

CHAPTER 4

ANALYSIS ON THE LABOUR PRODUCTIVITY OF THE MALAYSIAN MANUFACTURING SECTOR

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4.1 Overview

In this chapter, we will look at the results of the estimation of the regression model. Besides, hypothesis testing has been done using several tests to look at the significance of the regression model and the variables concerned. Finally, we will also look at the trends of the variables within these 25 years as well as the elasticity aspects.

4.2 Estimation Of The Regression Model

Using **E-views**, the computer output is presented below:

Summaries of Least Square Results

Dependent Variable: LP

Sample: 1978 - 2002

Included observations: 25

Variable	Coefficient	Std. Error	T-Statistic
C	143818.1	5890.492	24.41530
RW	14.34456	0.384106	37.34533
ULC	-2028.161	61.64927	-32.89838

R-squared	0.992348
Adjusted R-square	0.991652
S.E. of regression	2562.709
Sum squared resid	1.44E+08
Log likelihood	-230.0960
Durbin-Watson stat	1.076947
F-statistic	1426.484

A standard way of reporting the empirical result is;

$$LP = 143818.1 + 14.34456RW - 2028.161ULC$$

$$Se = (5890.492) \quad (0.384106) \quad (61.64927)$$

$$R^2 = 0.992348$$

The interpretation of the model:

This model has 2 independent variables: RW and ULC. The independent variable is real labour productivity in the manufacturing sector. According to economic theory, RW and LP are positively related whereas ULC and LP are negatively related. If RW and ULC are fixed at zero, on average, the real labour productivity is expected to increase by approximately RM 14381 billion of sales per employee.

The partial regression coefficient of 14.34456 signifies that, holding other variable constant, an increase of RM 1 of real wage lead to an increase of real labour productivity by approximately RM 14.3445 billion of sales per employee. The positive sign of the coefficient conforms to the economic theory.

The partial regression coefficient of -2028.161 explains that an increase of RM 1 of ULC result to a decrease of real labour productivity by approximately RM 2028 billion of sales per employee, ceteris paribus. The negative sign of the coefficient conforms with the economic theory.

4.3 Statistical criteria

4.3.1 Goodness Of Fit

To study the goodness of fit of this linear model, R^2 will be analyzed. Therefore, the value of R^2 , which is 0.9923, signifies that ULC and RW have explained approximately 99.2 percent of the variation in the real labour productivity of the manufacturing sector. On the other hand, approximately 0.8 percent of the variation has been explained by other variables.

4.3.2 Hypothesis Testing

A) Testing hypothesis about individual partial coefficients:

Here, t-test has been performed to look at the significance of the coefficients.

Hypothesis: $LP = b_1 + b_2 RW - b_3 ULC + u$

i) t-test for RW (b_2):

Null Hypothesis, $H_0 = b_2 = 0$

Alternative Hypothesis, $H_1 = b_2 > 0$

$\alpha = 0.01$

d.f = 22

Critical t-value = 2.508

Since the computed t-value (37.34533) exceeds the critical t-value (2.508), reject H_0 . Thus, RW is significant. Real wage is positively related with the real labour productivity.

ii) t-test for ULC (b_3)

Hypothesis Null, $H_0 = b_3 = 0$

Hypothesis Alternative, $H_1 = b_3 < 0$

$\alpha = 0.01$

d.f = 22

Critical t-value = -2.508

Since the computed t-value (32.89888) exceeds critical t-value which is |2.508|, reject H_0 . Thus, ULC is significant. Unit labour cost is negatively related with the real labour productivity.

B) Testing the joint hypothesis:

To test this joint hypothesis, F-test has been used.

Null Hypothesis, $H_0 = b_2 = b_3 = 0$

Alternative Hypothesis, $H_1 = b_2 = b_3 \neq 0$

At $\alpha = 0.05$

Number of observations to test, $N=25$

Number of independent variable included intercept, $k= 3$

F-value = 1426.484

Critical F-value = 4.30

(Statistical table of the F distribution) ($F^c_{2, 22}$) = 4.30

Since computed F-value (1426.484) exceeds the critical F-value (4.30), F-value is significant. Hence, reject null hypothesis.

4.4 *Economic Criteria*

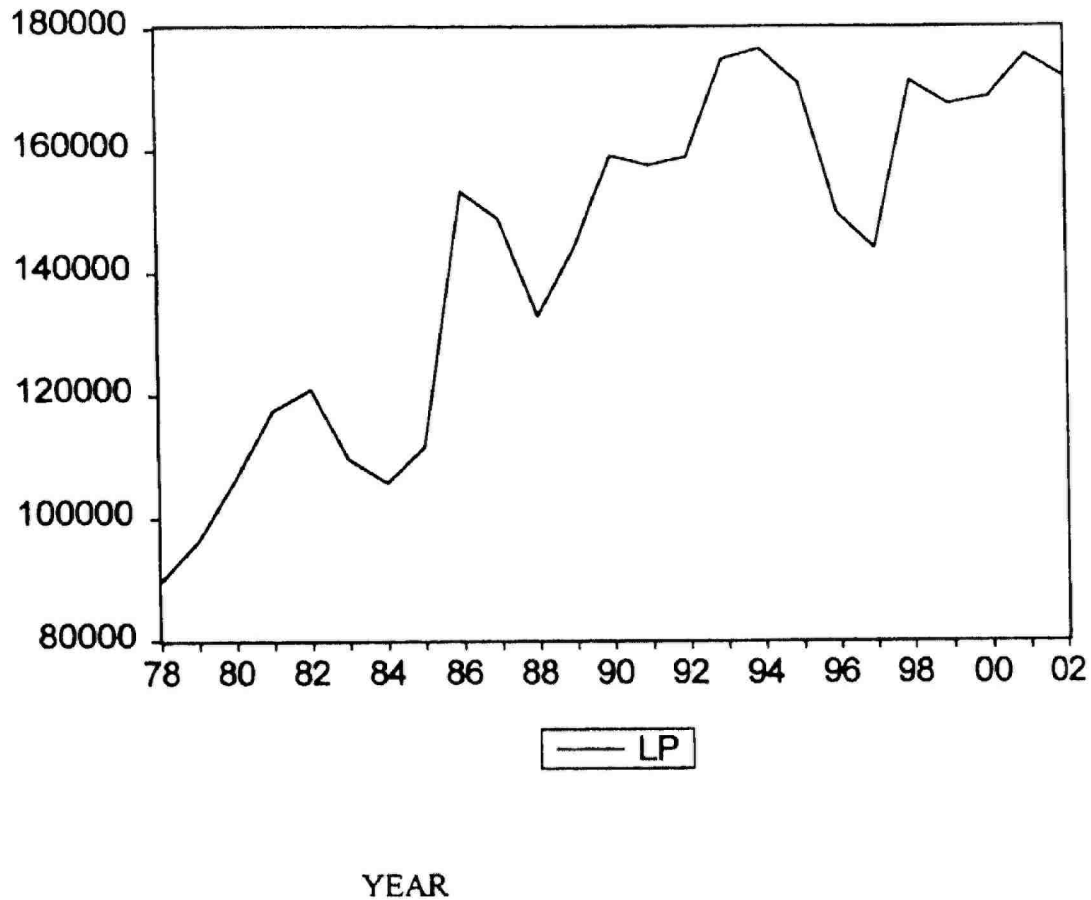
There are two economic criteria namely to analyze the trends of those variables and to assess the elasticity aspect.

4.4.1 *Trends of The Variables*

The trends of these three variables, which are LP (real labour productivity), RW (real wage) and ULC (unit labour cost) are depicted in the graphs.

A) Trend of real labour productivity (LP)

RM / EMPLOYEE



The long-term trend for real labour productivity has continued to rise from RM 89,845 million of sales per employee in 1978 to RM 172,072 million of sales per employee in 2002. The highest peak has been obtained in 1994 with the value of RM 176,629 million of sales per employee. The impact of economic crisis in 1997 has been depicted in the graph with the value of sales of RM 144,079 million of sales per employee in the same year. However, after it reached its momentum, the real labour

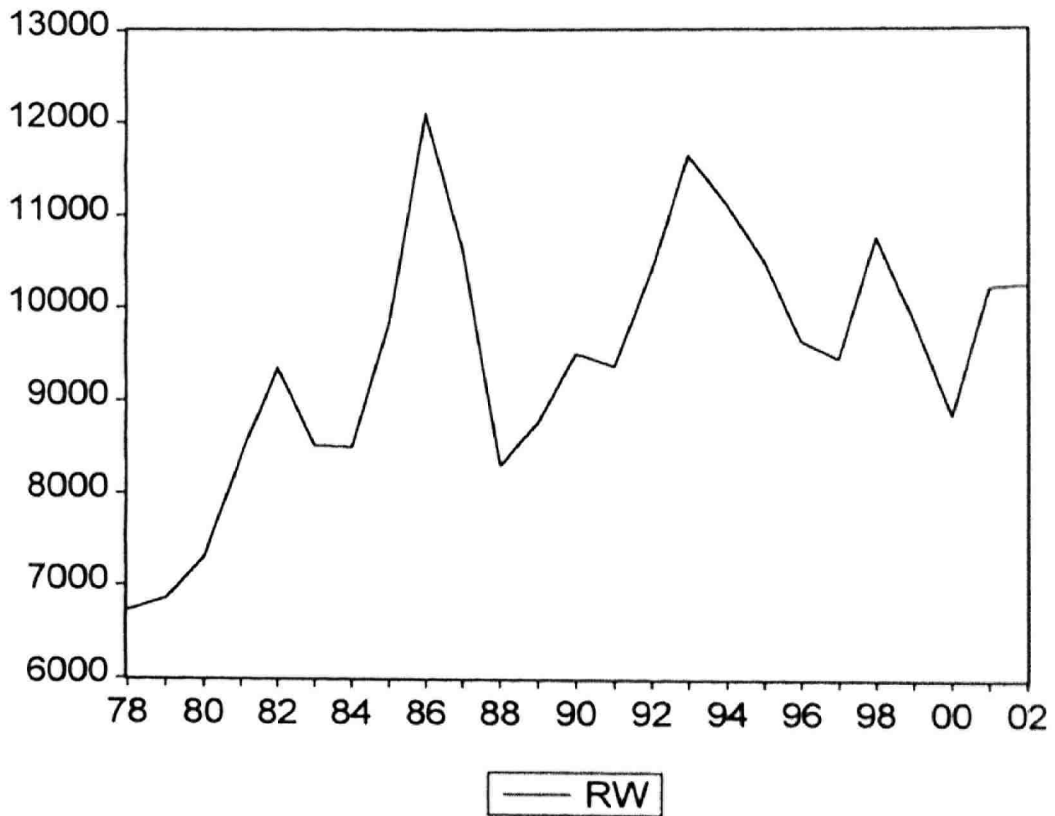
productivity bounced back and continued to increase until it reached its peak of RM 172,072 million of sales per employee in 2002. On the whole, the pattern of real labour productivity within the 25 years are increasing in nature.

If we look at the trends of the sub-sectors, among the sectors which had increasing trend in the labour productivity between 1994 to 2000 are the electronics sub-sectors, food processing industry, textile sub-sector, footwear product sub-sector, transport equipment sub-sector and fabricated metal products.²⁰

²⁰ NPC Productivity Report, 2001

B) Trend of real wage (RW)

RM/EMPLOYEE



YEAR

The long-term trend of the real wage within 1978 to 2002 is as depicted in the above graph. The amount of real wage in real labour productivity of manufacturing sector continued to rise from RM 6729 million per employee to RM 10,253 million per employee in 2002. The real wage reached a peak of RM 12,104 million per

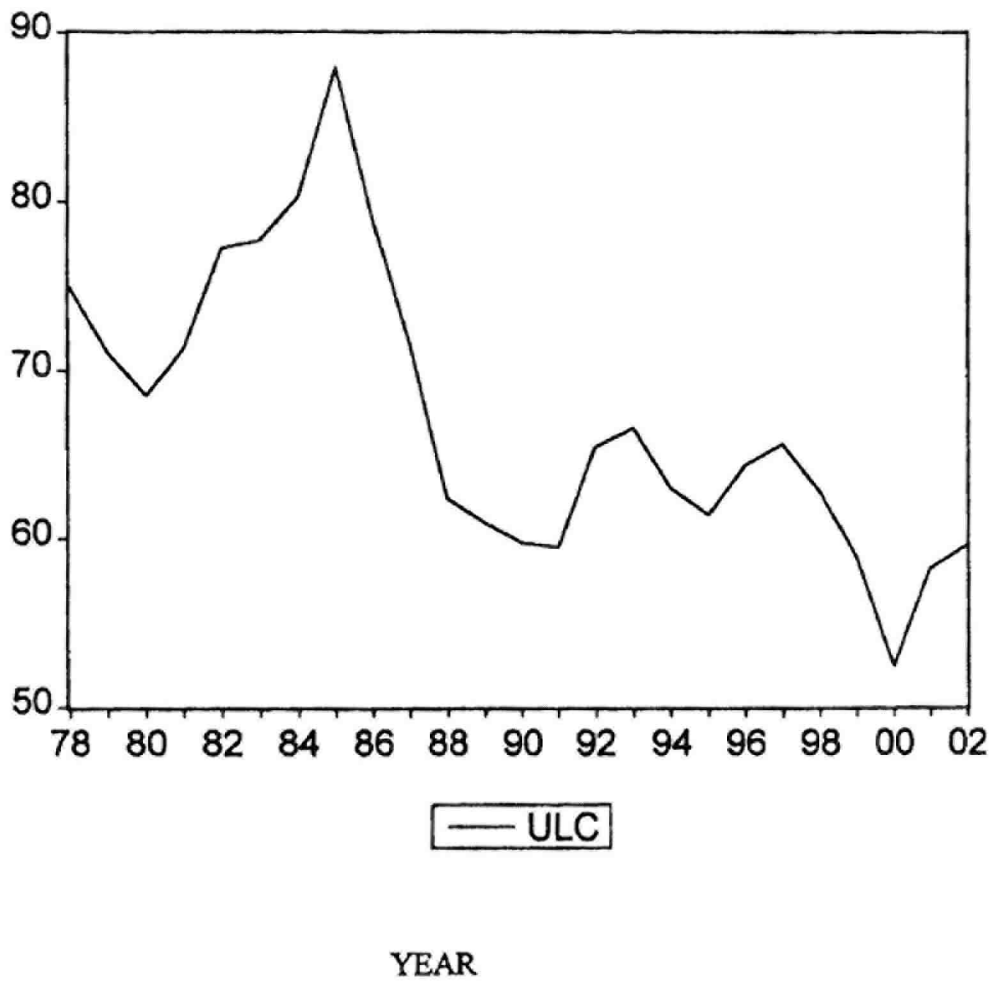
employee in 1986. Prior to economic crisis 1998, real wage signified a decreasing trend from the period of 1992 to 2002. In spite of some fluctuations from year to year, the real wage denotes an increasing trend within the time frame given.

Among the sub-sectors which were able to increase their competitiveness in their wage by having increasing trend between 1994 and 2000 are the electrical and electronics sub-sector, textiles sub-sector, footwear products sub-sector, wearing apparel sub-sector and rubber products sub-sector.²¹

²¹ NPC Productivity Report, 2001, Malaysia.

C) Trend of unit labour cost (ULC)

RM / SALES



As for the unit labour cost, the long-term trend continued to decline from RM 74.896 per sales to RM 59.59 per sales in 2002. The graph has reached its highest peak in 1985 whereby the ULC is at RM88.021 per sales. This might be due to the 1985 recession. On the whole, the overall trend is decreasing in nature.

In the case of the performance in unit labour cost for the individual sub-sector, among the sub-sectors which registered decreasing rate between 1994 and 2000 were the electrical and electronic sub-sector, textile industry, footwear product sub-sectors and wearing apparel sub-sector.²² This signified that the labour competitiveness had improved over the years. It was because the labour cost had been cheaper between 1994 and 2000 particularly in those sub-sectors.

4.4.2 Elasticity Aspect

Since this is a linear regression model, in order to measure elasticity, the formula of average elasticity has been used.

A) Elasticity of LP with respect to RW is defined as:

$$\begin{aligned} \eta &= \frac{\Delta LP}{\Delta RW} \times \frac{\overline{RW}}{\overline{LP}} \\ &= 14.34456 \times \frac{9478.840}{143439} \\ &= 0.94793 \end{aligned}$$

As $\eta < 1$, when RW increases by 1 percent, LP increases by 0.948 percent. Thus, real wage is inelastic. Here, we can see that for the overall

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manufacturing sector, although the increase in the real wage increased the labour competitiveness over these 25 years, nevertheless, we can say that the result is still insignificant. Thus, much has to be done in reviewing the wage system particularly in this sector in order to be more responsive towards attaining higher level of labour productivity.

B) Elasticity of LP with respect to ULC:

$$\begin{aligned} \eta &= \frac{\Delta LP}{\Delta ULC} \times \frac{\overline{ULC}}{\overline{LP}} \\ &= -2028.161 \times \frac{67.228}{143439} \\ &= -0.95058 \end{aligned}$$

As $\eta < 1$, when ULC decreases by 1 percent, LP increases by 0.95058 percent. Thus, ULC is inelastic. Therefore, for the overall manufacturing sector, within these 25 years period, although the unit labour cost has been decreasing, nevertheless, the impact of ULC to the labour productivity is still not reliable. It is because, a 1 percent decrease of ULC result to less than 1 percent increase in labour productivity. For the result to be significant, the ULC need to be revised from time to time.

4.5 Conclusion

The objective of this paper is to look at the impact of the two factors which are real wage and unit labour cost to the labour productivity. Based on the findings, it is found that the real wage and unit labour cost are significant in analyzing the labour productivity. First and foremost, from the hypothesis testing which have been done, the results obtained are significant and conform to the economic theory. Unit labour cost is negatively related to the labour productivity and the real wage is positively related to the labour productivity. Besides, the unit labour cost also has displayed a decreasing trend throughout these 25 years while the real wage registered an increasing trend. However, in terms of elasticity aspect, it is found that both of the variables are inelastic to labour productivity. Thus, it can be said that the response of labour productivity in the manufacturing sector towards the unit labour cost and real wage are insignificant. Therefore, much has to be done in order to improve the competitiveness of labour in this sector. Finally, another objective of this study which is to suggest improvements to meet the future challenges would be dealt with in the next chapter.