CHAPTER V

MARKET CONCENTRATION

5.1 Market Concentration indexes of Japanese Market

Japan was the one of the most important importing country of Thailand that import values for Thai orchid flowers were the highest when compared to the other countries in the world markets from 1982-1997 (Table A 2.2). Japan not only imported orchid flowers in the high values from Thailand, but also purchased from many countries in the world markets.

From Table 3.5, The import values of orchid flowers from the world markets of Japan tended to increase from 1993-1996 and the major exporting countries of orchid flowers to Japan were Thailand, Netherlands, Singapore, New Zealand, Australia and Taiwan (Figure 4.2). The numbers of exporting countries for orchid flowers to Japanese market had direct affected on the market concentration index of Japan including their amount of export values in each year.

This study chooses concentration method of Herfindahl index for the better following reasons (Burgess, 1989).

First, the Herfindahl index takes into account all the firms in the market.

Second, the Herfindahl index reflects the existing inequality between each firm in the market and every other one.

This analysis use the method of the concentration of Hirfindahl-Hirschman index (HHI), (Ferguson, 1988), as following:

$$HHI = \sum_{i=1}^{n} S_i^2 \qquad (5.1)$$

where

S_i^2 = the square of the market share of the i^{th} countries, measure as that country's export values divided by total import values of orchids into Japanese market.

n = number of orchid export countries to Japan which are Thailand, Netherlands, Singapore, New Zealand, Taiwan, Colombia, India, Australia, Mauritius, Malaysia, and the others, because of the limited of data in this study it is equal 11 countries in 1993-1997 (Table 3.5).

where $$S_i^2 = (X_i / T)^2 \quad (5.2)$$

For the market concentration of Japan,

where

Xi = orchid import values of Japan from country i ,

T = total imported values of orchids of Japan from the data in Table 3.5,

HHI = degree of market concentration index of Japan.

This study need to find the factors affecting the instability of Thai orchid exports to Japan by hypothesize that instability of Thai orchid exports are related to growth rates and market shares of Thai orchid exports to Japan and market concentration of Japan.

The factors that involved with instability of Thai orchid exports in Japanese market should be considered the characteristics of Thai orchids and the structure of orchid flower markets of Japan. The characteristics of Thai orchids that can measure, indirect method, by the amount of export values in each year because if it is good enough for the consumer requirements, the exports will increase every year. This can show in the forms of growth rates and instability indexes of Thai orchid exports in Japanese market and the market structure of orchid flowers in Japan by measuring the concentration indexes of orchid flowers in Japanese market.

Table 5.1 : Growth rates, instability indexes, market shares of Thai orchid exports and market concentration indexes of orchid flowers of Japanese market in 1993-1997.

Year	Growth rate (%)	Instability Index (%)	Market share (%)	Concentration index of Japanese market (HI)
1993	19.88	16.44 (17.42)	21.61	0.2077
1994	3.27	16.46 (18.22)	20.21	0.2011
1995	-2.05	16.19 (18.81)	18.95	0.1952
1996	-15.94	14.98 (16.67)	19.39	0.1623
1997	9.12	14.69 (15.39)	19.94	0.1572

* The instability indexes in (...) were corrected the autocorrelated error results.

From Table 5.1, the growth rates of Thai orchid exports decreased from 19.88 % in 1993 to –15.94 % in 1996. This may cause from the characteristics of Thai orchid flowers, the preferences (Japanese requirements), and the competitive problems among Thai orchid exporters. The market shares of orchid exports in this market also decreased from 21.61 % in 1993 to 18.95 % in 1995, then increased in slow late to 19.94 % in 1997. The results of market concentration indexes of orchid flowers of Japan decreased from 0.2077 in 1993 to 0.1572 in 1997. The instability indexes of Thai orchid exports to Japan tended to decrease every year from 16.44 in 1993 to 14.69 in 1997.

The regression analysis was used to find out the relationship between the instability indexes of Thai orchid exports to Japan and the growth rates, market shares of Thai orchid exports to Japan, and market concentration indexes of orchid flowers in Japanese market.

The estimating results were shown in Table 5.2.

Table 5.2 : The results of regression analysis between instability and growth rate, market share, market concentration of Japan in 1993-1997.

(Dependent variable = Instability of Thai orchid export to Japan)

Independent variables	Coeficient (Standard error)	t-value (Sig.)	Standardized Coefficients	Linear form		
				R^2	F-ratio	Sig.
Constant	18.082 (0.663)	27.255 (0.023)	-	0.999	1542.648	0.019[a]
Growth rate	-2.3E-02 (0.003)	-8.888 (0.071)	-0.228			
Market share	-0.644 (0.034)	-19.115 (0.033)	-0.487			
Market Concentration	65.937 (0.979)	67.353 (0.009)	1.145			

From Table 5.2, instability of Thai orchid exports to Japanese market in 1993-1997 were significant and positively related with concentration indexes but negatively related with growth rates and Thai market shares in Japanese market.

Growth rates and market concentration indexes

The results of regression analysis of these two items were in Table 5.3. The value of R^2 of this relationship was 0.232 and the significance level of the regression equation was 0.211 (F-ratio = 3.74).

Table 5.3 : The results of regression analysis of growth rates of Thai orchid export to Japan and market concentration indexes of Japan from 1993-1997.

(Growth rate = dependent variable)

Independent variable	Coeficient (Standard Error)	t-value (Significant)	R^2	(Quadratic form)	
				F-ratio	Significant
Constant	-47.927 (53.719)	-0.892 (0.438)	0.232	3.74	0.211
Market concentration	274.949 (289.013)	0.951 (0.412)			

The results showed that market concentration indexes of orchid flowers of Japan had very weak relationship with the growth rates of Thai orchid exports to Japan and the confidence level was about 79.90 % of confidence.

Market shares and market concentration indexes

The results of regression analysis of the relationships of market shares of Thai orchid exports to Japan and concentration indexes of orchid-flower of Japan (from Table 5.1) were in Table 5.4.

Table 5.4 : The results of regression analysis of market shares of Thai orchid export to Japan and market concentration indexes of Japan from 1993-1997.

(Market share = dependent variable)

Independent variable	Coeficient (Standard Error)	t-value (Significant)	Quadratic form		
			R^2	F-ratio	Significant
Constant	16.203 (4.116)	3.936 (0.029)	0.225	44.82	0.022
Market concentration	20.664 (22.147)	0.933 (0.420)			

From Table 5.4, Thai market shares were not significant related with market concentration of Japan from 1993-1997.

5.2 Market Concentration Indexes of Italian Market

From equation (5.1) and (5.2) for Italian market;

where S_i^2 = the square of market share of the i^{th} countries, measure as that country's export values divided by total export values of orchids into Italy,

n = (numbers of export countries of orchid flowers to Italy) 27, 22, 24, 24, 18, and 23 countries in 1992, 1993, 1994, 1995, 1996, and 1997 respectively, that the details are as follows (Table A 5.1).

In 1992, the 27 export countries into Italy were Thailand, Netherlands, New Zealand, Singapore, South Africa, Australia, Brazil, Malaysia, United States, France, Germany, Mauritius, Portugal, Philippines, Bulgaria, Morocco, Egypt, Kenya, Costa Rica, Panama, Trinidad and Tobago, Peru, Cyprus, Syria, Indonesia, Brunei, and ACP (70).

There were 22 of orchid export countries to Italy in 1993 which remain 17 countries were the same as those in 1992. About 10 countries did not export orchids to Italy in this year (Philippines, Morocco, Egypt, Kenya, Trinidad and Tobago, Peru, Cyprus, Syria, Indonesia and Brunei). The new coming countries in this year were Colombia, Belgium and Luxembourg, Tunisia, Denmark and Taiwan.

In 1994 (24 countries), there were 15 countries that continued exporting but 7 countries had dropped (Brazil, Malaysia, Bulgaria, Costa Rica, Panama, Tunisia and Denmark). There were 9 countries added in this year (Philippines, Ecuador, Kenya, ACP (70), Switzerland, Senegal, Saudi Arabia, Union of Arab, AFTA (4), and Australian Ocean).

There were 24 orchid export countries to Italy in 1995. This year 9 countries stopped to export orchids that were Philippines, Ecuador, Kenya, Switzerland, Senegal, Saudi Arabia, Union of Arab, AFTA (4), and Australian Ocean. The adding countries were Brazil, Malaysia, Zimbabwe, Hong Kong, Bulgaria, Morocco, Cyprus, Syria and Afghanistan (9 countries).

The exporting countries decrease to 18 countries in 1996 because about 7 countries were dropped from 1995; Zimbabwe, Bulgaria, Morocco, Cyprus, Syria, Belgium and Luxembourg, Afghanistan and only one country added (Peru).

In 1997, there were 23 orchid export countries in Italian market. This year, Peru and ACP (70) did not export orchids to Italy but the new countries began to export such as Lebanon, Pakistan, Canada, India, Sri Lanka, Philippines and Zimbabwe (7 countries).

X_i = orchid import values of Italy from country i ,

T = total imports of orchid flowers of Italy the data in Table A 5.1 and

HHI = degree of market concentration indexes of Italy

Table 5.5 : Growth rates, instability indexes, market shares of Thai orchid exports to Italy and concentration indexes of orchid flowers of Italian market in 1992-1997.

Year	Growth rates (%)	Instability index (%)	Market shares (%)	Market concentration index of Italy (HI)	Numbers of export countries to Italy
1992	13.98	10.48	84.32	0.7721	27
1993	-7.51	11.72	52.99	0.4600	22
1994	9.46	11.78	55.42	0.4619	24
1995	-15.42	12.45	59.83	0.4822	24
1996	-4.20	13.50	58.91	0.4796	18
1997	13.36	11.34	60.50	0.4821	23

From Table 5.5, growth rates of Thai orchid exports were fluctuated every year from 1992-1997. In 1992, market concentration index of orchid flowers of Italy was 0.7721, while export share of Thai orchids was 84.32 % and number of exporting countries were 27 countries. This meant that only a few countries could export orchid flowers in high values in Italian market in this year.

During 1993-1997, market concentration indexes of Italy were between 0.4600-0.4821. This meant that market shares of some countries had been decreasing or increased in competition. Market shares of Thai orchid exports to this market decreased to 52.99 in 1993 and slowly more up again to 60.50 in 1997. The instability indexes of Thai orchid exports increased from 10.48-13.50 from 1992-1996. In 1996,

the number of exporting countries equaled 18 countries with the highest instability in this year. Later, the number of exporting country increased to 23 countries and market share of Thai orchid exports increased to 60.50 %, but the instability index decreased to 11.34 in 1997.

The results of the relationships between market concentration indexes of orchid flowers in Italian market and growth rates, market shares, and instability indexes were presented in Table 5.6, Table 5.7, Table 5.8 and Figure 5.1.

Growth rates, Instability indexes and market concentration indexes

Table 5.6 : The results of regression analysis of growth rates of Thai orchid exports to Italy and market concentration indexes of Italy in 1992-1997.

(Growth rate = dependent variable)

Independent variable	Coeficient (Standard error)	t-value (Significant)	R^2	F-ratio	Significant
Constant	-23.688 (23.626)	-1.003 (0.373)	0.231	1.199	0.335[a]
Market concentration	48.498 (44.291)	1.095 (0.335)			

Table 5.7 : The results of regression analysis of instability indexes of Thai orchid exports to Italy and market concentration indexes of Italy in 1992-1997.

(Instability = dependent variable)

Independent variable	Coeficient (Standard error)	t-value (Significant)	R^2	F-ratio	Significant
Constant	14.683 (1.716)	8.555 (0.001)	0.411	2.791	0.170[a]
Market concentration	-5.375 (3.217)	-1.671 (0.170)			

The results of growth rates and concentration indexes of orchid flowers of Italy showed that these two items were not correlated with each other, because R^2 was only 23.1 %. The significance level was 66.5 % of confidence that was quite below the standard level. The instability indexes and concentration indexes of Italian market were not correlated with each other about 41.10 %. The significance level was 83.00 %.

Market shares and market concentration indexes

Table 5.8 : The results of regression analysis of market shares of Thai orchid exports to Italy and market concentration indexes of Italy in 1992-1997.

(Market share = dependent variable)

Independent variable	Coeficient (Standard error)	t-value (Level of significant)	R^2	F-ratio	Significant
Constant	14.468 (4.472)	3.236 (0.032)	0.967	118.11	0.001
Market concentration	91.106 (8.383)	10.868 (0.001)			

The results showed that market shares of Thai orchid exports to Italian market were significant and positively related to market concentration indexes of Italy from 1992-1997 (Table 5.8 and Figure 5.1). This relationship was found that if market concentration index of Italy increased or decreased 1 percent, market share of Thai orchid exports into Italy will be affected by increasing or decreasing about $[0.764]^*$ percent.

*Source: Computation, N = 6

The percent change of market share in $[...]^*$ can be calculated from the models of regression analysis of these relationships as follows (Sriboonchitta, 1999).

$$MS_I = 14.468 + 91.106 \; MC_I \qquad (5.3)$$

$$\frac{\%\Delta MS_I}{\%\Delta MC_I} = \frac{\Delta MS_I}{\overline{MS_I}} / \frac{\Delta MC_I}{\overline{MC_I}} = \frac{\partial MS_I}{\partial MC_I} * \frac{\overline{MC_I}}{\overline{MS_I}} \qquad (5.4)$$

where

MS_I = Market shares of Thai orchid exports to Italy in 1992-1997.

MC_I = Market concentration of Italy in 1992-1997.

$\frac{\partial \overline{MS_I}}{\partial \overline{MC_I}}$ = Slope of equation (5.3) that equaled 91.106

$\overline{MC_I}$ = Average value of market concentration of Italy in 1992-1997 $[0.52]^1$.

$\overline{MS_I}$ = Average value of market shares of Thai orchid exports to Italy in 1992-1997 $[62.00]^2$.

From equation (5.4),

$$\frac{\%\Delta MS_I}{\%\Delta MC_I} = 91.106 * 0.52 / 62.00$$

$$= 0.764$$

$[0.52]^1 = [0.7721 + 0.4600 + 0.4619 + 0.4822 + 0.4796 + 0.4821] / 6$ and

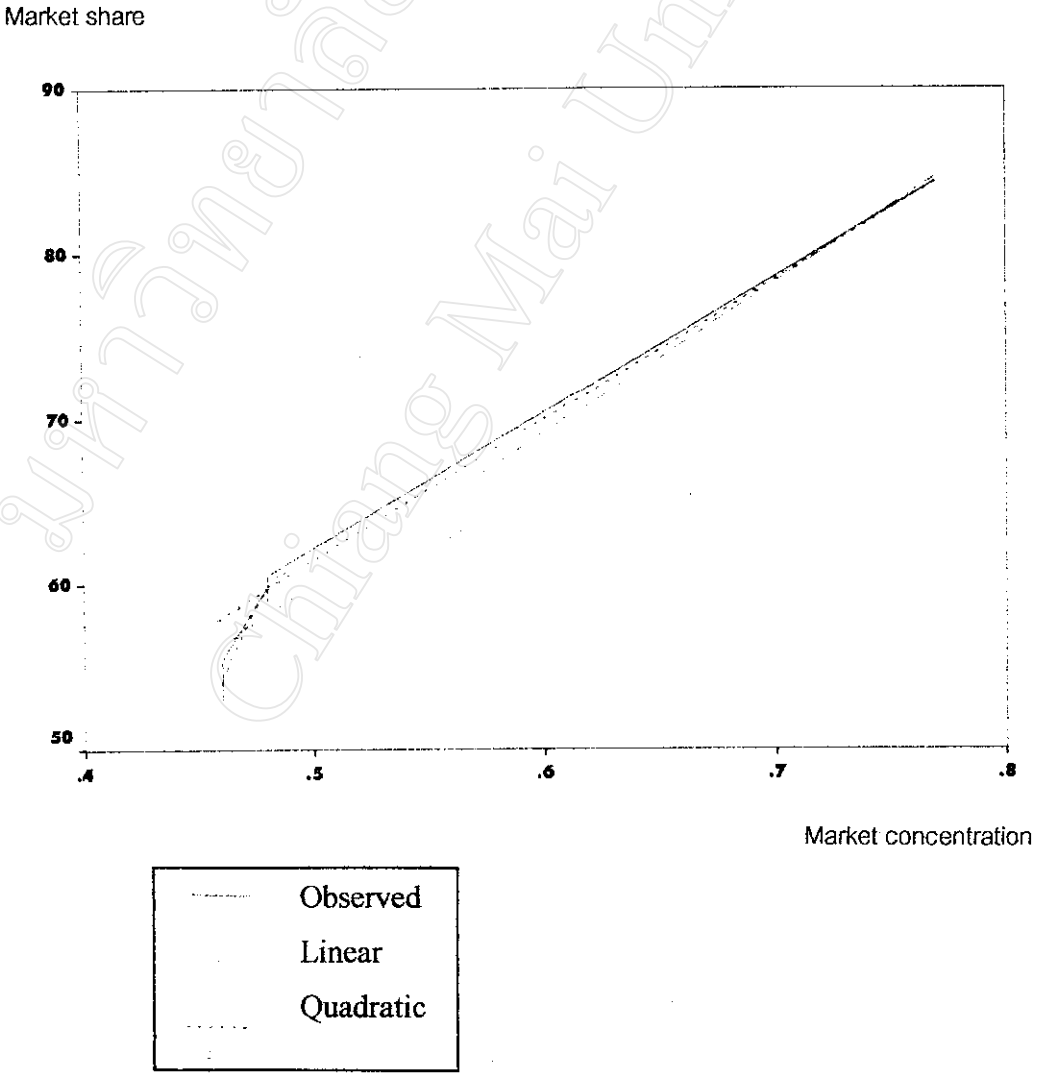
$[62.00]^2 = [84.32 + 52.99 + 55.42 + 59.83 + 58.91 + 60.50] / 6$ From Table 5.5

Figure 5.1: The relationship between market concentration indexes of Italy and market shares of Thai orchid exports to Italy in 1992-1997.

Dependent variable = market share

Independent variable = market concentration of Italy

Functional form	Residual Sum Squares	Degree of Freedom	F-ratio	Significance
Linear	0.967	4	118.11	0.000
Quadratic	0.993	3	225.32	0.001



5.3 Market Concentration indexes of American Market

From equation (5.1) and (5.2), market concentration indexes of the United States of America can measure as follows.

where

S_i^2 = the square of the market share of the i^{th} countries, measure as that country's export values divided by total import values of orchids flowers into American market from Table A 5.2 and Table A 5.3.

From Table A 5.2, there were the countries that exported *Dendrobium spp.* to American market from 1993-1997.

n = number of orchid export countries to America that equaled 10, 8, 7, 11, and 8 countries in 1993, 1994, 1995, 1996, and 1997 respectively. The details were as follows.

There were 10 orchid export countries to American market in 1993: Mexico, Costa Rica, Panama, Haiti, Trinidad and Tobago, Netherlands, Thailand, Singapore, China (Taiwan) and Japan.

The 8 countries in 1994, only 5 countries remained exported, the others 5 countries stopped exporting which were Mexico, Panama, Haiti, China (Taiwan), and Japan. The new 3 countries had added in this year (Jamaica, St Vincent and Grenadines, New Zealand).

In 1995 (7 countries), this year the number of exporting countries decreased because St Vincent and Grenadines had dropped.

The 11 countries in 1996, the number of exporting countries had been increased because the 4 countries had added (Canada, Italy, India, and Zimbabwe).

The exporting countries were 8 countries in 1997. Canada, Jamaica, Trinidad and Tobago, Netherlands, and Zimbabwe had dropped, and the new 2 countries were Haiti and France.

The exporting countries for others orchids (except *Dendrobium spp.*) to American market from 1993-1997 had the details as follows (Table A 5.3).

n = number of exporter countries equaled 12, 14, 13, 17, and 14 countries in 1993, 1994, 1995, 1996, and 1997, respectively. The names of these countries in each year were as following.

There were 12 countries in 1993: Costa Rica, Panama, Colombia, Netherlands, Italy, Thailand, Singapore, Korea Rep., China (Taiwan), Australia, New Zealand, Republic of South Africa.

Italy, Singapore, Korea Rep., and China (Taiwan) stopped exporting to America and the new 6 countries had added in this market (Canada, Trinidad and Tobago, France, Germany, Portugal, Israel). So there were 14 countries in 1994.

In 1995, there were 13 countries. About 10 countries remained exported orchids to US. which the 4 countries had dropped (Panama, France, Germany, and Israel). The 3 adding countries were Mexico, Ecuador, and Singapore.

The 17 countries exported orchids to US. in 1996. The 10 countries remained exported but Ecuador, Portugal and Republic of South Africa had stopped. The 7 countries had added in this year, which were Panama, Jamaica, Israel, India, Korea Rep., Mauritius, and Namibia.

There were 14 countries in 1997. The remaining countries were 11 countries because 6 countries dropped to export which were Trinidad and Tobago, Israel, India, Korea Rep., Mauritius, and Namibia. The new 3 coming countries were Peru, Dominican Rep., China (Taiwan).

The results of market concentration indexes of American market were in Table 5.9

Table 5.9 : Growth rates, instability indexes, market shares of Thai orchid exports to American market and concentration indexes of orchid flowers of America in 1993-1997.

Year	Growth rates (%)	Instability Index (%)	Market shares (%)	Concentration indexes of American market (HI)	Numbers of export countries to America
1993	-5.92	9.79 (7.99)	83.03	0.6964	16
1994	17.07	13.34 (10.26)	80.82	0.6617	17
1995	-5.04	13.39 (10.71)	79.45	0.6408	14
1996	-7.72	13.30 (11.54)	78.51	0.6257	19
1997	24.79	11.48 (10.12)	80.24	0.6552	18

* The instability indexes in (...) were corrected the autocorrelated error results.

From Table 5.9, the growth rates of Thai orchid exports to American market were fluctuated because of the changes of market shares of Thai orchids from 1993-1997. The results of market concentration of America decreased from 0.6964 to 0.6257, and market shares of Thai orchid exports decreased from 83.03 to 78.51 % from 1993-1996. The number of exporting countries increased from 1993-1996 (except in 1995). The instability indexes of Thai orchid exports to America increased from 7.99 to 11.54 from 1993-1996. In 1997, market concentration of America increased in slow late to 0.6552 and market share of Thai orchid exports to America also increased to 80.24 %, but number of exporting countries in this market (18 countries) and instability index decreased (10.12).

This study needed to analyze the relationship between growth rates, instability indexes, market shares and market concentration indexes of Thai orchid exports in American market. In order to know that Thailand can maintain or increase growth rates and market shares in this market as well as the stabilization of Thai orchid export values.

The relationships among growth rates, instability indexes, market shares of Thai orchid exports to American market and market concentration indexes of orchid flowers of America were as following.

Table 5.10 : The results of regression analysis of growth rates of Thai orchid exports to America and market concentration indexes of America in 1993-1997.

(Growth rate = dependent variable)

Independent variable	Coeficient (Standard error)	t-value (Significant)	R^2	F-ratio	Significant
Constant	-27.798 (213.865)	-0.130 (0.905)	0.008	0.023	0.889[a]
Market concentration	49.292 (324.807)	0.152 (0.889)			

The results showed that growth rates of Thai orchid exports to American market from 1993-1997 were not significantly related with concentration indexes of America.

Table 5.11 : The results of regression analysis of instability indexes of Thai orchid exports to America and market concentration indexes of America in 1993-1997.

(Instability = dependent variable)

Independent variable	Coeficient (Standard error)	t-value (Significant)	R^2	F-ratio	Significant
Constant	42.010 (2.816)	14.916 (0.001)	0.977	128.348	0.001[a]
Market concentration	-48.458 (4.277)	-48.458 (4.277)			

The results showed that the instability indexes of Thai orchid exports to American market were significant and had negative relationship with market concentration indexes of America from 1993-1997.

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Table 5.12 : The results of regression analysis of market shares of Thai orchid exports to America and market concentration indexes of America in 1993-1997.
(Market share = dependent variable)

Independent variable	Coeficient (Standard error)	t-value (Significant)	R^2	F-ratio	Significant
Constant	39.057 (3.305)	11.818 (0.001)	0.981	156.79	0.001
Market concentration	62.847 (5.019)	12.522 (0.001)			

The results showed that market shares of Thai orchid exports to America were significant and positively related to market concentration indexes of America from 1993-1997. This relationship was found that if market concentration index of America increased or decreased 1 percent, market share of Thai orchid export to America will be affected by increasing or decreasing about [0.514]* percent.

*Source: Computation, N = 5,

The percent change of market share can be calculated as follows.

$$MS_A = 39.057 + 62.847\ MC_A \qquad (5.5)$$

$$\frac{\%\Delta MS_A}{\%\Delta MC_A} = \frac{\Delta MS_A}{\overline{MS_A}} \div \frac{\Delta MC_A}{\overline{MC_A}} = \frac{\partial MS_A}{\partial MC_A} * \frac{\overline{MC_A}}{\overline{MS_A}} \qquad (5.6)$$

where, MS_A = Market shares of Thai orchid exports to America in 1993-1997.

MC_A = Market concentration of America in 1993-1997.

$\frac{\partial MS_A}{\partial MC_A}$ = Slope of equation (5.5) that equaled 62.847

$\overline{MS_A}$ = Average value of Thai market shares in American market from 1993-1997 that equaled [80.41][3],

$\overline{MC_A}$ = Average value of market concentration of America from 1993-1997 that equaled [0.656][4]

From equation (5.6), $\frac{\%\Delta MS_A}{\%\Delta MC_A} = 62.847 * 0.656 / 80.41 = 0.513$

[80.41][3] = [83.03 + 80.82 + 79.45 + 78.51 + 80.24] / 5 and
[0.656][4] = [0.6964 + 0.6617 + 0.6408 + 0.6257 + 0.6552] / 5 From Table 5.9

Figure 5.2 : The relationship between instability of Thai orchid exports to the United States of America and market concentration of the United States of America in 1993-1997.

(Dependent variable = instability of Thai orchid exports to America)
(Independent variable = market concentration of America)

Functional Form	Residual Sum Squares	Degree of Freedom	F-ratio	Significance
Linear	0.977	3	128.35	0.001[a]

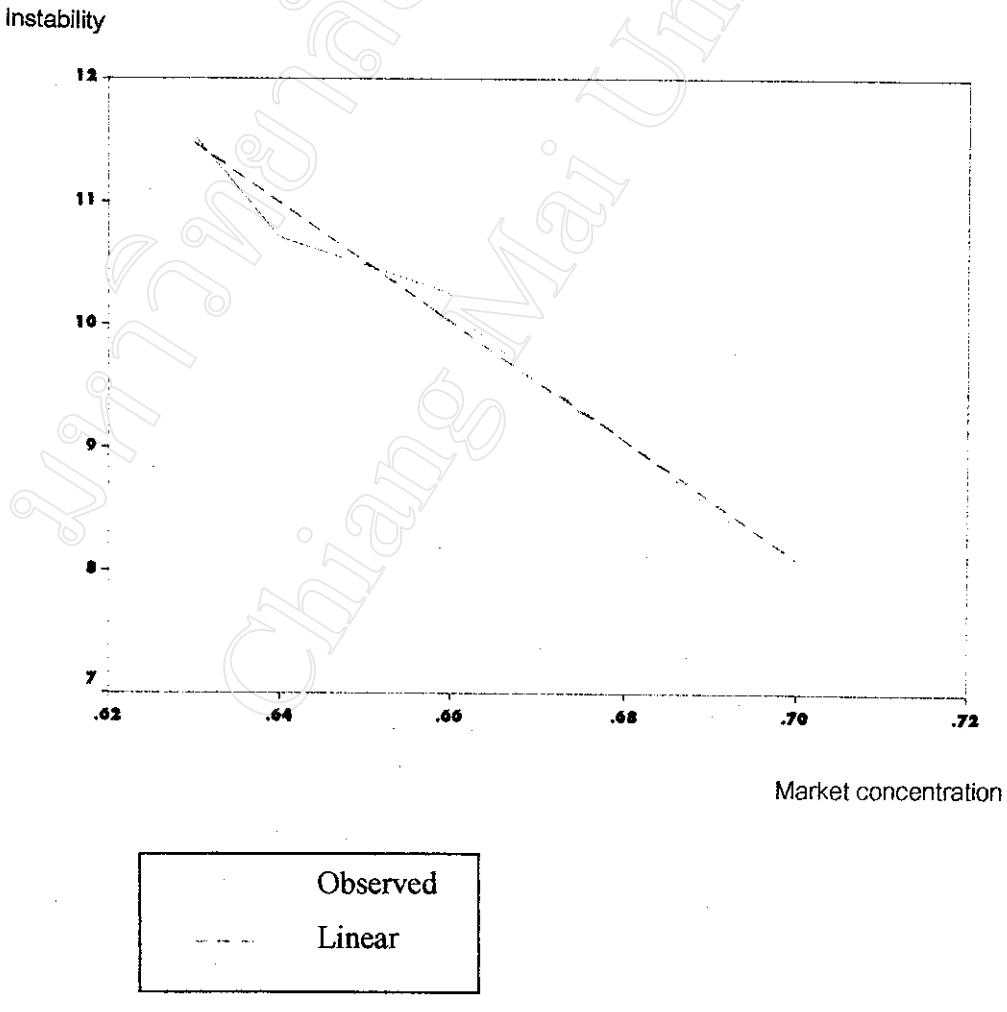
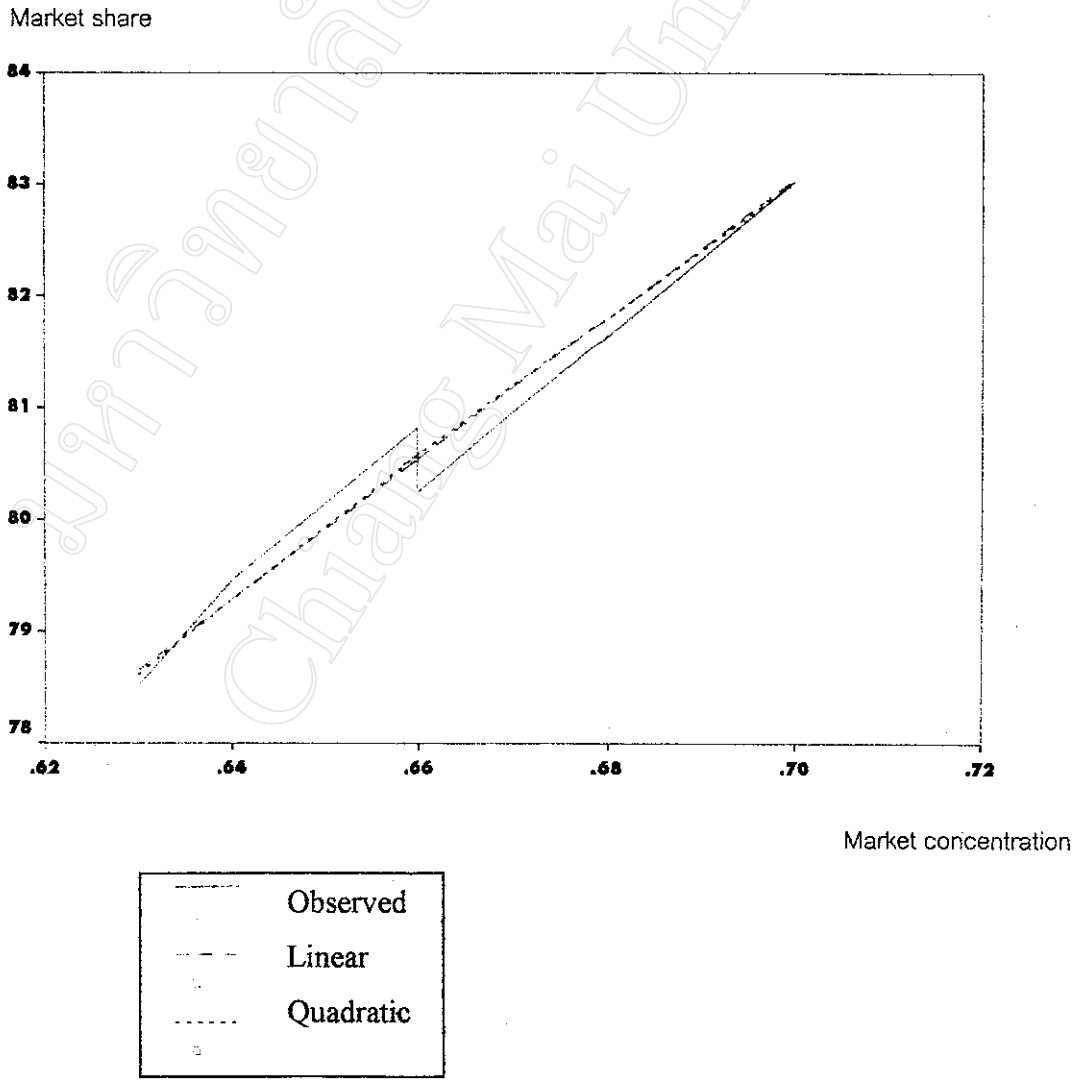


Figure 5.3 : The relationship between market share of Thai orchid exports to the United States of America and market concentration of the United States of America in 1993-1997.

Dependent variable = market shares of Thai orchids export to America

Independent variable = market concentration of America

Functional Form	Residual Sum Squares	Degree of Freedom	F-ratio	Significance
Linear	0.981	3	156.79	0.001
Quadratic	0.982	3	53.66	0.018



5.4 Thai-Orchid Export Price Consideration

Other than instability and the export values of Thai orchid exports to Japan, Italy and American markets, the export prices of Thai orchids in these 3 countries were also important factor for Thai orchid exports. It was good for Thai orchid exporters and the orchid growers to understand the export prices as well. There for, the price, quantity and value indexes of Thai orchid exports will be estimate.

Japanese market

Trend line of Thai orchid exports to Japan tended to increase but trend line of the average prices of Thai orchid exports to Japan tended to increase in slow rate from 1974-1997 (Figure 5.4). When compared the percentage changes of the quantities, values and prices of Thai orchid exports into Japanese market (from 1974-1997), the quantities had the highest index more than the base year (1985). The second was value indexes, and the price indexes were less than the base year (Table 5.13, and Figure 5.5).

The quantity, value and price indexes (% change) of Thai orchid exports can estimate as follows (Coppock, 1962).

$$\text{Quantity index} = \frac{\text{(Export quantity in year t)}}{\text{(Export quantity in base year)}} * 100$$

$$\text{Value index} = \frac{\text{(Export value in year t)}}{\text{(Export value in base year)}} * 100$$

$$\text{Price index} = \frac{\text{(Export price in year t)}}{\text{(Export price in base year)}} * 100$$

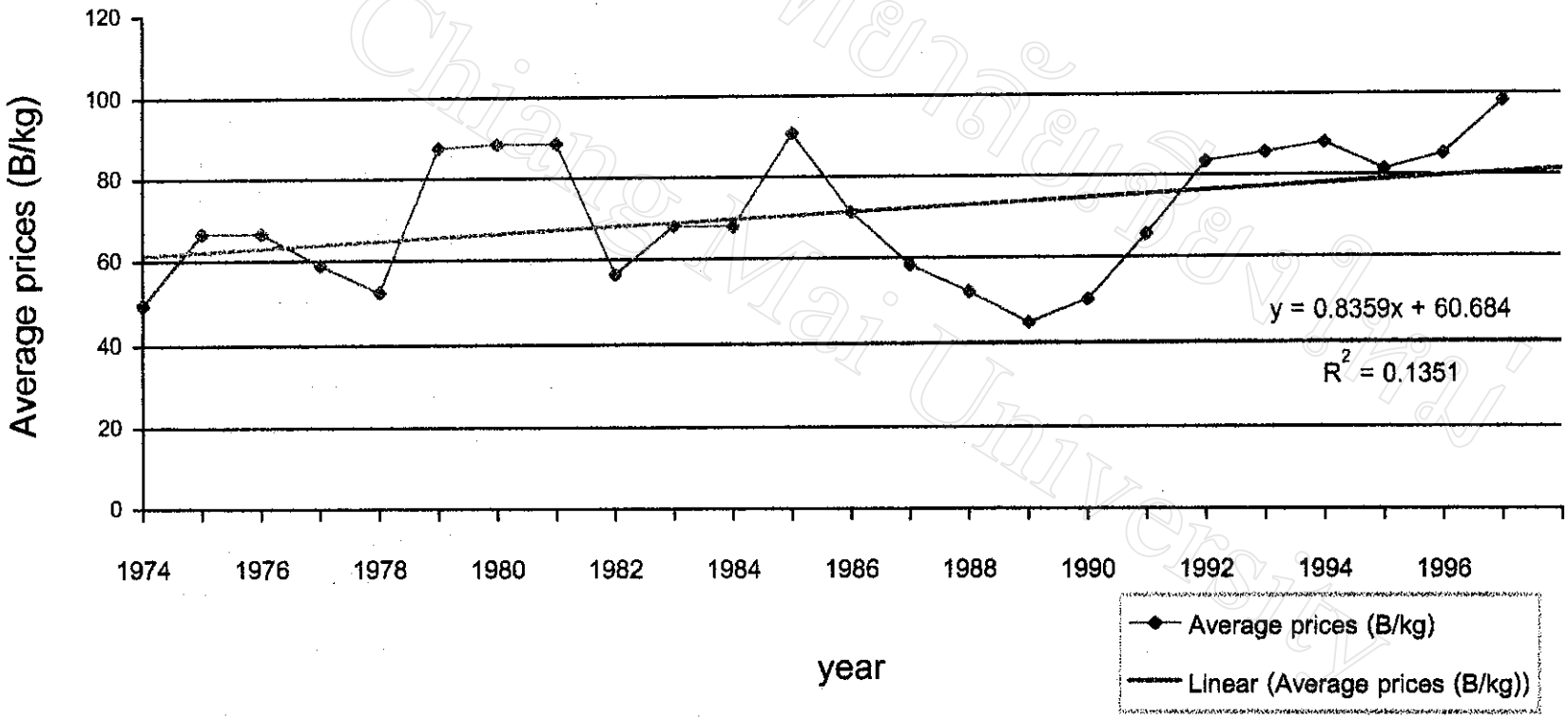
Percentage changes of quantities and values of Thai orchid exports to Japan tended to increase every year from 1974-1997. Percentage changes in quantities were more than the base year from 1986-1997. Only the price indexes, percentage changes,

were less than the base year (1985) every year from 1974 to 1996 (except in 1997 was equal 108.11 %). This was the important factor (or problem) for Thai orchid exports (especially for Thai orchid exporters and Thai orchid growers).

Table 5.13 : Indexes of value, quantity, and price of Thai orchid exports to Japan in 1974-1997 (the base year is in 1985 = 100).

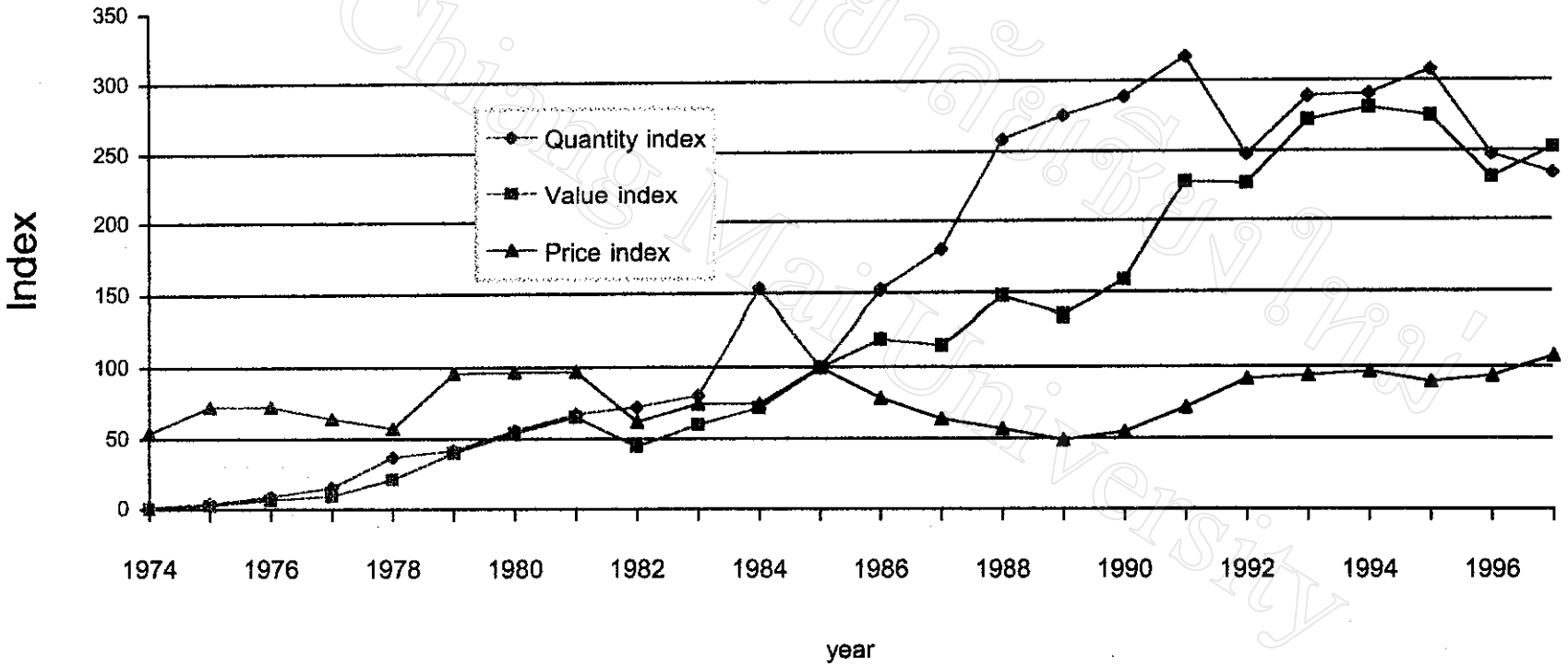
Year	Quantity exports (ton)	Quantity index (% change)	Value exports (million B.)	Value index (% change)	Average price (B/kg)	Price index (% change)
1974	31.57	1.81	1.56	0.89	49.50	54.40
1975	82.37	4.72	5.49	3.46	66.63	73.22
1976	166.63	9.55	11.08	6.96	66.47	73.04
1977	272.10	15.60	16.06	10.10	59.02	64.86
1978	647.93	37.16	34.01	21.39	52.48	57.67
1979	730.16	41.87	64.10	40.31	87.78	96.46
1980	980.41	56.23	86.80	54.59	88.53	97.29
1981	1,179.01	67.62	104.60	65.78	88.71	97.48
1982	1,266.55	72.64	71.59	45.02	56.52	62.11
1983	1,405.74	80.62	95.77	60.23	68.12	74.88
1984	1,681.79	153.80	114.37	71.93	68.00	74.72
1985	**1,743.67**	**100**	**158.69**	**100**	**91.00**	**100**
1986	2,654.86	152.26	189.55	119.45	71.40	78.46
1987	3,141.96	180.19	183.23	115.24	58.31	64.08
1988	4,519.16	259.17	234.74	147.63	51.94	57.07
1989	4,817.28	276.27	214.19	134.71	44.46	48.85
1990	5,042.34	289.18	252.09	158.55	49.99	54.93
1991	5,537.81	317.59	363.02	228.31	65.55	72.03
1992	4,323.21	247.94	361.12	227.12	83.53	91.79
1993	5,047.00	289.45	432.91	272.27	85.77	94.25
1994	5,073.58	290.97	447.07	281.18	88.11	96.82
1995	5,368.82	307.90	437.90	275.41	81.51	89.57
1996	4,313.97	247.41	368.10	231.51	85.32	93.76
1997	4,082.80	234.15	401.66	252.62	98.38	108.11

Figure 5.4 : Trend line of average prices of Thai orchis exports to Japan in 1974-1997.



Source : From Table A 2.3

Figure 5.5 : Thai orchid exports to Japan in 1974-1997, Indexes of value, quantity, and price, (1985=100)



Source : From Table 5.14

Italian market

From Figure 4.7, even trend line of Thai orchid exports values to Italy tended to increase, but trend line of the average price of Thai orchid export tended to decrease from 1970-1997 (Figure 5.6). When compared the value exports, quantity exports, the average price exports of Thai orchid flowers in this market in 1974-1997 with the value indexes, quantity indexes, average price indexes respectively found that only price indexes were lower than the base year (Table 5.14 and Figure 5.7). This showed those growth rates of quantity and value export did not increase the same proportion.

Percentage changes of quantities and values of Thai orchid exports to Italian market tended to increase every year from 1974-1997. Percentage changes in values and quantities of Thai orchid exports to Italy were more than the base year (1985=100) from 1989-1997, and 1988-1997, respectively. The percentage changes in price of Thai orchid exports to Italian market were more than the base year only a few years in 1979-1981 and 1986.

The quantity and average prices imports of Italy in 1993-1997 from Table A 5.1 of the major exporting countries in this market were in Table 5.15 and Figure 5.8 and Figure 5.9. Among the main competitive countries of Thai orchid exports in Italian market (the Netherlands, New Zealand, Singapore, South Africa and Australia), the quantity exports of Thai orchid were the highest about 83 – 94 % but the average prices of Thai orchid exports were the lowest compared to the others from 1992-1997.

Even the results of the instability of Thai orchid exports in Italian market were low (10.91-14.60 %) from 1993-1997 and the quantity and value exports were the highest in this market but the export price was not good. The percentage changes in price of Thai orchid exports to Italian market were more than the base year only a few years in 1979-1981 and 1986, and the average prices of Thai orchid exports were the lowest compared to the competitive countries from 1992-1997.

Thai orchid growers and exporters should develop new genus and species, and improved quality for the better export prices in the future not only increase in quantity exports in order to compete with other countries in this market.

Table 5.14 : Indexes of value, quantity and average price of Thai orchid exports to Italian market in 1974-1997 (million baht and 1985 = base year).

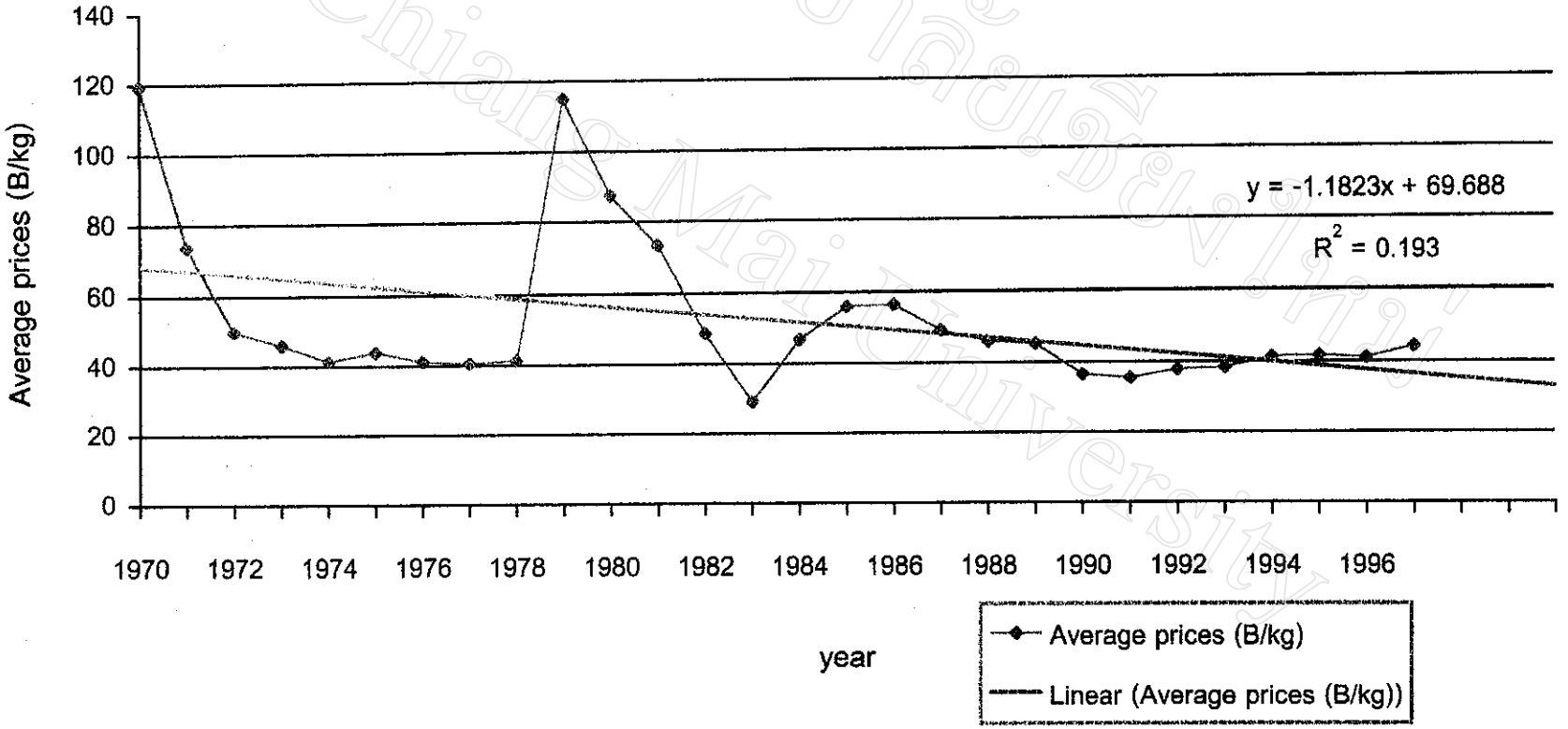
Year	Value exports	Value Index	Quantity exports (ton)	Quantity index	Avg. price Exports (B / kg)	Avg. price Index
1974	0.033	0.05	0.811	0.07	41.53	73.73
1975	0.114	0.18	2.593	0.23	44.15	78.38
1976	0.338	0.54	8.187	0.74	41.36	73.41
1977	1.176	1.88	26.860	2.60	40.75	72.34
1978	2.960	4.73	71.377	6.43	41.47	73.62
1979	12.389	19.82	107.67	9.70	115.07	204.28
1980	26.142	41.82	296.899	26.94	87.46	155.26
1981	39.125	62.59	532.511	47.99	73.47	130.43
1982	34.705	55.52	710.945	64.07	48.82	86.67
1983	33.706	53.92	1,154.406	104.04	29.20	51.84
1984	51.970	83.14	1,105.833	99.66	46.99	83.42
1985	**62.509**	**100**	**1,109.606**	**100**	**56.33**	**100**
1986	44.787	71.65	788.202	71.03	56.82	100.87
1987	46.961	75.13	962.034	85.80	49.33	87.57
1988	57.448	91.91	1,248.475	112.51	46.02	81.70
1989	68.354	109.35	1,502.680	135.42	45.49	80.76
1990	70.078	112.11	1,910.677	172.19	36.68	65.12
1991	78.202	125.11	2,195.611	197.87	35.62	63.23
1992	89.134	142.59	2,348.275	211.63	37.96	67.38
1993	82.439	131.88	2,143.425	193.17	36.46	68.28
1994	90.241	144.36	2,176.637	196.16	41.46	73.51
1995	76.326	122.10	1,820.458	164.06	41.93	74.44
1996	73.121	116.98	1,778.152	160.25	41.12	73.00
1997	82.893	132.61	1,870.757	168.60	44.33	78.70

Table 5.15 : Import quantity and average prices of orchid flowers of Italy (the top-sixth countries) in 1992-1997.

No.	Country	1992		1993		1994		1995		1996		1997	
		Stems (1,000) (%)	Avg. Price (ECU/ item)	Stems (1,000) (%)	Avg. Price (ECU/ item)	Stems (1,000) (%)	Avg. Price (ECU/ item)	Stems (1,000) (%)	Avg. Price (ECU/ item)	Stems (1,000) (%)	Avg. Price (ECU/ item)	Stems (1,000) (%)	Avg. Price (ECU/ item)
1.	Thailand	69,740 (94.94)	0.218	62,926 (83.21)	0.207	61,045 (87.35)	0.202	59,248 (88.19)	0.208	59,480 (86.02)	0.205	58,976 (86.78)	0.189
2.	The Netherlands	566 (0.77)	1.143	10,880 (14.39)	0.953	6,915.7 (9.90)	1.261	5,763.7 (8.58)	1.257	8,258 (11.94)	0.908	7,489 (11.02)	0.834
3.	New Zealand	904 (1.23)	0.560	564.6 (0.75)	0.930	839.3 (1.20)	0.689	657.3 (0.98)	0.787	786.7 (1.14)	0.812	778 (1.15)	0.795
4.	Singapore	1,125 (1.53)	0.530	749.8 (0.99)	0.614	497 (0.71)	0.730	401.3 (0.60)	0.631	223.3 (0.32)	0.766	153.19 (0.23)	0.764
5.	South Africa	455 (0.62)	0.251	126.8 (0.17)	0.434	204 (0.29)	0.480	175.6 (0.26)	0.672	34.97 (0.05)	1.058	71.3 (0.11)	0.799
6.	Australia	131 (0.18)	0.504	20.9 (0.03)	0.717	35.5 (0.05)	1.042	55.1 (0.08)	0.526	48.45 (0.07)	0.578	15.8 (0.02)	1.326
Total		73,460, 000		75,623, 738		69,888, 267		67,179, 795		69,148, 886		67,958, 239	

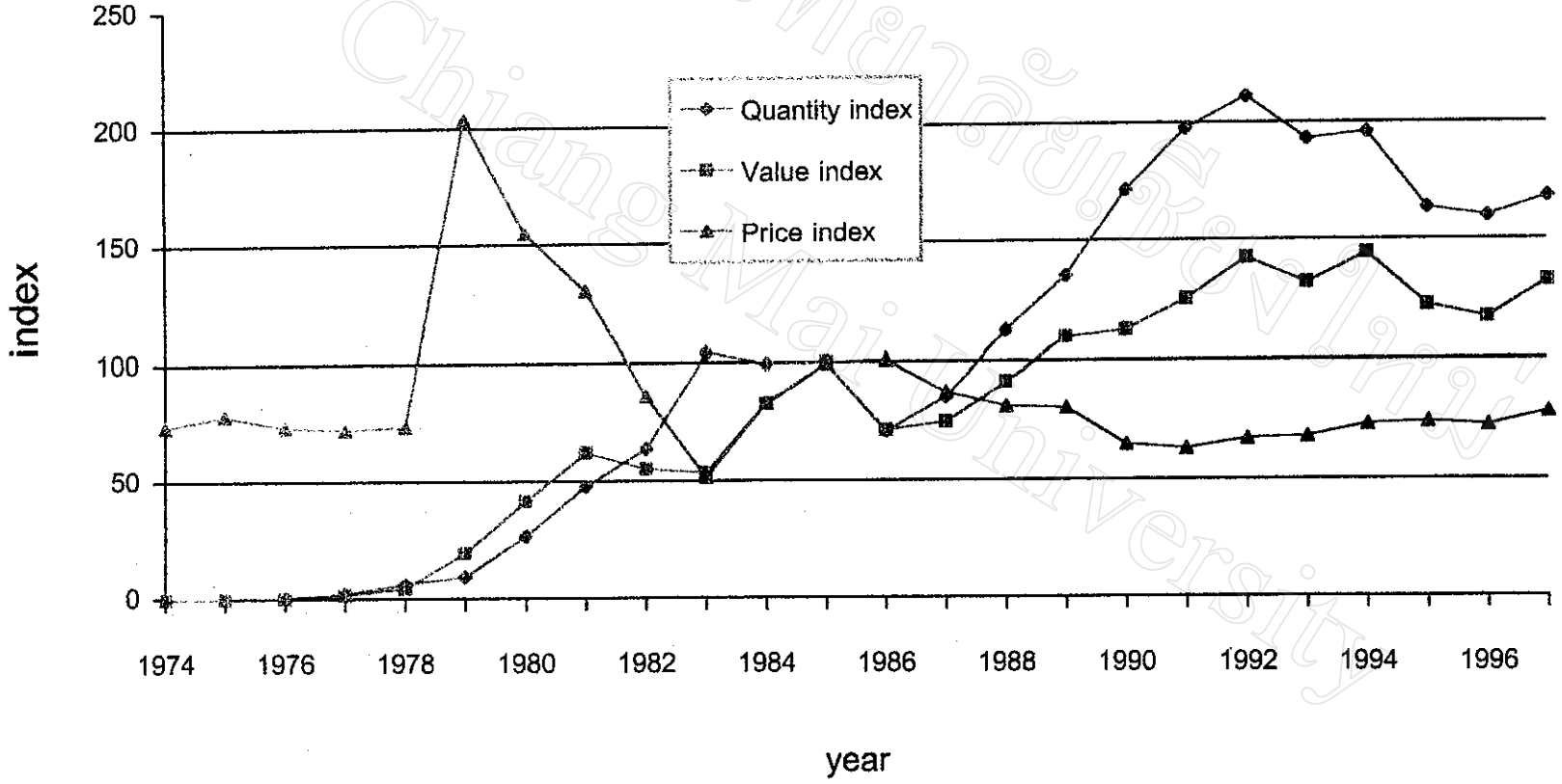
Source : From Table A 5.1

Figure 5.6 : Trend line of the average prices of Thai orchids export to Italy in 1970-1997.



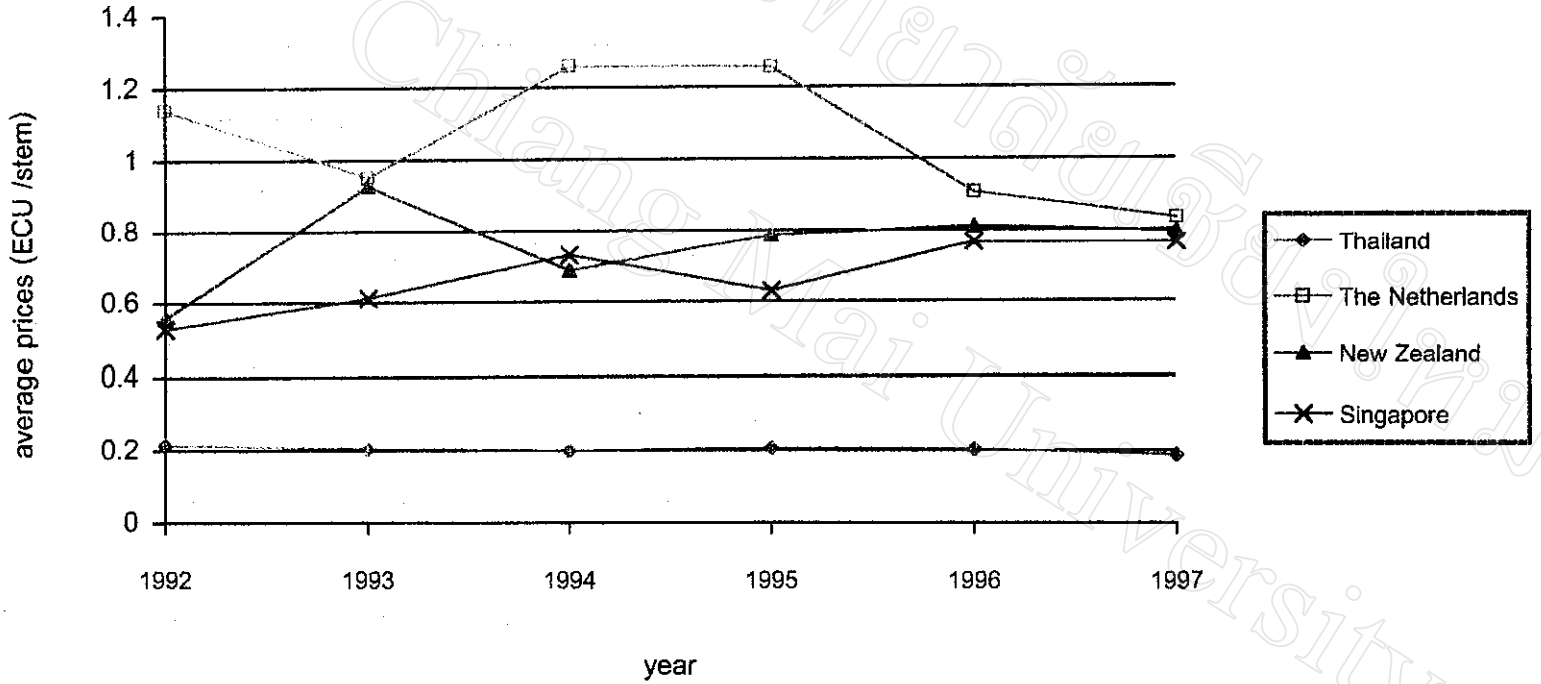
Source : From Table A 2.4

Figure 5.7 : Thai orchid exports to Italy in 1974-1997, indexes of value, quantity, and price, (1985=100)



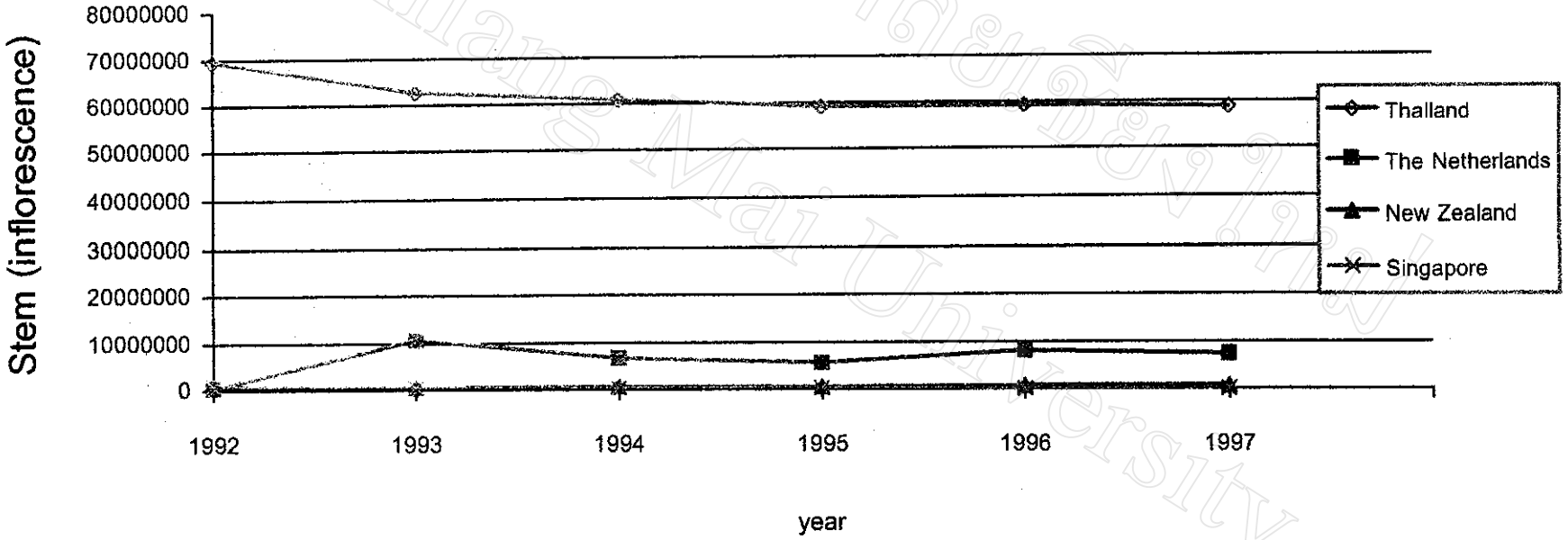
Source : From Table 5.15

Figure 5.8 : Average prices of import orchid flowers of Italy in 1992-1997.



Source : From Table 5.16

Figure 5.9 : Import quantities of orchid flowers of Italy (the top-fourth countries) in 1992-1997.



Source : From Table 5.16

American market

Even trend line of Thai orchid exports to American market tended to increase from 1970-1997 (Figure 4.10) but trend line of average price of Thai orchid exports to this market tended to decrease from 1970-1997 (Figure 5.10), that was not good for the Thai orchid exporters. When compared the value, quantity, and average price indexes of Thai orchid exports in this market from 1974-1997 with the base year (in 1985), the results showed in Table 5.16 and Figure 5.11. The values and quantity indexes were more than the base year, from 1987-1997. The average price indexes were fluctuated from 1987-1997 but they were better than Japanese and Italian markets, because they were nearly more than the base year except in 1977-1978, 1983-1984, 1989 and 1996.

In American market, the quantity exports of Thai orchids were the highest both for *Dendrobium spp.* (about 97-99 %) in Table 5.17 and other genus and species (about 46-62 %) in Table 5.18 from 1973-1997. The average prices of Thai orchid exports were not good compared to the main competitive countries (the Netherlands, New Zealand, Singapore and Costa Rica). For *Dendrobium spp.* (Table 5.17), the average prices of Thai orchid exports were the lowest and tended to decrease from 1993-1997. For the other genus and species, the export prices were lower than those were from New Zealand and Costa Rica.

These results showed that Thai orchid growers and exporters should develop the better quality for *Dendrobium spp.* and other genus and species for Thai orchid exports in the future. Thailand can increase export prices and values and can still be the top-first of the import country of America in the future.

Table 5.16 : Indexes of value, quantity, and average price of Thai orchid exports to American market in 1974-1997 (million baht and 1985 = base year).

Year	Values Exports	Value Index	Quantity Exports(ton)	Quantity Index	Average price (B/kg)	Average price index
1974	0.001	0.004	0.037	0.007	46.75	100.129
1975	0.010	0.041	0.189	0.032	55.28	118.398
1976	0.080	0.328	1.018	0.195	78.80	168.773
1977	0.189	0.775	4.759	0.911	39.73	85.093
1978	1.241	5.086	30.682	5.872	40.47	86.678
1979	1.135	4.652	13.736	2.629	82.66	177.040
1980	3.036	12.442	18.448	3.530	164.57	352.474
1981	6.287	25.770	53.069	10.156	118.48	253.759
1982	9.259	37.951	144.634	27.678	64.02	137.117
1983	14.052	57.590	323.466	61.901	43.44	93.039
1984	19.443	79.688	417.737	79.941	46.54	99.679
1985	**24.401**	**100**	**522.558**	**100**	**46.69**	**100**
1986	18.061	74.025	384.829	73.643	46.93	100.514
1987	31.873	130.631	566.136	108.339	56.30	120.583
1988	43.435	178.012	739.647	141.544	58.72	125.766
1989	41.722	170.992	895.220	171.315	46.60	99.807
1990	50.331	206.275	1018.002	194.811	49.44	105.890
1991	51.769	212.172	1054.537	201.803	49.09	105.140
1992	64.698	265.156	1071.824	205.111	60.36	129.278
1993	60.865	249.451	1298.268	248.445	46.88	100.407
1994	71.254	292.025	1311.788	251.032	54.31	116.320
1995	67.662	277.303	1387.497	265.520	48.76	104.433
1996	62.438	255.894	1366.556	261.513	45.69	97.858
1997	77.917	319.332	1453.984	278.244	53.59	114.778

Table 5.17 : Import quantities and average prices of orchid flowers (*Dendrobium spp.*) of USA. from 1993-1997.

No.	Country	1993		1994		1995		1996		1997	
		Stem (%)	Avg. price ($/stem)	Stem (%)	Avg. price ($/stem)	Stem (%)	Avg. price ($/stem)	Stem (%)	Avg. price ($/stem)	Stem (%)	Avg. price ($/stem)
1.	Thailand	13,748,369 (97.89)	0.21	16,407,052 (97.43)	0.18	15,499,067 (97.32)	0.19	27,743,081 (97.58)	0.11	29,093,616 (99.41)	0.10
2.	The Netherlands	3,110 (0.02)	0.32	22.95 (0.14)	0.26	358 (0.002)	13.96	384,474 (1.35)	0.20	0 (-)	-
3.	New Zealand	0 (-)	-	37.14 (0.22)	0.43	30.43 (0.19)	0.59	909 (0.003)	4.40	1,517 (0.005)	2.36
4.	Singapore	54,498 (0.39)	0.33	289.02 (1.72)	0.27	245.39 (1.54)	0.51	77,505 (0.27)	0.72	67,305 (0.23)	0.37
5.	Costa Rica	34,415 (0.25)	0.31	23,660 (0.14)	0.50	42.01 (0.26)	0.45	76,835 (0.27)	0.16	42,720 (0.15)	0.09
Total		14,043,812		16,839,056		15,926,318		28,431,089		29,265,688	

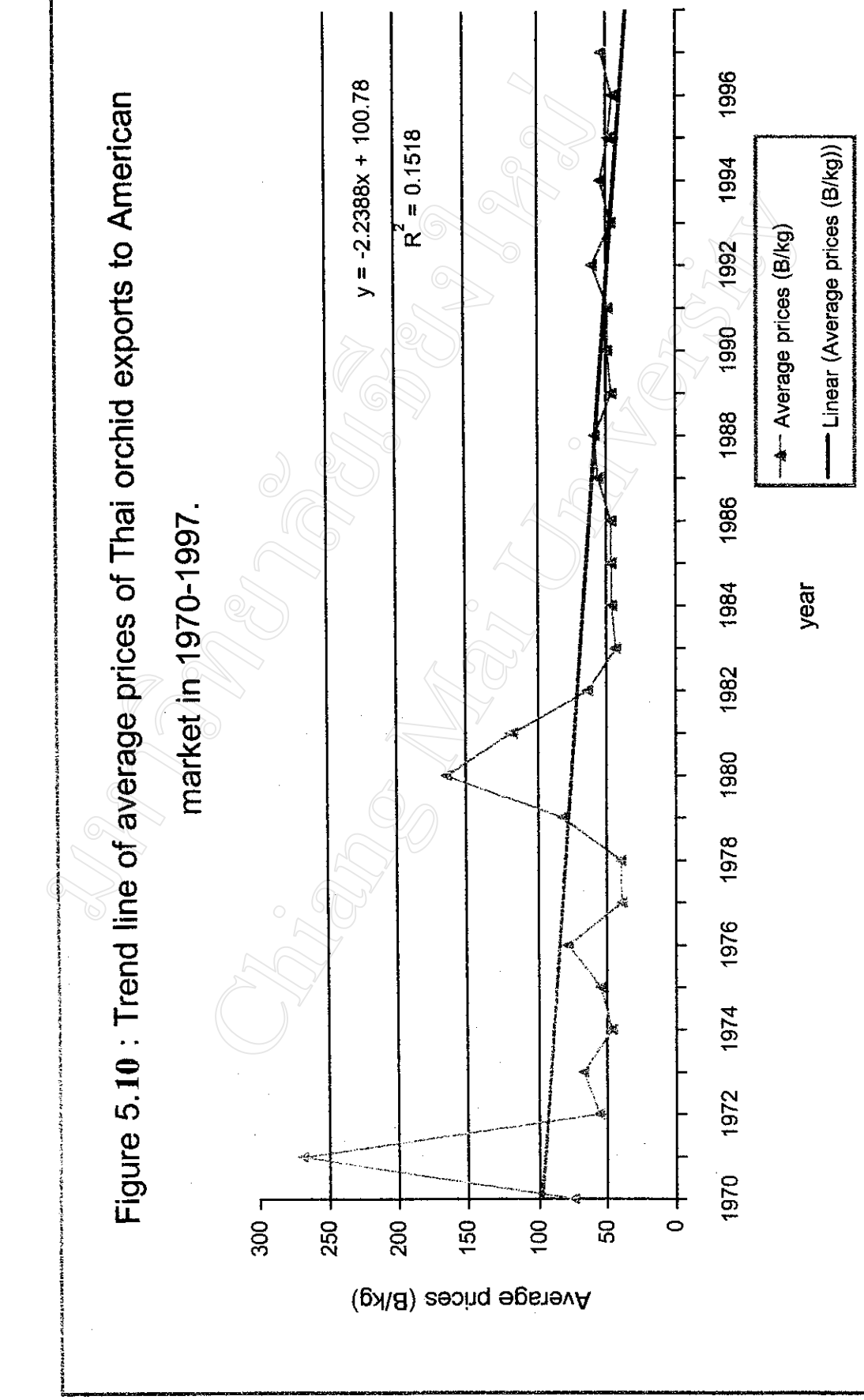
Source : American Business Information Center, Thailand, 1993-1997 (From Table A 5.2).

Table 5.18 : Average prices and import quantities of orchid flowers of USA. (except Dendrobium) in 1993-1997.

No.	Country	1993		1994		1995		1996		1997	
		Quantity (stem) (%)	Avg. price ($ / stem)	Quantity (stem) (%)	Avg. price ($ / stem)	Quantity (stem) (%)	Avg. price ($ / item)	Quantity (stem) (%)	Avg. price ($ / stem)	Quantity (stem) (%)	Avg. price ($ / stem)
1.	Thailand	3,661,436 (58.75)	0.28	3,968,687 (62.32)	0.28	3,162,884 (52.42)	0.38	3,931,530 (61.20)	0.22	2,263,188 (46.52)	0.26
2.	The Netherlands	1,779,137 (28.55)	0.18	1,489,602 (23.39)	0.22	1,675,683 (27.77)	0.22	1,090,084 (16.97)	0.24	1,404,939 (28.88)	0.24
3.	New Zealand	421,775 (6.77)	0.69	316,801 (4.97)	0.69	567,184 (9.40)	0.40	613,658 (9.55)	0.40	312,729 (6.43)	0.47
4.	Singapore	5,791 (0.09)	0.17	0 (-)	-	73,520 (1.22)	0.08	15,525 (0.24)	0.64	4,225 (0.09)	0.71
5.	Costa Rica	152,520 (2.45)	0.36	433,496 (6.81)	0.42	464,485 (7.70)	0.39	575,275 (8.96)	0.32	764,615 (15.72)	0.27
Total		6,231,997		6,368,465		6,033,620		6,423,698		4,864,517	

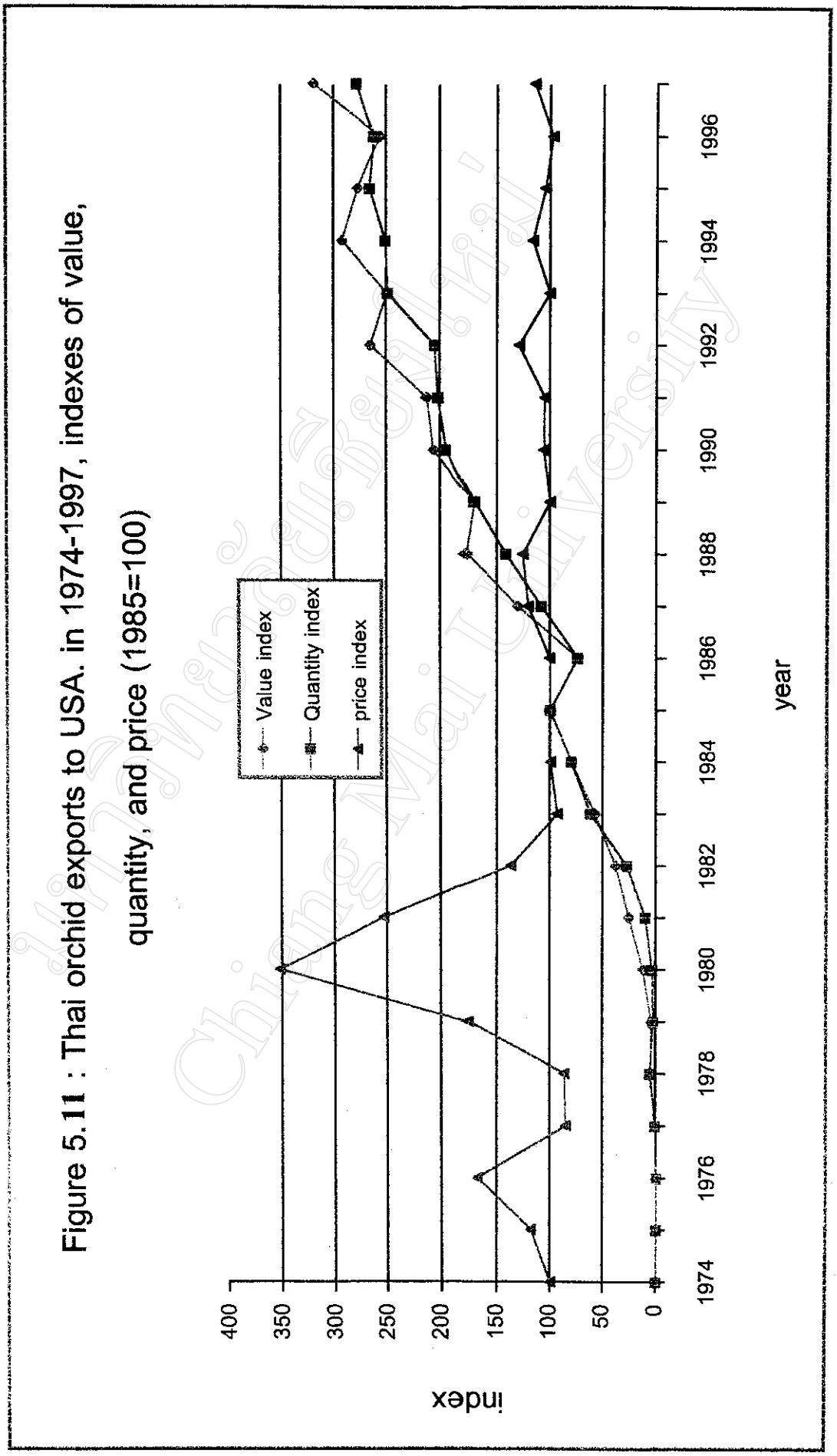
Source : From Table A 5.3

Figure 5.10 : Trend line of average prices of Thai orchid exports to American market in 1970-1997.



Source : From Table A 2.5

Figure 5.11 : Thai orchid exports to USA. in 1974-1997, indexes of value, quantity, and price (1985=100)



Source : From Table 5.17