CHAPTER 6

THE TEST OF TWELVE HYPOTHESES
ON JAPANESE DIRECT INVESTMENT IN KEDAH

6.1 Introduction

In this chapter we tested a number of hypotheses in order to know the tendencies of the Japanese firms in Kedah. Though we used computer calculations for this analysis, we must say that some errors are possible. For example, we got a lot of data through the interviews with the Japanese executives. However, some respondents were reluctant to give us certain information. Some of the firms refused to grant an interview. This means that data used here may give a slightly distorted impression of the Japanese companies in Kedah.

We began our survey in the end of 1992 and completed it in the end of 1993. In a long span of time the situation may change. Domestic factors in Malaysia are also changing. Thus, in the end of 1993, the highway from Penang to Kedah was completed. This fact improved the environment for investment. External factors have also changed. When we began our research, the Japanese economy was strong and the Japanese executives were confident in the future good performance of their companies. In the end of 1993, when the Japanese economy weakened, this confidence was shaken. This factor may also affect companies' decisions in factory management.

6.2 Hypothesis Test

In this research, we put forward and investigated 12 Hypotheses in order to find out the character of the Japanese Direct Investment in Kedah. We used SAS programming for the statistical test.

6.2.1 Hypothesis One: Japanese Ownership and Export Orientation

The minority Japanese owned firms tend to be less export-oriented than the firms with a bigger Japanese ownership. This is because investment by the export-oriented Japanese firms may be encouraged by the Malaysian Government, hence they are allowed full ownership or majority ownership. On the other hand, the less export-oriented Japanese firms may be less encouraged to invest and are allowed only minority ownership.

We used SAS computer program to analyse this hypothesis. Japanese ownership is expressed by the Japanese equity ratio (JER):

JER = Japanese equity ÷ Total equity.

To find out the intensity of export we used the Export-Sales Ratio (ESR):

ESR = Sales for Foreign Market ÷ Total Sales.

Corr Procedure was used to analyse the relationship between the JER and ESR. Linear regression analysis was used to investigate the linear relationship between these two elements.

The SAS printout shows that the correlation ratio between the ESR and JER is 0.70668 and the p-value for the correlation ratio is 0.0047. This means that relationship between the ESR and JER is quite significant.

The Linear Regression Procedure shows that F value = 11.9 and that the p-value for F is 0.0047 with R^2 = 0.4997. The intercept is estimated at 4.841, the slop is estimated at 0.9. The p-value for the intercept is 0.8, the p-value for the slop is 0.0047. This means that the linear model describes the relationship between the variables as not satisfactory.

This test proves that the export-oriented firms have a high Japanese ownership, while domestic-market oriented firms have a low Japanese ownership. However, this relationship is not of the linear type. These findings coincide with our expectations.

6.2.2 Hypothesis Two: Market Orientation and Local Content

The firms oriented toward the domestic market tend to have a high local content, while the export-oriented firms tend to have a low local content. This is because the export-oriented firms manufacture a high quality production for the foreign markets, hence they require a high quality materials and do not buy local products. Conversely, the firms oriented toward the domestic market buy cheaper local materials for their production if the inputs are good enough.

To know the intensity of domestic market orientation we used the domestic sales ratio (DSR):

DSR = Sales in domestic market ÷ Total sales, where

Sales in domestic market = Total sales - exports.

The local content ratio (LCR) is expressed by:

LCR = Purchases from local firms ÷ Total purchases.

To investigate this hypothesis the correlation procedure and linear regression analysis were used.

SAS printout shows that the correlation between the export ratio and the local content is 0.47906. The significance level of the correlation ratio is 0.083. This means that the relationship between the DSR and LCR is statistically not very significant.

The linear regression procedure shows that F value = 11.9, the probability is 0.083 and R^2= 0.2295. The estimated intercept is 114.7, while the slop estimated is 6.7. The p-value for the intercept is 0.003 and the p-value for the slop is 0.0831. This means that the linear model does not describe the relationship between the variables satisfactorily.

This test reveals that the domestic-market oriented firms do not necessarily have a high local content, and the external market oriented firms' local content is not always low. These findings do not lend support to our expectations.

The reason why the result does not support our hypothesis may be that the local content is effected by various elements, such as type of industries, or

vintage, location, etc. The market orientation may be just one of the factors, but not the most important.

6.2.3 Hypothesis Three: Location and Size of Employment

The Japanese firms located near Penang are of a smaller size in terms of employment compared with those located far from Penang. This is because usually the SMIs need not to employ a big number of workers, so they can set up their factories near Penang where the competition on the job market is tense. On the contrary, big the Multinationals prefer to set up their factories far from Penang, because they need a large amount of workers and they do not want to compete with other firms on the job market.

SAS programming was used to analyse the relationship between the location of firms and their employment. We consider the firms located in Tikam Batu and Kulim industrial estates as the firms located near Penang. They will be referred to as Near Penang Firms (NPF). The firms in Sungai Petani and Bakar Arang industrial estates are considered as the firms located far from Penang, they will be referred to as Far from Penang Firms (FPF). The size of a firm is determined according to its Total Employment (TEM). TTEST procedure was used to examine the relationship between the two elements.

Then we compared the TEM of NPF with TEM of FPF. The average TEM of NPF is 438, the average of TEM of NPF is 694. The computer printout shows that $F = 1.34$ and P-value $= 0.7287$. Therefore, these two means are not significantly different. These findings are not consistent with our expectations.

The reason for this may be that some of the firms with a large employment could have been established near Penang before the FDI boom. This means that there is a possibility that the relationship between location and employment is significant only for the newly-established firms, but not for all firms in Kedah.

6.2.4 Hypothesis Four: Location and Local Content

The Japanese firms located near Penang have a higher local content than the firms located far from Penang. This is because the firms situated near Penang can easily find a supplier near the factories, while the firms located in remote areas may face more difficulties to find a supplier near their factories.

SAS programming was used to analyse the relationship between location of a firm and its local content. We use the LCR to analyse the intensity of local content, as it was used above (see above 6.2.2). The firms are divided into two groups according to their location, namely NPF and FPF (see above 6.2.3).

TTEST procedure was used to analyse the relations between the two elements. The average LCR of 7 NPF is 54 percent, while the average LCR of 7 FPF is 47 percent.

SAS printout of the TTEST of the firms' local content and their location shows that $F = 1.02$ and P-value = 0.9729. So, these two variables are not significantly different. This means that the local content of the firms located near Penang is not higher than of those located far from Penang. These findings are thus not in conformity with our expectations.

The reason why the results of the test are different from our anticipation may be that the local content is determined not by the firms' location only. Firms' vintage or type of industry may have a bigger effect on their local content. If our data was not so limited, we would have investigated the local content of the firms with similar characteristics (same vintage or same type of industry). This would have shown the relationship between LCR and location more accurately. However, the limited information hinders us from doing so.

6.2.5 Hypothesis Five: Establishment Year and Market Orientation

The earlier established firms are more domestic market-oriented, while the newer firms are more export-oriented. This is because after the introduction of the Investment Promotion Act (1986) many export-oriented firms were given special incentives. That is why the newly-established firms tend to be export-oriented. There were not much special incentives for the export-oriented firms in the earlier period, so the earlier established firms tended to be more domestic market-oriented.

Here we use the ESR to analyse the intensity of export (see above 6.2.1),

The firms were divided into two groups by vintage:

1) Earlier Established Firms (before 1985), which will be referred to as EEF

2) Later Established Firms (in 1985 or after 1985), which will be referred to as LEF.

Then, all the firms were divided into two groups by ESR:

1) Higher ESR Firms (ESR of 50 percent or more), which will be referred to as HEF

2) Lower ESR Firms (ESR of less than 50 percent), which will be referred to as LEF.

Chi-square procedure and SAS computer programming were used to analyse the relationship between these factors.

The computer printout of the result of the Chi-square analysis of the relationship between the firms' year of establishment and their export orientation yields a Chi-square of 4.381 with p-value for Chi-square of 0.036.

This means that there is a periodical bias for the market-orientation. The PHI is 0.559. The contingency coefficient is 0.488. The Cremer's V is 0.559. It proves that the firms' vintage and their export ratio are significantly dependent on each other. These findings are consistent with our expectations.

This result shows that the later established firms are usually more export-oriented than the earlier established firms. In other words, a majority of the Japanese firms established in Kedah in 1985 or later are export-oriented.

6.2.6 Hypothesis Six: Establishment Year and Local Content

The earlier established Japanese firms have a higher local content, while the newly-established firms have a lower local content. This is because the firms that have come to Malaysia earlier have established a production network. That is why their local content is high. Conversely, the newly established firms have not established a production network locally and are dependent on the imported inputs.

We used LCR to analyse the intensity of local content, as it was done above (see 6.2.2). The fourteen respondent Japanese firms in Kedah are divided into the two groups by vintage: 1) EEF and 2) LEF (see above, 6.2.5). Then, these 14 firms are further divided into the two groups by the LCR:

1) High LCR Firms (LCR of 50 percent or more), referred to as HLF.

2) Low LCR Firm (LCR of less than 50 percent), referred to as LLF.

Chi-square procedure and SAS programming were used for the analysis.

The computer printout of the result of the Chi-square analysis of the relations between firms' establishment year and their local content shows that Chi-square is 0.884, and the p-value for Chi-square is 0.347.

This means that there is no periodical bias for the preference of supplier. The PHI is 0.251. The contingency co-efficient is 0.244. The Cremer's V is 0.251. This result shows that there is no connection between vintage and local content of a firm, contrary to our expectations.

The reason why our hypothesis is at variance with our findings may be that the firms' local content is not influenced by the vintage only. Type of industry or firms' location may have a bigger effect on the local content, but the limited data does not allow us to conduct a more thorough analysis.

6.2.7 Hypothesis Seven: Industry and Market Orientation

The Non-electronics/electrical Japanese firms are more oriented toward the domestic market, while the electronics/electrical firms are more export-oriented. This is because the electronics/electrical firms have some advantages

to export their production, which is neither heavy nor of a very big size, nor fragile. On the contrary, production of the non-electronics/electrical firms (transport equipment/machinery, wood or metal products) is difficult to export. For that reason, these industries are oriented toward the domestic market.

The ESR was used to measure the intensity of export, as it was done above (see 6.2.1). The fourteen respondent Japanese firms in Kedah are divided into two groups by their ESR: 1) HEF and 2) LER (see above, 6.5.5). There are 7 electronics/electrical firms and 7 non-electronics/electrical firm that answered our questionnaire.

Chi-square procedure and SAS programming were used for the analysis.

The computer printout of the result of the Chi-square analysis of the relations between the type of industry and market orientation shows that Chi-square is 0.311 and that the p-value for Chi-square is 0.577.

This means that there is no industrial bias for the market orientation. The PHI is 0.149. The contingency coefficient is 0.147. The Cremer's V is 0.149. It shows that the type of production and the export ratio of a firm are independent of each other. These findings contradict with our expectations. The reason for this may be that some of the non-electronics/electrical firms are engaged in exports, one of these firms is even exporting all its production. On the other hand, two of the electronics/electrical firms were of the import-substitution type.

6.2.8 Hypothesis Eight: Industry and Local Content

The Non-electronics/electrical Japanese firms have a lower local content, while electronics/electrical firms have a higher local content. This is due to the fact that electronics/electrical industry is well developed in Malaysia, and some local electronics/electrical firms are able to supply the Japanese MNs with materials or parts. Firms in other industrial groups are still less developed, and are unable to provide their Japanese counterparts with the necessary inputs.

We used the LCR for the analysis of the intensity of the local content, as it was done above (see 6.2.2). The fourteen Japanese firms are divided into two groups by their LCR, HLF and LLF. There are 7 electronics/electrical firms and 7 non-electronics/electrical firms that answered survey questionnaire.

Chi-square procedure and SAS programming were used for this analysis.

The computer printout of the result of the Chi-square analysis of the relations between the type of industry and the local content gives a Chi-square of 4.677 with p-value of 0.031.

This means that there is an industrial bias for the firms' local content. The PHI is 0.577. The contingency co-efficient is 0.560. The Cremer's V is 0.577. This result shows that the electronics/electrical firms tended have a higher local content than the non-electronics/electrical firms did. These findings fit our expectations.

In other words, we can say that electronics/electrical firms have a stronger production network in Malaysia than non-electronics/electrical firms.

6.2.9 Hypothesis Nine: Japanese Ownership and Size of Firms

Firms with a Japanese majority ownership are of a bigger size, while firms with a Japanese minority ownership are of a smaller size. This is because usually the big Multinationals have the own strategy and markets, and they do not need a local partner. Conversely, the SMIs may sometimes have not enough means for a successful operation in Malaysia, so that they are more willing to find a local partner.

We used the JER to measure the intensity of the Japanese equity participation, as it was done above (see 6.2.1). We divided the 14 respondent Japanese firms in Kedah into the three following groups according to their JER:

1) Group One (firms with 100 percent JER);

2) Group Two (firms with JER of 50 percent or more);

3) Group Three (firms with JER of less than 50 percent).

Firms' size is measured by the Total Investment (TIN), Total Employment (TEM) and Total Sales (TSA). GLM procedure was used to analyse the variances of these three elements corresponding to the Japanese ownership.

SAS printout shows that the F-value for TIN in each group of firms is 0.61, p-value is 0.5622. This means that the total investment does not differ significantly between the groups of companies.

SAS printout shows that F-value for the TEM in each group of firms is 0.36 with a p-value of 0.706. This result shows that the total employment is also not significantly different in the various groups of firms.

Analysis of the sales figures shows that the F-value for total sales in the three groups of companies is 1.67 with a p-value of 0.232. This means that, in 1992, the total sales were not significantly different in the various groups of firms.

From these findings, we can conclude that there is no clear relationship between the size of firms and their ownership structure. For example, some SMIs may have a high Japanese ownership, while some MNs may have a low Japanese ownership. These findings do not agree with our hypothesis.

The reason why the result of analysis is different from our expectations may be that the JER is effected by the various elements, such as the Government guidelines, company's strategy, etc. The size of firms may be one of the factors, but is not the most important one.

6.2.10 Hypothesis Ten: Japanese Ownership and Productivity

Firms with a Japanese majority ownership have a higher productivity, while firms with a Japanese minority ownership have a lower productivity. This hypothesis is based on the Japanese businessmen's opinion that a higher Japanese ownership is better for a company's success. That is why some Japanese companies are reluctant to establish joint-ventures with local partners.

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This hypothesis's purpose is to check whether this opinion holds some truth or not.

We divided the 14 respondent Japanese firms in Kedah into the three groups according to JER (see 6.2.9). Productivity is expressed by:

Productivity = Total value added ÷ Total employment.

As we do not have data on the value added we employ the total sales instead.

The GLM procedure was used to analyse the variances of the productivity corresponding to the Japanese ownership.

SAS printout shows that the F-value for the productivity is 3.97 with a p-value of 0.95. This means that the productivity does not differ significantly between the different groups of firms.

The results of the analysis show that there is no clear relationship between JER and productivity. In other words, firms with a high JER may have a low productivity, while firms with a low JER may have a high productivity. These findings do not support our expectations. The reason for this may be that productivity is effected by various elements, such as firm's management, facilities, etc. The ownership structure may be one of the factors, but not the most important.

6.2.11 Hypothesis Eleven: Salaries and Location

Salaries at the Japanese firms located near Penang are higher and increase more quickly than salaries at the firms located far from Penang. This is because Penang is the industrial area, so the workers' salaries are higher than in Kedah. Therefore, the Japanese firms located near Penang pay their workers higher salaries and increase them more often in order to prevent workers from job-hopping. Conversely, the firms in remote areas increase workers' salaries less often.

SAS programming was used to analyse the relationship between the salaries and location. The firms are divided by their location into the two following groups: 1) NPF and 2) FPF (see 6.2.3). The staff of the Japanese firms is divided into the 5 categories (see 5.9.1).

TTEST procedure was used to analyse this hypothesis. SAS printout of the TTEST analysis of the relationship between salaries and location has yielded the following results:

$F = 2.04$, p-value $= 0.4076$, for an ordinary worker.

$F = 6.74$, p-value $= 0.0352$, for a technician.

$F = 1.84$, p-value $= 0.4775$, for an engineer.

$F = 1.86$, p-value $= 0.4690$, for a manager.

$F = 2.31$, p-value $= 0.331$, for a director

This means that the salaries of ordinary workers, engineers, managers and directors are not significantly different between the NPF and FPF, while the salaries of technicians do differ significantly between the two locations.

SAS printout of the TTEST analysis of the relationship between salaries increase and location shows the following:

$F = 1.96$, p-value $= 0.4349$, in 1991.

$F = 7.98$, p-value $= 0.0232$, in 1992.

$F = 3.21$, p-value $= 0.1357$, in 1993.

This means that the increase of salaries in 1991 and in 1993 was not significantly different, while the increase of salaries in 1992 was significantly different.

These findings show that the salary of technicians in the NPF is higher than it is in the FPF. The increase of salary in the NPF in 1992 was higher than the salary increase in the FPF in the same year. This supports our expectation.

The salaries of technicians at the NPF in Kedah increased fast due to the shortage of technicians in Penang. The workers in the NPF often quit their jobs and find new employment in Penang. That is why many of the NPFs in Kedah had to pay higher salaries to technicians to prevent them from job-

hopping. The increase of salaries in Penang in 1992 was caused by a serious shortage of labour force. As a result, salaries at the Japanese firms in Kedah in 1992 also increased, especially at the NPF.

6.2.12 Hypothesis Twelve: Salaries and Industry

The Japanese electronics/electrical firms pay higher salaries and increase them more often, while the non-electronics/electrical firms pay lower salaries which increase slowly. This is because there are a lot of electronics/electrical firms and the competition between them is more intense. Hence, the electronics/electrical firms pay better salaries. On the contrary, the number of the non-electronics/electrical firms is limited and the competition between them is less intense such that there is no pressure on them to pay better salaries.

SAS programming was used to analyse the relationship between the industries and salaries. TTEST procedure was used to analyse this hypothesis. Here the staff of the Japanese firms was divided into the 5 categories, as it was done in the section 5.9.1. There are 7 Japanese electronics/electrical firms and 7 non-electronics/electrical firms which answered our survey questionnaire.

Computer printout of the results of the TTEST analysis of the relationship between the industries and salaries shows the following:

$F = 6.15$, p-value $= 0.0439$, for an ordinary worker.

$F = 4.67$, p-value $= 0.0836$, for a technician.

$F = 1.63$, p-value $= 0.5667$, for an engineer.

$F = 2.59$, p-value $= 0.2710$, for a manager.

$F = 3.03$, p-value $= 0.2028$, for a director.

This means that the salaries of technicians, engineers, managers and directors are not significantly different between the industries, while the salaries of ordinary workers are significantly different in the different industries.

The SAS printout of the TTEST analysis of the relation between the salaries' increase and the industries is as follows:

F = 2.51, p-value = 0.2881, in 1991.

F = 13.20, p-value = 0.0050, in 1992.

F = 0.18, p-value = 0.1053, in 1993.

This means that the increase of salaries in 1991 and in 1993 was not significantly different between the industries, while the increase of salaries in 1992 was significantly different.

These findings show that the salaries of ordinary workers at the electronics/electrical firms are higher than the salaries at the non-electronics/electrical firms. The increase of salaries at the electronics/electrical firms in 1992 was higher than the salaries' increase at the non-electronics/electrical in the same year. These findings are consistent with our expectations.

Due to the large number of the electronics/electrical companies, the workers at the electronics/electrical firms in Kedah can find new employment more easily than those at the non-electronics/electrical firms. The tight labour market and new employment opportunities for the workers of the electronics/electrical firms have forced these firms to pay higher salaries. The increase of the workers' salaries at the electronics/electrical firms in Kedah in 1992 was due to the increase of the workers' salaries in Penang.