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August 2009

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Abstract

This study investigates the relationship between real wages, labor productivity and unemployment in Malaysia at the macroeconomic level, using time-series econometric techniques. The study found a long-term equilibrium relationship between labor productivity and real wages, but that unemployment was apparently unconnected to the system. The results suggested that labor productivity is positively related to real wage in the long run. However, the increase in real wage exceeds the increase in labor productivity causing an increase in unit labor cost. In addition, the study found a positive causal flow from productivity to wages in the short-run supporting the marginal productivity theory.

JEL Classification: J39

Keywords: real wages, productivity, Malaysia

* Corresponding author. E-mail : skgoh@usm.my. The author would like to acknowledge the financial assistance from the Erasmus Mundus Research Scholarship that underlies this paper and supported this research. The authors would like to thank Tang Tuck Cheong for helpful comments and suggestions. The usual disclaimer, however, applies.

1. **Introduction**

The Malaysian government has long placed much emphasis on the importance of the relationship between wages and productivity. Labor productivity is relatively important in influencing wage increases in the labor market. The government recognized that wage levels must increase in order to improve the standards of living and reduce poverty. However, increase in wages without a corresponding increase in productivity could aggravate inflationary pressures as well as erode the country's international competitiveness and its attractiveness as a profitable centre for foreign investment. It is worrisome that Foreign Direct Investment (FDI) inflows into Malaysia have been falling rapidly in recent years. FDI inflows into Malaysia have been almost stagnant since after the Asian Currency Crisis of 1997. In the year 2005, the UNCTAD World Investment Report 2006 revealed that global FDI inflow rose substantially by 29%; while South-East Asia saw a 19% rise during the same year, Malaysia was the only Asean country to register a decline in FDI of 14% (World Investment Report, 2006, Chapter II). One of the causes for the decline in FDI in Malaysia is that the country has been losing its competitiveness due to pressure on wages. Malaysia is no longer a centre for cheap labor and low-cost production as compared with countries like China, India or Vietnam (Yusof, 2006).

There has been an increasing volume of empirical studies concerning the relationship between real wages and productivity. Most empirical studies found a positive long run relationship between real wages and productivity, although the relationship between these two variables has not been one to one.[1] Hall (1986), Alexander (1993), Wakeford (2004), Strauss and Wohart (2004) for example, found positive long run relationship between real wages and productivity in the respective countries which they are examined, and the increases in labor productivity are associated with a less than unity increase in real wages. No study examined the relationship between wages and productivity in Malaysia except for Ho and Yap (2001). Ho and Yap (2001) investigated wage formation in the Malaysian manufacturing industry from 1975 to 1997. They found a big positive significant relationship between wages and productivity for the Malaysian manufacturing industry where the increase in real wage exceeded the increase in labor productivity in the long run. Nevertheless, there were several drawbacks in the methodology of their study.

[1] In the special case of Cobb-Douglas technology, the marginal product of labor is proportional to the average product of labor, which is known as productivity. Hence, the wage paid by a competitive firm should rise at the same rate as the rise in productivity.

The objective of this study is to re-examine the relationship between real wages and productivity in Malaysia using more appropriate time series techniques and longer data set. The study also focuses on aggregation at the national level to evaluate the long-run dynamics between wages and productivity rather than focusing on a single sector as in Ho and Yap's study. The following specific questions are addressed in this study. Firstly, is there a long-run equilibrium relationship between productivity and real wages in Malaysia? Secondly, what are the short-term or dynamic relationships among these variables? Thirdly, can statistical techniques shed any light on the directions of causality between these two variables?

Section 2 of the paper presents a brief review of relevant theories which provide possible causal links between real wages and labor productivity. The section later provides the international and Malaysian literature for comparative purposes. It concludes with a discussion of the various possible causal links between real wages and labor productivity, and thereby provides a background for the empirical analysis. Section 3 describes and analyses the data used in the study. Section 4 outlines the empirical methodologies and reports the results. Section 5 summarizes the main results and presents the conclusions.

2: Theoretical Background

According to different wage determination theories, the evolution of wages is not only influenced by productivity but also influenced by other factors, such as unemployment (see Blanchflower & Oswarld, 1994, Blanchard & Katz, 1999, Bell et al, 2002). Real wage, productivity and unemployment represent an important nexus within labor markets which has received a significant amount of attention in economic literature. For example, Blanchard & Katz (1999) suggest the following specification:

$$w_t - p_t^e = \alpha + \beta\, prod_t + \lambda(w_{t-1} - p_{t-1}) + \gamma u_t + \varepsilon_t$$

where w_t is the nominal wage rate, p_t^e is the expected price level in time t, $prod_t$ is the level of productivity, u_t is the unemployment rate, $w_{t-1} - p_{t-1}$ is the lagged term of real wage which serves as a proxy for reservation wage.

The coefficient on the productivity term is expected to be positive, and the coefficient on the unemployment term is expected to be negative. Although the sign of the coefficient of productivity and unemployment on wages is fairly clear in theory, a number of causal relations between real wages, productivity and unemployment are suggested based on theory and previous empirical evidence.

The marginal productivity theory suggests that highly productive workers are highly paid, and less productive workers are less highly paid. At the macroeconomic level, an increase in real wages is expected to raise the cost of labor and therefore cause factor substitution from labor to capital. This could raise marginal productivity and, hence, average out labor productivity. Therefore, it is hypothesized that productivity positively affects real wages.

On the other hand, efficiency wage theory proposes that wages affect productivity. Firms pay their employees more than market clearing wages in order to increase their employees' productivity or efficiency. High wage workers are less likely to quit. Thus firms can retain more experienced and productive workers than newly hired workers who may not be as productive as experienced workers. For example, it has been argued that raising pay can stimulate worker effort and strengthen long-term employment relationships. Akerlof (1982) had proposed that when firms raise pay, workers put forth greater efforts out of a sense of loyalty to those employers.

There is also a growing volume of work making use of insider-outsider models, closely related to bargaining models and theoretical analysis of trade unions, which postulates a relevant role for insider effects in wage determination. Unlike the efficiency wage theories, the insider-outsider approach does not assume a direct effect of wages on productivity and unemployment. The insider-outsider theory, by contrast, rests on the assumption that incumbent workers in their own interest exploit various labor turnover costs, some of which insiders may influence themselves.

Literature Review

There has been an increasing volume of empirical material concerning the relationship between real wage, productivity and unemployment. Using the two-step procedure of Engle and Granger (1987), Hall (1986) found real wages, productivity and unemployment formed a cointegrated system in the United Kingdom. A more detailed analysis was later conducted by Alexander (1993). Using more appropriate time series analysis, Alexander investigated the relationship between productivity, wages and unemployment in the United Kingdom for the period 1955 – 1991. The study split the sample into two sub-periods after finding evidence of a structural break in 1979. She found that there was no direct link between wages and productivity from 1955 to 1979 while unemployment was the central variable, being caused by both wages and productivity during this period. After 1979, a negative causality from wages to productivity was found, while unemployment became almost divorced from the system. Wakeford (2004) found that though a long run relationship existed between real wages and productivity in South Africa, unemployment was apparently not connected to the two variables. Real wages impact on productivity negatively but productivity had no effect on real wages in the short run. Strauss and Wohar (2004) found the long-run relationship between real wages and productivity at the industry level for a group of U.S. manufacturing industries over the period 1956 – 1996, and the increases in productivity are associated with a less than unity increase in real wages in the U.S. Using Geweke's linear feedback technique, Meghan (2002) estimated the relationship between wages and productivity for several industrialized countries to distinguish between conventional and efficiency wage behaviors. Results suggested that efficiency wages were being paid in Canada, Italy and the UK. In contrast, Sweden, the U.S. and France exhibited no efficiency wage setting, with very negligible wages and productivity feedback measures. The study also found that economic institutions such as worker unions played an important role on the wage-productivity settings for this group of industrialized countries. Scott and Meghan (2002) found that efficiency wage behavior had not been the norm in Japan from 1975 to 1997. Nevertheless, efficiency wage setting cannot be ruled out for some key areas of manufacturing in Japan.

There is a lack of local empirical studies concerning the relationship between real wage and productivity in Malaysia. Ho and Yap (2001) analyzed both the long-run and short-run dynamics of wage formation in the Malayian manufacturing industry as a whole and also for 13 selected sub-sectors of the industry using the Engle-Granger test. They estimated a long run wage equation for the Malaysian manufacturing industry as a whole. The study found a positive long run relationship between labor productivity and real wage and the coefficient was greater than 1. This suggests that for every 1 per cent change in labor productivity, real wage increases by 1.96 percent in the manufacturing industry holding all other variables constant; this implies that the increase in real wage exceeds the increase in labor productivity causing an increase in unit labor cost. The short-run dynamic model revealed a negative relationship between real wages and labor productivity suggesting that labor productivity gains do not bring about higher wages in the short run. There are several drawbacks in the methodology of this study. The authors used Engle-Granger two step procedures to test the cointegration relationship among four variables, namely, real wages, productivity, unemployment and union density. This procedure has certain drawbacks especially when one is estimating cointegration for more than two variables. As pointed out by Enders (2004), the Engle-Granger procedure can identify only one long-run relationship. And, in a set of four variables as estimated by Ho and Yap, it can, in fact, identify up to three long-run relationships.

Since the focus of this study is to examine the relationship between real wages and productivity, this study aims to apply the tri-variate model, namely, real wage, productivity and unemployment, as have been used in international literature (Alexander,1993; Wakeford,2004; Meghan,2002; Scott and Meghan,2002). In Malaysia, although the number of unions has increased over the years, report from the Ministry of Human Resources (2001) showed that union members constituted only 8% of the workforce in year 2000 compare to 15% in 1996. In addition, as pointed out by Ayadurai (1985), restrictions on labor to organize labor movement have resulted small and ineffective unions. Hence, it is not surprise that in Ho and Yap's study, the variable, union density, which measure union power is statistically insignificant both in the long run and short run cointegration models. Our study will not incorporate the variable, union density, in the model

3. Data

The present study uses annual time series data from 1970 to 2005. Data for productivity and real wages are obtained from Malaysia Productivity Council (MPC), while data for unemployment are obtained from the Department of Statistics, Malaysia. We would have preferred to work with quarterly data so that the study has an adequate number of observations for analysis. However, quarterly data for the variables required in this study were not available.

Productivity is measured by real GDP per worker. As pointed by Wakeford (2004), the most appropriate concept of productivity in economics is marginal productivity or output per hour of labour input. However, such data is not available in Malaysia. Following the study by Alexander (1993) and Wakeford (2004), our study resorts to the use of average labor productivity. This can be attained by dividing the total output with total employment.

Nominal wages are given by the aggregate wages of 10 economic sectors, namely, manufacturing, utilities, transportation, finance, government services, wholesale and retail trade, agriculture, construction, mining and other services. The wages are then deflated using the consumer price index to provide a measure of the workers' real purchasing power otherwise known as real consumption wages (Wakeford, 2004).[2] In this paper, average (i.e. per worker) real wages are under consideration.[3]

The third variable is the unemployment rate calculated according to the broad definition. All variables were transformed in logarithmic form so that coefficients can be interpreted as elasticities.[4] The following notation is used for

[2] If the nominal wage is deflated by producer price index, the real wage is known as real product wage which provides a measure of the labor cost of production.

[3] Feldstein (2008) commented it is better to compare the productivity rise with the increase of total compensation rather than with the increase of the wages. With the rise in fringe benefits and other non cash payments, wages have not risen as rapidly as total compensation. Nonetheless, such data is not available in Malaysia.

[4] It is noted that Alexander (1993) and Wakeford (2004) only transformed real wages and productivity into logarithms, while unemployment was retained as a percentage. In this study, we transformed all the variables into logarithmic form to ensure that all variables are unit free. The

the three variables: LRW= log (average real wage), LPROD= log (average labor productivity), LU= log (unemployment rate).

Table 1-1 summarizes the statistics of the variables used in the present study. The descriptive investigation shows that the series have autocorrelation which is a common statistical property for time series data.

Table 1-1: Summary statistics for the series

	LRW	**LPROD**	**LU**
Mean	2.418	2.696	1.557
Median	2.318	2.594	1.648
Maximum	3.127	3.267	2.174
Minimum	1.785	2.183	0.875
Standard Deviation	0.419	0.338	0.360
Skewness	0.180	0.228	-0.182
Kurtosis	1.800	1.737	1.858
Jarque-Bera (probability)	2.352 (0.308)	2.704 (0.258)	2.152 (0.341)
Q-statistics	Auto	Auto	Auto

Note: The null hypothesis of Q-statistics is there is no autocorrelation up to order k=20. Auto denotes autocorrelation.

Log of productivity, real wages and unemployment

data for the unemployment data is in annual form. The highest value of the unemployment rate throughout the sample size is 7.7% while the lowest is 2.4%. Hence, the values of the logarithm of the unemployment rate are all positive.

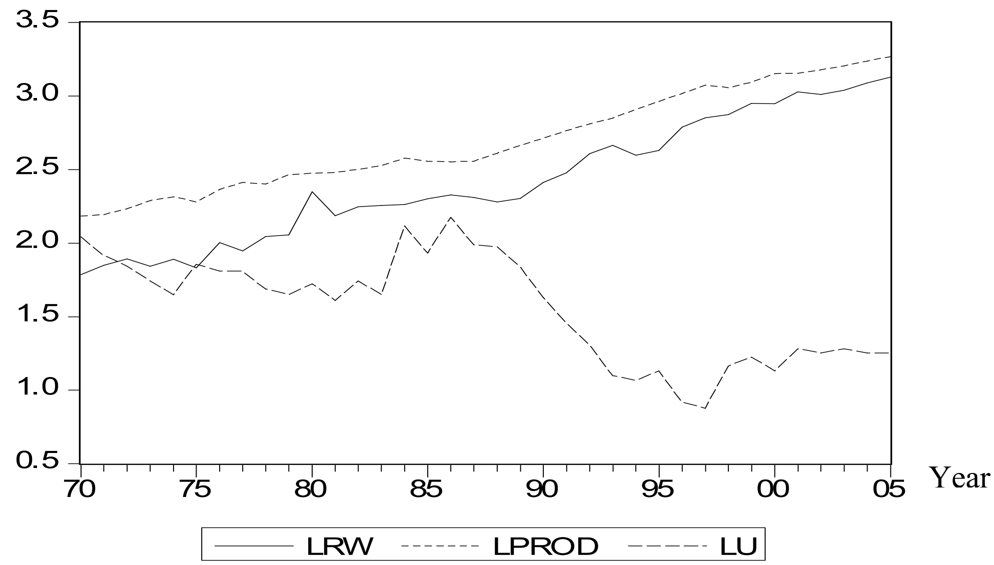


Figure 1-1: Real Wages, Productivity and Unemployment, 1970 - 2005

The series are presented in graphical form to look for evidence of trends and structural breaks. Real wages and productivity displayed a positive trend, interrupted by several shocks, with productivity rising more steeply than real wage. There was a small spike in the real wage series during the early 1980s due to tight labor market situations and a sharp increase in fiscal pump-priming to insulate the Malaysian economy from the global recession. It was followed by small dips in 1995 and 1996, the period before the 1997 Asian Currency Crisis. Since then, real wage has risen considerably. The productivity series displayed a broadly similar though smoother pattern. It rose fairly consistently from 1970 to 1996 before taking a small dip in 1997 during the Asian Currency Crisis.

The unemployment series seemed to move closely with real wage in the 1970s and early 1980s. Unemployment rose when real wage was the lowest in 1974, and vice versa, unemployment went down when the real wage was high in 1982. After 1987, there was a steady decline in the unemployment rates till 1997. This was attributed to the economic transformation that had taken place where the manufacturing sector replaced the agriculture sector as a major source of employment in the economy. During this period too, the labor market experienced a shortage of labor, and the country was forced to allow the influx of foreign labor. Nevertheless, the outbreak of the Asian Currency Crisis in 1997 led to an increase in unemployment rates with rampant retrenchment of workers and restructuring of firms taking place.

4. Methodology and Empirical Results

It is a routine now for researchers to test for cointegration when working with multivariate series. The most widely applied tests are the Engle-Granger (1987) and Johansen (1991) cointegration techniques. It is more appropriate to adopt the Johansen technique in this study rather than the Engle-Granger as the former allows one to test for more than one cointegrating vector, in particularly, in the case of more than 2 variables in a system.

A common practice in performing cointegration test is to determine the stationarity of the series or its degree of integration, I(d). Augmented Dickey Fuller (ADF) and Phillips and Perron (PP) tests are then applied to all series to determine their order of integration. It is important to note that these tests assume no structural breaks. [5]

Table 1-2 presents the results of ADF and PP test for a unit root for each individual series. The regressions are run with trend for real wages and productivity series, and without trend for unemployment series. It is found that the null hypothesis of unit roots cannot be rejected at conventional significance levels, and therefore it can be concluded that all series are non-stationary in level, but being stationary in first difference, it can be concluded that all series are I(1).

Table 1-2: Results of Unit Root Tests – the ADF and PP tests

Series	**ADF**	**PP**

[5] The paper has cautiously considered the concerns of structural break(s) in the unit root and cointegration tests. Conventional cointegration (Engle-Granger, Johansen, and so on) and unit root tests (i.e. ADF, PP, and so on) are not taken into account for variables that have undergone structural changes, and the power to reject the unit root null declines. However, the results of Bai and Perron test for structural breaks detection are inconclusive, For example, although the $\sup F_T(K)$ tests, UDmax and WDmax tests are significant for k between 1 to 4 and conclude that at least one break is present for all series, the sequential procedure (using a 5% significance level) and the BIC and LWZ select 0 breaks (BIC selects 2 breaks for the LRW series). Given the documented facts that the sequential procedure perform better than other tests, we conclude in favor of no break for all series. For comparison purposes, the paper also implemented unit root and cointegration tests which take into account of structural break such as unit root tests proposed by Lanne et al (2002) and Saikkonen and Lutkepohl (2002). In general, the empirical results for unit root and cointegration tests are consistent with the alternative specifications which allow for possible structural break(s).

	In levels	In first differences	In levels	In first differences
LRW	-2.14	-8.93***	-3.32	-8.93***
LPROD	-1.61	-4.92***	-1.80	-6.13***
LU	-1.15	-7.02***	-1.55	-6.89***

Note: The ADF test is based on the following model: $\Delta x_t = \beta_0 + \beta_1 x_{t-1} + \sum_{i=1}^{T} \beta_2 \Delta x_{t-i} + \varepsilon_t$

The PP test is based on the following model: $x_t = \beta_0 + \beta_1 x_{t-1} + \varepsilon_t$

Constant and time trend have been included into the unit root equation for lRW and LPROD data (in level). For first-differenced data, the unit root equation was estimated without a time trend. For the ADF test, the optimum lag (.) is selected based on Akaike Information Criterion (0 to 4 lags). For the PP test, the lag truncation of four was used for the Bartlett kernel based on the Newey-West adjusted variance estimators. *** denotes rejection of the unit root null at the 1% level, based on MacKinnon (1991) critical values.

Cointegration Test

The next step is to apply the Johansen multivariate cointegration procedure to test whether there is a cointegrating vector(s) among the nonstationary series. To do so, the Johansen test can be applied to test for the presence of a cointegrating vector among the nonstationary series as suggested by Johansen and Juselius (1990). The assumption imposed on the cointegration equations is linear deterministic trend and intercept in data without structural break(s). Table 1-3 reports the estimated trace and maximum test statistics. Overall, the cointegration test results in Table 1-3 confirm that there exists at least one cointegrating relationship among the three variables. This allows one to estimate the long-run relationship and the Error Correction Models (ECMs).

Table 1-3: Johansen multivariate cointegration test

Hypothesized number of CE	Trend and Intercept			
	λ_{trace} statistics	5% critical value	λ_{Max} statistics	5% critical value
None	47.89**	42.91	27.12**	25.82
At most 1	20.77	25.87	15.56	19.38
At most 2	5.21	12.52	5.21	12.52

Note: ** denotes significance at 5%

The long-term equilibrium vector is estimated to be Z=LRW-1.28LPROD+0.067 LU which is shown in Table 1-4, column 2. The coefficient of LPROD has a standard error of 0.054 and is therefore significant at 1 percent, while the coefficient of LU has a standard error of 0.051 and is clearly insignificant. The result is tested further via an over-identifying restriction (that the coefficient of LU=0), which produces a χ^2 statistic of 1.71 which is not significant (p=0.1907). Hence, the evidence suggests that LU is not part of the long-term relationship.

Table 1-4: Ordinary Least Squares estimation for long-run elasticity parameters

Regressor	**LRW**	**LRW**
Constant	-1.139*** (0.215)	-0.882*** (0.088)
LPROD	1.280*** (0.054)	1.223*** (0.033)
LU	0.067 (0.051)	
R^2	0.977	0.976
Adjusted R^2	0.976	0.975
Durbin-Watson Statistic	1.731	1.610
F-statistic (p-value)	717.265 (0.000)	1403.4 (0.000)

Note: *** denotes significance at 1%.

The last result suggests that a cointegration test for the bivariate relationship between LRW and LPROD should be conducted. Applying the same methodology as before, the estimated trace test statistics show the existence of a single cointegrating vector. The trace and maximum test clearly indicates a single cointegrating vector at the 5 per cent level.[6]

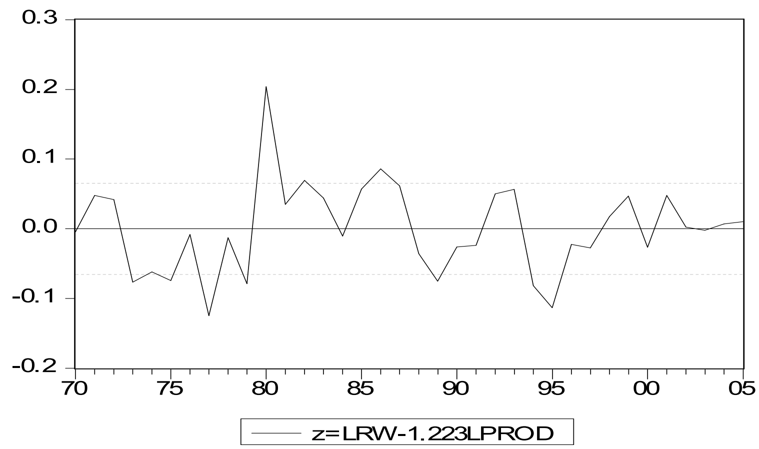
Table 1-5: Johansen multivariate cointegration test

Hypothesized number of CE	**Trend and Intercept**			
	λ_{trace} statistics	**5% critical value**	**λ_{Max} statistics**	**5% critical value**
None	24.38**	18.39	22.16**	17.15
At most 1	2.22	3.84	2.22	3.84

Note: ** denotes significance at 5%

The long-term equilibrium vector is estimated as Z=LRW-1.223LPROD (Table 1-5, column 3), which is depicted in Figure 1-2. The standard error on the coefficient of LPROD is 0.033 implying a high degree of significance. This implies that for every 1 per cent rise in productivity, real wage rises by 1.223 per cent in the long run.

[6] We also ran the two-step Engle-Granger (1987) test. The ADF t-statistics for the residuals from the cointegration equations (both for the constant or constant and time trend) lie below the 1% and 5% critical value, indicating the null hypothesis of no cointegration can be rejected.



Error Correction Model

If the economic time series are found to be cointegrated, an econometric framework for an ECM representation can be specified. The error-correction process can reconcile the long-run equilibrium with disequilibrium behavior in the short-run, which allows testing for short-term or dynamic causality.

The ECM specification can be written as follows:

$$\Delta LRW_t = a - \lambda ECT_{t-1} + \sum_{j=0}^{p} b_j \Delta LPROD_{t-j} + \sum_{j=0}^{p} c_j \Delta LW_{t-j} + \varepsilon_t$$

where Δ is the first-order differencing operator and ECT_{t-1} stands for the previous period's error-correction term generated from a cointegrating equation using OLS estimator.[7]

Given the study has only 36 observations and to save degrees of freedom, a maximum lag length of four is imposed on the ECM.[8] Then the general model is narrowed down on the basis of "general to specific" modeling paradigm using the individual t-test. Regressors with small absolute t-values were eliminated sequentially until all absolute t-values were greater than a threshold value. Note that only a single regressor is eliminated in each step. Then new t-values are computed for the reduced form.

The results of the ECM estimations are reported in Table 1-6. The DLPROD model is very badly specified; none of the lagged of the DLW and DLPROD (including the error correction term) are significant in the model, but the DLRW model has reasonable explanatory power. The F-statistic for the DLRW model is

[7] Since the model is left with two variables, hence, it is safe to use OLS as an estimation technique.
[8] As a general rule, an optimal lag length of four quarters is sufficient in an empirical study when annual data are being used.

significant and the model passes all of the conventional tests for serial correlation, functional form and residual normality.

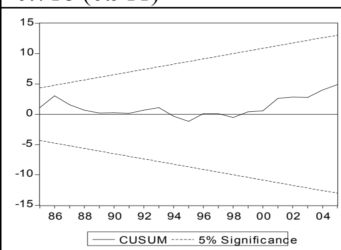
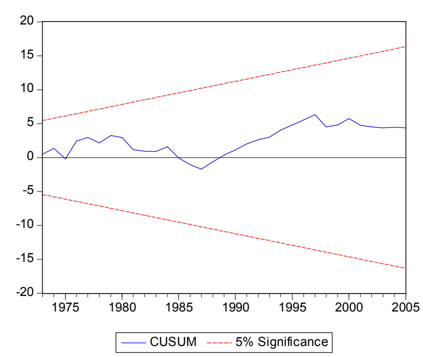
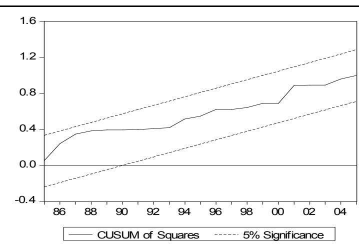
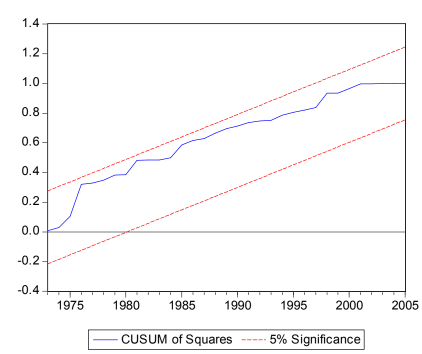
It can be seen that in the DLRW model, the error correction term is significant at 1 per cent level but not the error correction term in the DLPROD model. This implies that real wages adjust back towards long-run equilibrium (but not productivity) following a shock. The coefficient of the error correction term in the DLRW model is quite large, indicating a fairly rapid adjustment of real wage to equilibrium.

The significance of the 4^{th} lag of productivity term in the DLRW model and the positive coefficient imply that productivity Granger cause real wages, supporting the marginal productivity theory as discussed in Section 2. The relatively long lags suggest that changes in productivity are not immediately reflected in real wages as observed by Feldstein (2008).

Conversely, for the DLPROD model, none of the lagged of real wages and productivity is significant which implies that real wage has no impact on productivity in the short run.

In sum, the econometric evidences suggest the following dynamic causal system: productivity impacts on real wages positively but real wages have no effect on productivity. The adjustment to equilibrium occurs through wages only but not productivity.

Table 1-6: Error Correction Models for Real Wage and Productivity

Regressor	**Dependent Variable** **DLRW**	**DLPROD**
Constant	0.015 (0.015)	0.031*** (0.005)
ECT(-1)	-0.917*** (0.162)	-0.011 (0.075)
DLPROD(-4)	0.724*** (0.352)	
R^2	0.519	0.0007
Adjusted R^2	0.485	-0.029
Durbin-Watson statistics	2.10	2.273
F-statistics (p-value)	15.15 (0.000)	3.552 (0.029)
Jarque-Bera (p-value)	1.19 (0.551)	2.201 (0.332)
Q-statistics (p-value)	14.43 (0.532)	21.32 (0.161)
LM test: F-statistics (p-value)	0.851 (0.438)	0.995 (0.381)
Ramsey's RESET: F-statistics(p-value)	1.491 (0.244)	0.561 (0.576)
Quandt-Andrew Unknown Breakpoint Test Maximum LR F-statistic	 2.658 (0.933)	 2.159 (0.981)
Exp LR F-statistic	0.442 (0.904)	0.447 (0.900)
Ave LR F-statistic	0.718 (0.911)	0.793 (0.878)
CUSUM		
CUSUMSQ		

Note: *** denotes significant at 1 per cent, ** denotes significant at 5 per cent and * denotes significant at 10 per cent. Parentheses indicate standard errors. For the Quandt-Andrew Unknown Breakpoint Test, the result of the LR F-statistic is identical to the Wald F-stiatistic since the equation is linear estimation.

5. Concluding Remarks

This study aims to contribute to the body of literature addressing the productivity, wage and unemployment relationships in Malaysia using appropriate time-series techniques. The results have revealed some useful information about the nature of the relationship between wages, productivity and unemployment. The key findings of this study are as follows:

First, a long-term equilibrium (cointegrating) relationship seems to exist between real wages and productivity for the period 1970 to 2005, but unemployment is apparently not connected to the other two variables. In the long term, a 1 per cent rise in productivity is associated with a rise of approximately 1.22 per cent in real wages. The increase in real wage exceeds the increase in labor productivity leads to an increase in unit labor cost, hence, eroding the competitiveness of Malaysia as a centre of cheap labor and low-cost production.

Among the various forms of capital flows, foreign direct investment (FDI) has been often considered as one of the most important contributing factors to its economic success (Arthukorala and Menon, 1995). It is one of the most reliable components of capital flows and widely regarded as having a stronger positive impact on economic development and growth than any other form. However, just as any other forms of investment, FDI in Malaysia could be affected by rising labor costs. The study by Rahman and Yussof (2003) showed that labor market competitiveness has an impact on foreign direct investment in Malaysia. It is important to ensure that any increase in wages does not continue to exceed labour productivity, as this could affect the overall production cost as well as erode the country's competitiveness in the international markets.

Secondly, the unemployment rate behaves in a manner inconsistent with the theory proposed by Blanchflower and Oswald (1995) who pioneered a body of international wage curve literature, in which a negative relationship between real wages and unemployment is hypothesized and substantiated empirically. In this study, the econometric results show that unemployment is divorced from the long-term equilibrium between real wages and productivity, hence supporting evidence for the insider-outsider model of the labor market, that is, unemployment appears to have little effect on wage rates.

Looking at the plot of the data of unemployment and real wages in Section 3, the loose relationship between unemployment and real wages after the year 1987 may not come as a surprise in the case of Malaysia. Data shows that after 1987, unemployment rates continued to decline but real wage growth remained relatively contained. This was attributed to the privatization program launched by the government to combat the global economic recession in the early 1980s. Successful economic transformation had taken place where by and large, the manufacturing sector has profusely replaced the agriculture sector as a major source of employment in the economy. During this period too, the labor market experienced a shortage of labor, and a way out to alleviate this problem was to allow foreign laborers to work in Malaysia. Besides productivity, we believe that other labor market variables might predict changes in real wages better than the unemployment variable and we leave this for future research.

Thirdly, the econometric evidence suggests that the following dynamic (short-term) causal system operates in the labor market: productivity impacts on real wage positively but real wage has no effect on productivity. This result also reveals that the Productivity-Link Wage System (PLWS) introduced by the government is partially successful. This system which establishes a closer link between wage and productivity/performance enables employers to develop a wider and more systematic approach towards improving productivity and wages through the active involvement and cooperation of employees.

In conclusion, at least three possible avenues for further research stem from this study. One is to analyze the relationship between real wage and productivity in a selected sector of the Malaysian economy. The results can then be compared with this current study which focuses on aggregation at the national level. Second, according to the marginal productivity theory, a productivity improvement will induce a pay raise. Presumably an increase will be more responsive at a time when the labor market is particularly tight. The econometric evidence documented that the increase in real wage exceeds the increase in labor productivity; this partly reflects a tight labor market in Malaysia. Future studies can examine ways to fine-tune the human resource development policies in Malaysia so as not to depend heavily on foreign workers. Lastly, it is important to understand wage formation in an economy. This study shows that there is a positive relationship between real wage and productivity but no relationship between unemployment and real wage. Future research can identify other labor market variables which might explain changes in real wages besides productivity.

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