Since it is hypothesized that the shift of  import protection  burden may differ in the case of  traditional and non-traditional export according to their nature of factors  of production, the study,  therefore,  constructs

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[2]See The Industrial Management Co., Ltd., Tax System for Industrial Restructuring; Final Report Volume I, 1985.

[3]They are obtained from the Department of Business Economics.  However the Department has surveyed producer prices for limited items of exports.  We, thereby, cannot attain the data in more detail as getting from the Foreign Trade Statistics of the Department of Customs.  Moreover it supplies data back to the year 1960.
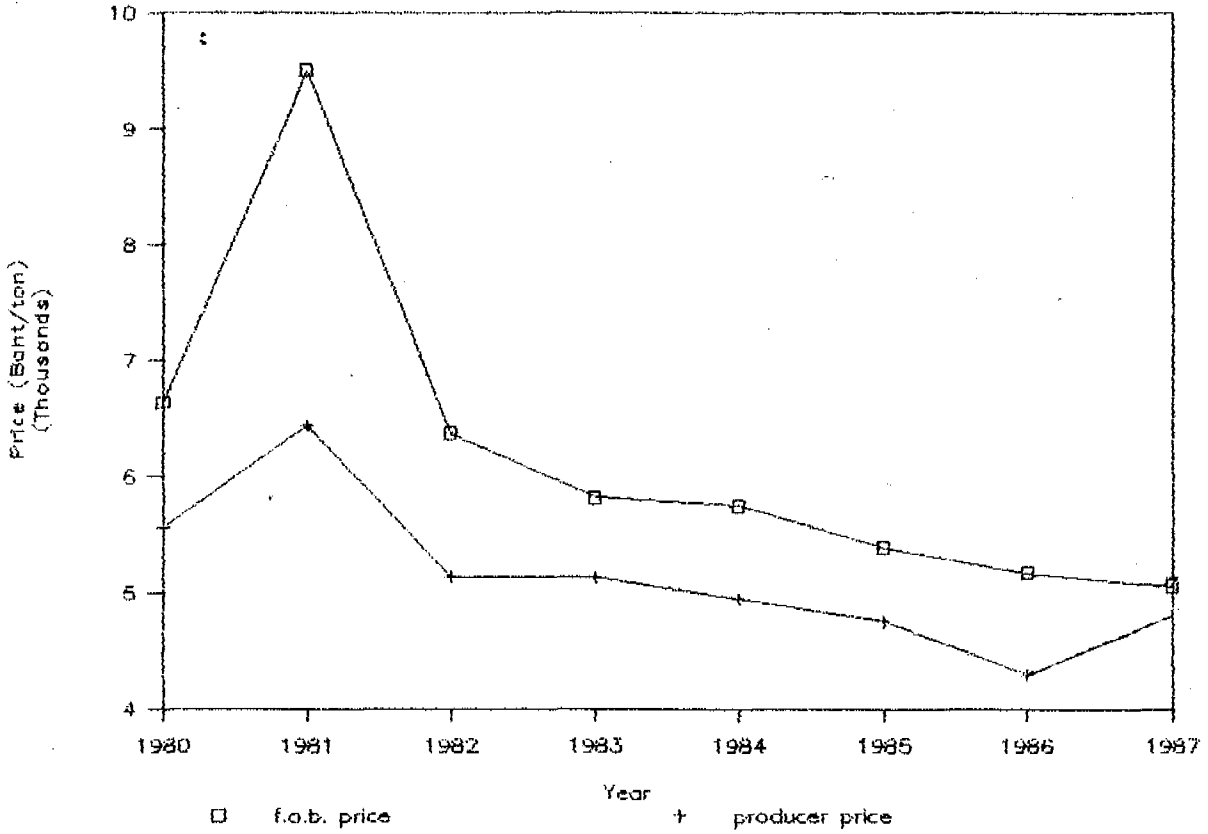
## Figure 4.1

## RICE PRICE



Year

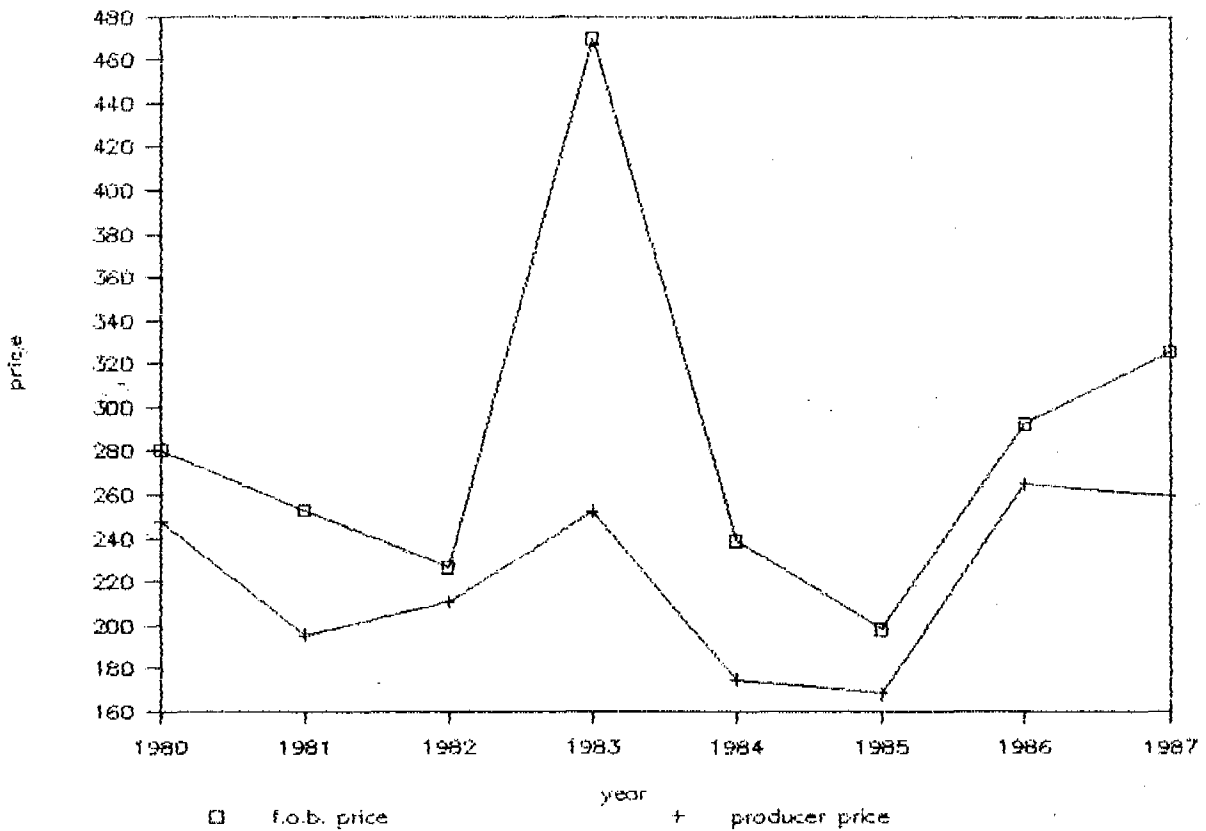□   f.o.b. price          +   producer price

## Figure 4.2

## CASSAVA PRICE



year

□   f.o.b. price          +   producer price

## Figure 4.3

## RUBBER PRICE



Figure 4.3 RUBBER PRICE — Price (Baht/kg) vs Year (1980–1987); □ f.o.b. price, + producer price

## Figure 4.4

## TIN PRICE



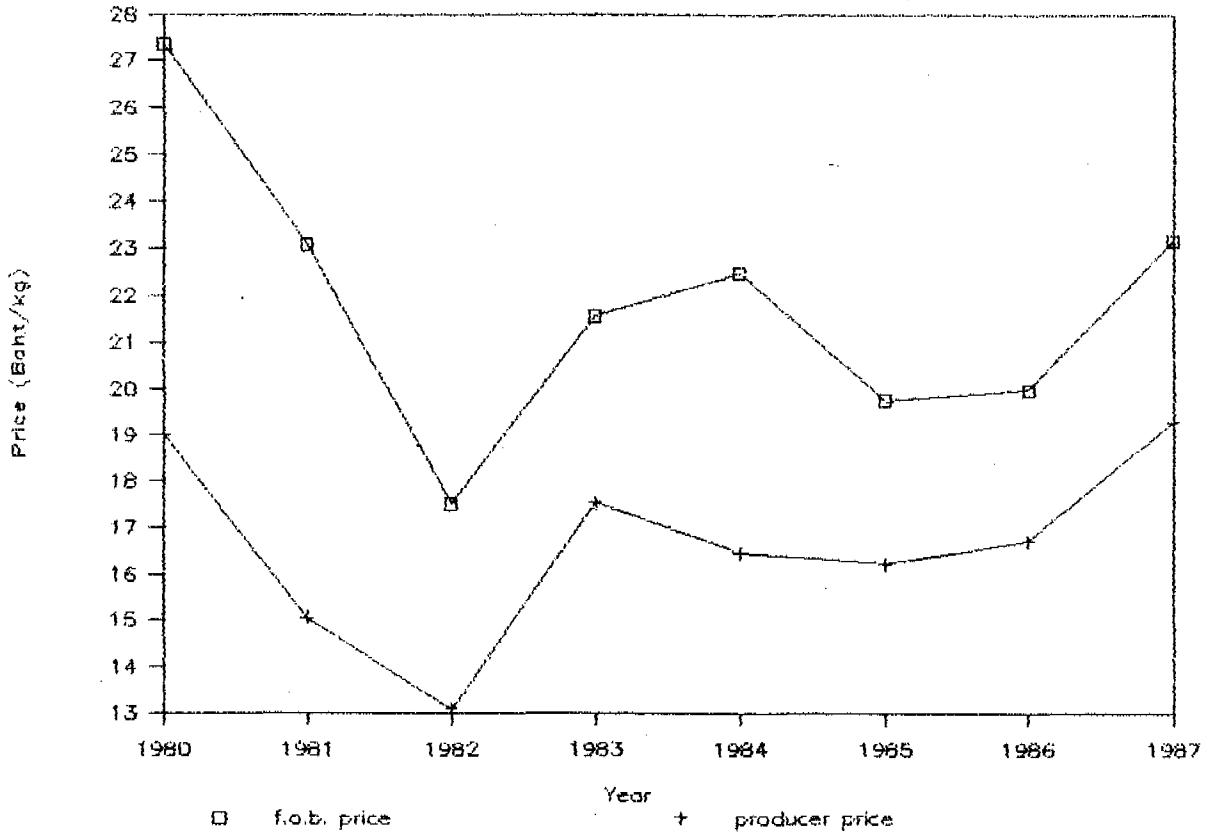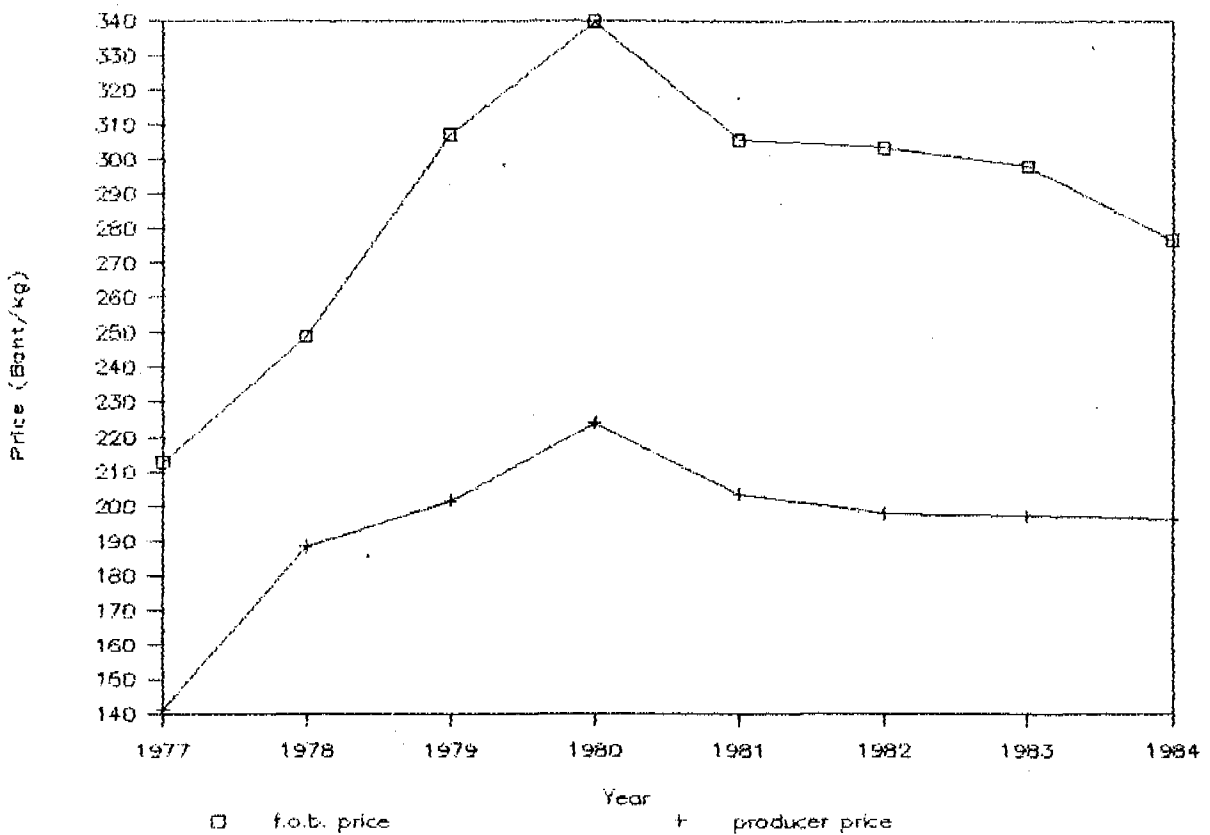Figure 4.4 TIN PRICE — Price (Baht/kg) vs Year (1977–1984); □ f.o.b. price, + producer price

both price indices. It is interesting to see the shift of incidence of protection in the case of export as a whole too. We do not calculate this export price index but adopt the index calculated by the Bank of Thailand. Only traditional and non-traditional export price indices are computed as stated in detail as follows.

- **Traditional Export Price Index**

Traditional exports are defined as the products that have been principal exports encompassing the period from 1962 onwards. They are land intensive by nature of products. The study samples traditional export from the principal exports reported by the Bank of Thailand in the Bank of Thailand Monthly Bulletin (1965, 1975, 1985). The principle exports however are products that the country export more than one percent of total export of each year.

The index is also calculated in three series as of import' price index as follow,

(1) The period of 1962 - 1969 with 1965 as its base year

(2) The period of 1970 - 1979 with 1975 as its base year

(3) The period of 1980 - 1987 with 1985 as its base year

The traditional export price index of all series is composed of rice, maize, mung beans, cassava products, tobacco, rubber, jute & kenaf and tin.

The base year is changed every ten years. When we change the base year, we also alter the weight given to every traditional exports. Thus the index is reliable because the structural changes in Thailand's trade pattern have been already captured.

- Non-Traditional Export Price Index

Non-traditional exports in Thailand are manufactures. Basing on the foreign trade statistics, the number of non-traditional exports or manufacturing goods is very low in the period before 1972. This is, however, not surprising because the export promotion policy has been pursued since 1972. Thus non-traditional price index is not computed for the period 1962 - 1971.

It is different from traditional export price index. Samples picked up for calculating non-traditional price indices are not the same for the period of January 1972 - November 1984 and the period of December 1984 - December 1987. The main reason relies upon the way to sample data. We select the sample of non-traditional export from the principal export expressed in the Bank of Thailand Monthly Bulletin (1975,1985). Some products may be substantially exported for this period of time but may not be so in the past. Therefore some exports are not sampled in the period of January 1972 - November 1984 but are selected as the component of composites price index for the period of December 1984 - December 1987; for examples, canned pineapple, wood products, artificial, flowers, etc. when their value of export have been

becoming crucial.

The two series of non-traditional export price indices have two base years as follows :

(1) The period January 1972 - November 1984 with 1975 as its base year

(2) The period January 1984 - November 1987 with 1985 as its base year

The price index for the period of 1962 - 1971 is not calculated. The component of composites price indices of the two series are illustrated in Table 4.2.

It should be noted here that prices of precious stones in our sample for example diamonds, ruby, sapphire etc. have very fluctuated in monthly observations. According to the information presented by the Department of Business Economics, the precious stones in each item of the CCCN codes are not homogeneous. They are different depending on their quality. We however cannot ignore this item because the value of its export has been high. In case of the prices so fluctuating, they are, thereby, smoothened by looking at their time trend.

### 4.3.3 Non-Tradable Home Goods Price Index

What is non-traded goods? Theoretically, they are the items of consumer expenditure for which no actual or potential trade exists.[4] However in the real world every

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[4]Greenaway, D. and Milner, C.R. "Estimating the Shifting of Protection Across Sectors : An Application to Maritius," Industry & Development, No.16, 1986 : p.10.

Table 4.2

The Component of Composite Non-Traditional Export Price Indices

| The Period of January 1972 – November 1984 | The Period of December 1984-December 1987 |
|---|---|
| Commodity Description | Commodity Description |
| Fish (fresh & meal) | Fish (fresh & canned) |
| Cuttle fish (fresh, meal & canned) | Cuttle fish (fresh & canned) |
| Shrimp | Shirmp |
| Fowls duck | Fowls duck |
| Sugar | Sugar |
| Molasses | Canned pineapple |
| Plastic products | Plastic products |
| Textile products | Textile products |
| Precious stones | Precious stones |
| Furniture & parts | Furniture & parts |
| | Wood products |
| | Iron or steel tupes & pipes |
| | Artificial flowers |
| | Footwear |
| | Integrated Circuits |

commodity can be traded. But for doing research, we must have some specific criteria to classify commodities. The guidance used in the study is that home goods are those whose actual value of export plus import less than 10 percent of their total domestic production. With this criterion, there are lots of home goods in the Thai economy as we shall see in the chapter 6 that the proportion of home goods in gross domestic product (GDP) of Thailand was 50 per cent in 1982.

It is the Department of Business Economics which provides the Consumer and Producer Price Indices. The Producer Price index cannot supply price data in the detail required. The study then utilizes the subgroup information from the consumer price index to compute composites price index of non-tradable home goods.

Some proxies will be used as representatives of Thailand's home goods. The major reason of choosing them is that their prices encompass the entire period, providing monthly data back to 1962. However only the price data in the area of Bangkok Metropolis has been surveyed back to 1962 by the Department of Business Economics. We thereby have no choice to apply price data of Bangkok Metropolis as proxies of price data for the economy as a whole.

Even though price data of Bangkok Metropolis are employed to construct home good price index, it is yet consistent to the sources of information of the price indices of import and export. This is because to compute

the latter two indices, we use c.i.f. prices for imports and f.o.b. prices for exports. There are border prices at Klong-Tuey Port, Bangkok Metropolitan area.

The items included in the home goods index are listed in Table 4.3.

However there is one danger in relying on the consumer price index as the source of information. Greenaway (1989) warned that the country where indirect taxes were important, they served to drive a wedge between consume prices and producer prices. Fortunately, they have not been levied on commodities in our sample.

The study calculates only one series of non-tradable price index using 1976 as its base year. The weight given to each item of commodity employed to compute the index is households spending in Bangkok Metropolis surveyed by the National Statistical Office in the Socio-Economic Surveys. They were converted to weight factors given to each items of commodities in the index structure by the Department of Business Economics.

It is realized that the expenditure pattern of populations might change when time passed by due to many factors such as change in income level, price of goods and services, household structure and pattern of living or development of new products and services as well as population growth. For this reason, the only one series of the index may not reflect the real change of home goods prices. Instead of changing the base year, we

Table 4.3

Construction of The Composite Home Goods Price Indices

(฿/month)

| Commodity Description | Index aggregate or Index weight | | |
|---|---|---|---|
| | 1964 | 1976 | 1981 |
| Dress making charge | 3.72 | 16.55 | 58.53 |
| House rent | 64.58 | 381.35 | 856.35 |
| Laundry | 1.68 | 4.14 | 17.06 |
| Water supply | 13.37 | 40.67 | 58.5 |
| Electricity | 54.85 | 106.87 | 236.38 |
| Telephone | 6.05 | 29.96 | 49.54 |
| Doctor fee | 4.22 | 4.85 | 4.17 |
| Dentist fee | 2.39 | 9.56 | 13.11 |
| Hospital clinic | 36.54 | 54.51 | 118.74 |
| Hair cut | 22.19 | 20.65 | 56.09 |
| Bus fare | 40.13 | 85.61 | 213.51 |
| Taxi fare | 12.32 | 17.27 | 42.85 |
| Cinema admission | 12.18 | 75.91 | 95.88 |
| Boxing admission | 1.97 | 2.86 | 8.49 |
| Newspaper | 9.93 | 26.54 | 56.02 |
| School fees | 14.62 | 66.49 | 144.2 |

Source of index aggregate : Department of Business Economics,
Ministry of Commerce, Bangkok, Thailand.

change the weight given to each item of goods. The home goods price indices of the period 1962-1971, 1972-1980 and 1981-1987 are based on the 1964, 1976 and 1981 weights, respectively.

The Department of Business Economics has also taken the characteristics of the population of its samples in to consideration. Because the relative importance or weight of any item of commodity is derived from the expenditure pattern of the population covered by the index. The population in each area has different way of living depending on many factors such as level of income, size of family occupation. Therefore when revising the Consumer Price Index (CPI) the Department of Business Economics also altered certain population characteristics of the index in compliance with the changing situation. The index family was defined by the level of income and the number of family member.[5] Hence we obtain the reliable weight factors.

Now it is possible for us to investigate the incidence of protection by estimating equation (4.2).

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[5]The Department of Business Economics, Ministry of Commerce, The Revision of General Consumer Price Index (Bangkok: the Department of Business Economics Press, 1984), pp.12-15.