

**ID023 – The Impact of Bank Internal Characteristics on the Fluctuation
of Share Prices: A Case Study of Malayan Banking Berhad
(MAYBANK)**

Azahana Jamli, *Zuriyati Ahmad, Salwani Affandi
Faculty of Business Management,
Universiti Teknologi MARA Cawangan Terengganu, Malaysia

Abstract

This study aims to examine the impact of internal bank characteristics and the variation of Maybank's share prices. Four bank internal characteristics of Maybank such as dividend per share (DPS), earning per share (EPS), return on equity (ROE) and debt to equity ratio (DER) are used. Monthly data spanning from 2000 to 2016 comprising of 204 observations are tested using multiple regressions with ordinary least square (OLS) method. Further investigation using Johansen Cointegration tests are applied to measure the relationship and cointegration in the long run equilibrium. Findings reveal that that dividend per share (DPS), earning per share (EPS), return on equity (ROE) and debt to equity ratio (DER) have positively significant relationships with Maybank's share price. In the long run, similar results are obtained as OLS except for ROE. ROE is unexpectedly found to be negatively significant in influencing share price. Thus, the finding provides some useful insights for the impacts of internal bank characteristics on the Maybank's share price.

Keywords: share price, bank characteristics, cointegration

1. INTRODUCTION

Equity market can be defined as a market in which the shares of public companies are issued and traded either through exchanges or over the counter (Irfan & Nishat, 2002). Financial managers will show their interest in equity market as it has the ability to provide access capital to the companies. Moreover, equity market also able to give adequate returns to the investors as well as minimum risk (Gatua, 2013). Equity market is important to sustain the growth of the company and economy of the country. The equity market or share price movement however is not independent in nature and both intrinsic as well as extrinsic factors that have been established to exercise the influence over stock market movements (Malhotra & Tandon, 2013). In Layman's terms, share price will be more valuable if the price is high. In a different angle, share price can be valuable in two situations; when people willing to pay for the stock even though the price is high and when the price is low because they can pay at lowest price.

In Malaysia, the stock market has gone through the fluctuating pattern with the high uncertainty on economic growth (Dety, Sudarmawan & Suharto, 2017). The stock market volatility has strong relationship with the market performance which means, if the stock market is in good condition, the price of share will increase. Meanwhile, if the stock market is in worst condition, the price of share will decrease. For example, in 2008 Malaysia share price has

* Corresponding author, e-mail: zuriy271@tganu.uitm.edu.my

fallen and given impact to the banking sector. While the share price also been affected by the volatility of economics condition where the share fall from RM8.26 in 2007 to RM4.76 in 2008 with the difference of RM3.50. According to Kaminsky and Reinhart (1999), systemic banking crises are often found to be more severe and protracted compared to the effects of currency crises. In comparison, the banking crisis is most affected in year 2008 rather than the effect of currency crisis. Nonetheless, the macroeconomic factors are not the only factor that leads to the changes in share price. The changes of share price might lead from the microeconomic factors as well such as internal characteristics of the firms or banks themselves. Previous literature such as Irmala et al. (2011), Srinivasan (2012), Malhotra and Tandon (2013), Wang, Fu and Luo (2013), Vu (2013), Samuel and Pradeep (2016) and Balakrishnan (2016) have highlighted the influence of internal firm characteristics on share price. The bank characteristics are found to be important factors in determining the share price of firms.

This paper however will departs slightly from the previous literature by examining the impact of internal bank characteristics on the share price of banking sector in Malaysia, specifically, Malayan Banking Berhad (Maybank). The rationale behind this study, bank is a place or platform for the investors to invest because it has a good background of company. It is a safe place for investment because banks are controlled and guided by Bank Negara Malaysia (BNM). Banks plays the most irrational trading in times of uncertainty and many investors and industries are unable to use macroeconomic factors to determine the exact stock market performance.

1.1 Literature Review

There are substantial literatures in the area of internal characteristics and share price. For example, focusing on internal firm characteristics and share price, Samuel and Pradeep (2016) studied the case of listed firm on Johannesburg Stock Exchange (JSE). Method of multiple regression analysis is applied with data used from 16 South African companies listed on the JSE from year 2008 to 2013. The internal bank characteristics used in this study are dividend per share (DPS), earnings per share (EPS), and price-earnings ratio accounts for 57.8% of share prices movements.

Concentrating on the firm sectors in India, Irmala et al. (2011), Srinivasan (2012), Malhotra and Tandon (2013) and Balakrishnan (2016) study the determinants of share price. Irmala et al. (2011) for example are focusing on three different sectors which are auto, healthcare and public sector. On the other hand, Srinivasan (2012) have taken six major sectors in Indian company namely Heavy and Manufacturing, Pharmaceutical, Energy, IT and ITES, Infrastructure and Banking. Balakrishnan (2016) only focuses on Pharmaceutical sector. While, Malhotra and Tandon (2013) used empirical evidence from 100 companies in India which are listed in National Stock Exchange (NSE). Findings by Srinivasan (2012) and Malhotra and Tandon (2013) shows a similar result that EPS have positive relationship with share price and the dividend per share (DPS) have negative relationship to share price but their findings contradict with the finding by Irmala et al. (2011). Balakrishnan (2016) however reveals that EPS and DPS are not affected with share price in the Pharmaceutical sector.

Wang, Fu and Luo (2013) and Vu (2013) use the earning per share (EPS) as internal variable to determine the impact of stock price in China. Similar result has been found showing a positive relationship between EPS and share price. Wang et al. (2013) highlighted other variable which is return on equity (ROE) and it shows a positive relationship with share price. Marryam (2016) on the other hand, used several variables to examine the impact of firm performance in London Stock Exchange on stock returns. Finding shows when EPS increases, the investor who wants short term gain of dividend will sell their stock into the market and it will cause the share price of company decreases. Meanwhile, the finding of return on equity (ROE) has negative and insignificant impact to the share price.

Focusing on the banking sector studies Radhe and Subash (2016), Zeeshan, Ali, Sohail and Sulaman (2015), Zuriawati, Jorah and Abdul Hadi (2012) and Seetharaman and Raj (2011) have shown the relationship between share price with earning per share (EPS), return on equity (ROE) and debt to equity ratio (DER). Radhe and Subash (2016) used the sample from 14 banks in NEPSE and show the result of earning per share (EPS) and return on equity (ROE) have positive relationship with share price. Meanwhile, Zeeshan et al. (2015) investigate the determinants of share price by using sample of the listed commercial bank in Karachi Stock Exchange (KSE) from the year 2007 until 2013. The result is in parallel with Radhe and Subash (2016) which shows that earning per share (EPS) have positive relationship with share price.

2. METHOD AND MATERIAL

Based on the previous literature the model is estimated as follows;

$$SP = \alpha + \beta_1 DPS + \beta_2 EPS + \beta_3 ROE + \beta_4 DER + \varepsilon$$

The model equation consists of SP represents the dependent variable. Meanwhile, α indicates constant term and β means the coefficient of independent variables. The independent variables are denoted as follows;

DPS = Dividend per share as an independent variable and can be defined as the dividend paid to shareholders and it can be calculated by dividing the total dividends with number of outstanding share (Irmala et al. 2011). The higher dividend per share (DPS) will show strong performance to its shareholder because it gives high dividend to the shareholder. Thus, when the company gives high dividend per share (DPS), it will attract the investor to buy their share. This will caused the demand of share to increase and make the price of share high.

EPS = earning per share can be referred as the portion of a company's profit allocated to each outstanding share of commons stock (Malhotra & Tandon, 2013). Earning per share (EPS) used to serve as an indicator of company's profitability.. By using this ratio, it can prove the fact that higher earning per share (EPS) will increase the rate of dividend and also show the good performance of a company.

ROE = Return on equity used to measure how well a company utilize investment to generate earnings growth. The rising of return on equity (ROE) will makes a company increasing its ability to generate more profit without needing much. It indicates that the company's management is deploying the shareholder's capital.

DER = debt to equity ratio which is defined as the ratio which measures a firm's debt financing in relative to its equity financing. When debt to equity ratio (DER) is high, the risk on common equity also will be higher as well as the probability of bankruptcy to occur. Investors might request for higher share prices as compensation. Thus, when debt to equity ratio (DER) is high, low share price is expected as the investors are afraid to invest due to high debt in the company.

This study has been conducted using the case of Malayan Banking Berhad Malaysia (Maybank). Data are gathered from year 2000 until 2016 and and measured in monthly basis. The data collected utilize secondary data like Malayan Banking Berhad annual financial report which is and datastream. 204 numbers of observations are applied to analyse the data.

The multiple regression analysis using Ordinary Least square (OLS) method is used to check the relationship between variables. Nonetheless since OLS is subjected to spurious problem, cointegration analysis will be used by taking the Johansen cointegration test. Cointegration

aims at explicitly dealing with the relationship between non stationary time series and spurious result can be avoided. The cointegration test will be based on two tests; trace test statistics and the maximum eigenvalue test statistics.

3. RESULTS AND DISCUSSIONS

Empirical Results

Table 1 presents the result of estimation for coefficient and the significance of the model. R^2 value is 0.6954 which suggest that 69.54 percent explanatory ability for the systematic variations in the dependent variable with the adjusted value 0.3046. Finding shows in ordinary least square (OLS) method, all the variables can reject the hypothesis where there is no relationship between the independent variables and the changes in Maybank's share price

Table 1: Regression Model

Variable	C	DPS	EPS	ROE	DER	R-Square	F-Statistic
Coefficient	2.6433	3.1238	3.9184	0.0690	0.0072	0.6954	113.5894
Std. Error	0.3718	0.4654	0.3864	0.0199	0.0016		
T-Statistic	7.1090	6.7117	10.1400	3.4710	4.4329		
Probability	0.0000	0.0000	0.0000	0.0006	0.0000		

Based on the estimated equation in the previous section, significant relationship with positive sign is obtained in DPS. It is found to be highly significant with the value of 99 percent level of confidence. The higher dividend per share (DPS) shows a strong performance of Maybank's Bhd to its shareholder. The higher dividend is expected to the shareholder. While, EPS, ROE and DER as hypothesized are also positively influence the share price high significant level with less than 1% beta as been found by Radhe and Subash (2016), Zeeshan, Ali, Sohail and Sulaman (2015), Zuriawati, Jorah and Abdul Hadi (2012) and Seetharaman and Raj (2011).

Since OLS is subjected to spurious problem, result can be misleading. The unit root test is applied to test for the stationary level of the variable. This can avoid the spurious problem. Using 1% significance level, it is found that all variables fail to reject the null hypothesis of non stationary at the level form. Conversely, all variables are stationary at their first difference form, since the null hypothesis of non stationary can be rejected. In conclusion, all variables are I(1) or integrated of order 1 (result will be provided upon request). Thus, the next step is to test for the cointegration among variables.

Table 2: Johansen Cointegration test result

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.162521	80.45093	69.81889	0.0056
At most 1	0.087247	44.97905	47.85613	0.0909
At most 2	0.066661	26.72105	29.79707	0.1086
At most 3	0.050462	12.92369	15.49471	0.1176
At most 4	0.012757	2.567726	3.841466	0.1091

Trace test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.162521	35.47188	33.87687	0.0320
At most 1	0.087247	18.25800	27.58434	0.4738
At most 2	0.066661	13.79736	21.13162	0.3819
At most 3	0.050462	10.35596	14.26460	0.1896
At most 4	0.012757	2.567726	3.841466	0.1091

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

From the analysis of the maximum eigenvalue and trace tests, the model shows the presence of one cointegrating equation since these statistics exceed their critical value at the 5% significance level. It shows all variables are cointegrated and there is a meaningful long run relationship. Thus, the next step is to find out the magnitude of the long run relationship. The result obtained is as follows;

$$SP = 4.6974DPS + 7.3774EPS - 0.2129ROE + 0.00246DER$$

(2.6712) (4.9245) (2.7542) (4.0328)

* t statistics in the parenthesis

** Denote significant at 0.01 level of significance

As found in the OLS result, all the bank internal characteristics show significant at 99% level of confidence or 1% alpha of level of significance. As expected the magnitude tested on DPS, EPS and DER show these bank characteristics influence SP in Maybank positively. The higher the EPS, DPS and DER will result in the higher changes in Maybank's share prices. This result is in as expected magnitude as well similar findings with the previous literatures (Irmala et al., 2011; Srinivasan 2012; Malhotra and Tandon, 2013; Wang, Fu and Luo, 2013; Vu, 2013; Samuel and Pradeep, 2016 and Balakrishnan ,2016)

Nonetheless, interestingly in the long run ROE is negatively significant in influencing SP. In other words, the rising of return on equity (ROE) will lead to the lower Maybank share prices and vice versa. Eventhough commonly expected the association of ROE and SP is positive but this finding is similar to the studies by Adnan et. al (2015) and Marryam (2016). Negative relationship between stock prices and return on equity shows in the long run bank might not fully optimize in using the shareholders' funds and generate less proceeds for investment. These will ultimately causing decrease in share prices.

4. CONCLUSION

The study is aimed to examine the impact of internal bank characteristics on the share price of banking sector in Malaysia, specifically, Malayan Banking Berhad (Maybank). The result depicts dividend per share (DPS), earnings per share (EPS), return on equity (ROE) and debt to equity ratio (DER) have positive relationship and significant to share price. It shows that all bank internal characteristics will positively and significantly influence the Maybank's share price. This also indicates the internal bank performances are really important in influencing bank share prices. When testing for the long run equilibrium the similar results are found except for the ROE. A negative significant relationship highlight in the long run bank might not fully utilized the performance of the bank that lead to the lower share price. Thus, this result

provides an implication that in the long run the performance of the bank should be concentrate by the banks to avoid negative impact on the bank's share prices.

References

- Adnan Ali, Farzad Ali Jan & Ilyas Sharif. (2015). Effect of dividend policy on stock prices. *Business and Management Studies: An International Journal*, Vol 3(1), 56-87.
- Balakrishnan, K. P. (2016). A Study on Impact of Earnings per Share, Dividend per Share Price Earning Ratio on Behaviour of Share Market Price Movements (Pharma Sector) with Special Reference to NSE. *IJARIE*, 2(1), 381-390.
- Dety, N., Sudarmawan, S. & Suharto. (2017). Factors that Influence Stock Market Volatility: A Case Study from Malaysia. *International Journal of Business Studies*, 1(1), 13-18.
- Gatua, F. K. (2013). Analysis of Share Price Determinants at Nairobi Securities Exchange. Dissertation Submitted for Master of Business Administration Degree, (pp. 1-41). University of Nairobi.
- Irfan, C. M. & Nishat, M. (2002). Key Fundamental Factors and Long-run Price Changes in an Emerging Market: A Case Study of Karachi Stock Exchange (KSE). *The Pakistan Development Review*, 41(4), 517-533.
- Irmala, P. S., Sanju, P. S. & Ramachandran, M. (2011). Determinants of Share Prices in India. *Journal of Emerging Trends in Economics and Management Sciences*, 2(2), 124-130.
- Kaminsky, G. L. & Reinhart, C. M. (1999). The Twin Crises: The Causes of Banking and Balance of Payments Problems. *American Economic Review*, 89(3), 473-500.
- Malhotra, N. & Tandon, K. (2013). Determinants of Stock Prices: Empirical Evidence fom NSE 100 Companies. *International Journal of Research in Management & Technology*, 3(3), 86-100.
- Maryyam, A. (2016). Impact of Firms' Performance on Stock Returns (Evidence from Listed Companies of FTSE-100 Index London, UK). *Global Journal of Management and Business Research: D Accounting and Auditing*, 16(1), 31-39.
- Radhe, S. P. & Subash, D. (2016). Factors Affecting The Share Price: Evidence from Nepalese Commercial Banks. 1-16. doi:10.13140/RG.2.1.2141.1440
- Samuel, T. E. & Pradeep, B. (2016). Determinants of Share Prices: The Case of Listed Firms on Johannesburg Stock Exchange. *Journal of Accounting and Management*, 6(1), 85-92.
- Seetharaman, A. & Raj, J. R. (2011). An Empirical Study on the Impact of Earnings per Share on Stock Prices of a Listed Bank in Malaysia. *The International Journal of Applied Economics and Finance*, 5(2), 114-126. doi:10.3923/ijaef.2011.114.126
- Srinivasan, P. (2012). Determinants of Equity Share Prices in India: A Panel Data Approach. *The Romanian Economic Journal*, 46, 205-244.
- Vu, J. (2013). Predictibility of High-value Stocks on Australian and Shanghai Stock Exchange. *International Review of Business Research Papers*, 9(4), 22-32.

Wang, J., Fu, G. & Luo, C. (2013). Accounting Information and Stock Price Reaction of Listed Companies - Empirical Evidence from 60 Listed Companies in Shanghai Stock Exchange. *Journal of Business & Management*, 2(2), 11-21.

Zeeshan, A., Ali Raza Arshad, Sohail Yousaf & Sulaman Jamil. (2015). Determinants of Share Price of Listed Commercial Banks in Pakistan. *Journal of Economics and Finance*, 6(2), 56-64.

Zuriawati Zakaria, Jorah Muhammad & Abdul Hadi Zulkifli. (2012). The Impact of Dividend Policy on the Share Price Volatility. *International Journal of Economics and Management Sciences*, 2(5), 1-8.

ID032 – Determinants of Inflation for Indonesia

Hanin Faqihah Mohd Safiee, *Noorazlina Ahmad, Nurul Syuhada Baharuddin
Faculty of Business and Management, Universiti Teknologi MARA Cawangan Terengganu,
Malaysia

Abstract

This study observes the macroeconomic factors that influence inflation in Indonesia with specific attention on Gross Domestic Product (GDP) growth, population, Foreign Direct Investment (FDI) and unemployment. An Ordinary Least Square (OLS) method and Regression Model are applied to examine the relationship between macroeconomic variables and inflation in Indonesia. By using annually data from year 1984 until 2016, which is containing a total number of 33 yearly data observations. The OLS Regression result shows that population, FDI and unemployment have positive relationship with inflation whereas GDP growth has negative relationship with Inflation. It shows that GDP growth, FDI and unemployment have a significant relationship with inflation while Population has an insignificant relationship with inflation. The result provides some useful insight into the macroeconomic factors that influence inflation rate in Indonesia while the finding also can help the government to avoid inflation and improve the economy stabilization.

Keywords: GDP growth; inflation; unemployment; FDI; OLS; time series data

1. INTRODUCTION

Does inflation affect the economy? Inflation is an important phenomenon that can occur in all countries around the world. Economies with inflation rates of 3% to 6% may experience positive economic impact (Alexander, Andow & Danpome, 2015). Inflation is an increase in the general price level and prices will increase continuously. The fluctuation of inflation also creates difficulties for people to make decisions about their consumption, investment, and production then at last give their impact on economic growth. Higher inflation rates will affect the decline in consumer income, and if the situation continues, it will lower the standard of living of the community and the level of poverty will increase (Bank Indonesia, 2017).

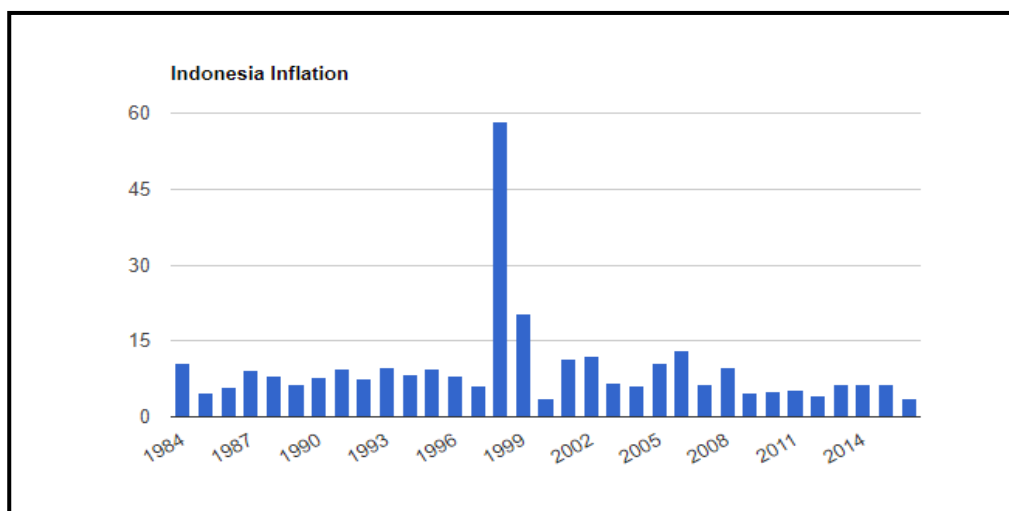
Indonesia is the fourth largest country in term of population size with about 260 million people. The condition of inflation is relating to the stability of economic development, then if the economic condition becomes worse, the inflation rate will increase. Indonesia experienced an economic crisis in 1998 and inflation rose sharply during that period (Swaminathan, 2017). However, Indonesia managed to stabilize their economy by using some policies and strategies to boost economic growth in their country. In 2008, the economy in Indonesia was still in recovery of stability and increased economic development. Thus, Indonesia can still be considered as a developing country in the world since the country has great potential and versatile in the past economic as well as political and culture sense (Touwen, 2008).

1.1 Problem statement of the study

Indonesia faced economy slowdown and it related to the phenomenon of inflation in this country. Besides, Indonesia faced financial crisis in 1998 and the crisis affected the economy

* Corresponding author, e-mail: noora436@tganu.uitm.edu.my

condition and society. According Sherlock (1998), the country experienced of low inflation in first half of 1997, but the price increase and the inflation rate increase to 11% in the second half of 1997 compared to 6.5 % in 1996. However, in early 1998, prices have increased rapidly and led to hyperinflation in this country. Prices are rising in many sectors such as food and others. This also contributes to higher unemployment rates. Figure 1 below shows Indonesia' Inflation Rate fluctuated substantially in recent years and it intended to decline in 1998 - 2016 which is ending at 3.5% in 2016.



Source: The World Bank

Figure 1: Inflation Rate in Indonesia

The objectives of this study are to examine the relationship between macroeconomic variables (population, GDP growth, FDI, unemployment) against inflation in Indonesia and also to determine the most important factor influencing inflation.

1.2 Literature review

Lim and Sek (2015) study the Inflation determination in 28 countries using the Error Correction Model method based on Autoregressive Distributed Lag. Its data span from 1970 to 2011 to identify the causes of inflation between the two countries (high and low inflation countries). The result found that money supply and GDP growth have a positive relationship with inflation while national expenditure and country imports have a negative correlation with inflation. Raja Nur Aini and Amalina (2017) and Enu, Obeng and Hagan (2013) each explore the factors affecting GDP Growth in Malaysia and Ghana using the OLS Method. The findings show that GDP growth has a negative correlation with inflation. The studies which use data around 1982-2012 show the same results between the two countries of Malaysia and Ghana. Raja Nur Aini and Amalina (2017) added in their study that FDI and female labor participation had a positive relationship with GDP growth.

Ahiakpor (2014) study the determinants of inflation in Ghana by using the method of Bayesian Model Selection with data spanning from 1965 to 2012. The researcher found that population has positive relationship with inflation. Enu and Havi (2014) conducted study on Macroeconomic Determinants of Inflation in Ghana by apply a Co-integration Approach with data collected from year 1964 until 2008. The result found that population size has positive relationship with Inflation Rate similar to Ahiakpor (2014).

Umeoura and Emmanuel (2013) from Nigeria used data from 1986 to 2011 to study the effect of FDI. The OLS method found that FDI had a positive relationship with the inflation rate in the country. Contradict with Enu and Havi (2014) who conducting a study on Inflation Macroeconomic Determinants in Ghana using the Co-integration Approach with data collected

from 1964 to 2008. The results found that FDI, Foreign Aid and Agricultural Output had a negative correlation with inflation. In parallel, Furrugh Bashir, Farzana Yousaf, and Huda Aslam (2016) study the Determinants of Inflation in Pakistan on Demand and Supply Side Analysis and used Autoregressive and Distributed Lag Model methods in order to estimate long-term and short-term results. Hence, the variables used in this study are divided into two categories, namely demand side and supply side. The result reveals that the FDI has a negative relationship with inflation.

Thus, the finding reveals that the unemployment rate has positive relationship with inflation. Ojapinwa and Esan (2013) using the series data, Augmented Dickey Fuller, Phillip Peron Unit Root Tests, Auto Regressive Distributed Lag, Dynamic Ordinary Least Square with data from 1970 until 2010 of Nigeria. The result shows that unemployment has a negative relationship with inflation in the short term. Meanwhile, the unemployment and inflation have a positive relationship in the long run. Islam, Ghani, Mahyudin and Manickam (2017) investigate the determinants of factors that affecting Inflation in Malaysia. The researchers used a method of time series data, Statistical Package for the Social Sciences Version 22 with data ranging from 1980 to 2014. This finding reveals that unemployment rate has a negative relationship with inflation. Similar to Furuoka and Munir (2014), the finding also shows unemployment has a negative relationship with inflation. The study focuses on Malaysia by using Error Correction Model, Unit Root Test and Johansen Co-integration test with the data covering 1975 to 2004.

2. METHOD AND MATERIAL

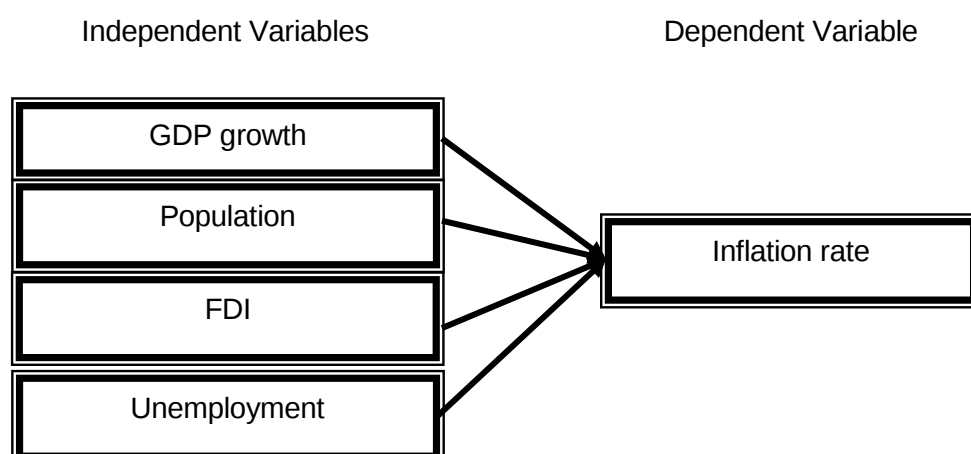


Figure 2: Theoretical framework

This study explored the determinants of inflation in Indonesia for the period 1984 until 2016 including 33 observations by using the Time Series Data and OLS method. All the data are collected from International Monetary Fund's World Economic Outlook Database, The World Bank and Statistic Indonesia.

$$INF = f(GDP, POP, FDI, UE)$$

From the function above, it can form the equation model which it will explain the relationship between the dependent variable and independent variables used in the equation which is:

$$INF = \alpha - \beta_1 GDP + \beta_2 POP - \beta_3 FDI - \beta_4 UE + \varepsilon$$

where,

$$\begin{array}{ll} INF & = \text{Inflation Rate (Consumer Price Index)} \\ \alpha & = \text{Constant} \end{array}$$

β_1 GDP	= Coefficient of Gross Domestic Product
β_2 POP	= Coefficient of Population
β_3 FDI	= Coefficient of Foreign Direct Investment
β_4 UE	= Coefficient of Unemployment Rate
ε	= Error Term

3. ANALYSIS AND RESULTS

The regression model shows the relationship between the dependent and independent variables. It creates for the equation of framework and also analyzes the R-Squared, T-statistic, F-statistic and Durbin Watson. This table below shows the original model without correction and the adjusted model with the correction of lagged 1.

Table 1: Regression Model

	Original model (without correction)	Adjusted model (with correction)
C	-230.5135	-4.600460
GDP	0.025501	-0.536045
POP	1.384216	0.041733
FDI	0.383129	0.100523
UE	-1.036307	0.417678
INF(-1)		0.989662
R-SQUARE	0.951436	0.999221
F-STAT	137.1385	6668.104
FSTAT (PROB)	0.000000	0.000000
DURBIN WATSON	0.294704	1.973758

Table 1 show the result of original data which is without correction and the adjusted data with the correction of lagged 1. It is reveals that the original data have autocorrelation problem because the value of Durbin Watson below than 1.8. Thus, the lagged have been used to reduce the autocorrelation problem (Sekaran and Bougie, 2010). The data with correction have used the lagged 1 and the result reveals that there is no autocorrelation problem with the value of the data increase from 0.29 to 1.97 which is above than 1.8. Besides, the lagged 1 have been chosen because it was the best result that can be produced. The data with correction also change the result of T-stat probability to become more significant than insignificant and the autocorrelation problem is completely disappearing.

Based on the result, the regression model created the equation of framework that shows the relationship between dependent and independent variables. Below shows the equation from adjusted model with lagged 1.

$$\text{INF} = -4.6005 - 0.5360 \text{ GDP} + 0.0417 \text{ POP} + 0.1005 \text{ FDI} + 0.4177 \text{ UE} + 0.9897 \text{ INF} (-1)$$

(0.5177) (0.0000)*** (0.3195) (0.0466)** (0.0039)*** (0.0000)***

Note *** ** * indicates significant at level 1%, 5%, 10%

The dependent variable is inflation rate (INF) while independent variables are GDP growth, population (POP), FDI, and unemployment (UE). The equation shows that the constant is equal to -4.6005, which means if other variables are held constant, inflation will decrease by 4.60%. In addition, the coefficient value for GDP growth shows that, it has a negative relationship with inflation rate which is -0.5360. If there is 1% increase in GDP growth, it will decrease the inflation rate by 0.54%.

The coefficient of population shows that, it has positive value with inflation rate. If there are 1 million increases in population, it will increase the inflation rate by 0.04%. Moreover, the coefficient of FDI also has positive relationship with inflation rate. Thus, if there is USD 1 billion increase in FDI, will increase 0.10% of inflation rate. Next, the coefficient of unemployment

reveals there is positive relationship with inflation rate. Thus, if there is 1% increase in unemployment, inflation rate will increase by 0.42%.

Table 2: T-statistic

Variables	Coefficient	T-statistic	Probability
GDP	-0.5360	-7.9142	0.0000
POP	0.0417	1.0149	0.3195
FDI	0.1005	2.0897	0.0466
UE	0.4177	3.1638	0.0039

Judging from the result recorded in Table 2, GDP resulted negative significant relationship towards the inflation at 1% which achieved 99% of confidence level that the variables can be the effective determinants inflation in Indonesia since the value of t-statistic is higher than other variable which is 7.9142. The result also shows that unemployment has a positive significant relationship with inflation (0.0039) at 1% level of significance. Thus, only FDI shows significant on inflation rate (0.0466) at significant 5%. Meanwhile, population find to has negative and insignificant relationship with the inflation indicating that population did not affect the inflation.

4. DISCUSSION

The findings show that GDP growth has a negative and significant relationship with inflation rate. The findings are supported by Raja Nur Aini and Amalina (2017), Munir and Mansur (2009), Enu et al. (2013) and Andinuur (2013). Meanwhile, Enu et al. (2013) said the increase in the general price level will impact consumer income to fall and it will lead to lower consumption spending and their cost of living will increase. Then, exports of goods and services also increase then led to encourage imports. Increase production costs will also impact on reduce production of goods and services and lower GDP growth in the country.

Besides, population is found that it has positive relationship and insignificant on the inflation rate in Indonesia. Result is obtain similar with Ahiakpor (2014) and Enu and Havi (2014). Population has an ability to influence inflation rate because when there is increase in population it will lead to increase in aggregate demand for goods and services.

Moreover, FDI shows positive and significant relationships in influencing inflation. The result is similar to Umeoura and Emmanuel (2013) and they also point out that FDI inflows will affect the increase in money supply and if FDI inflow is not applied productively, the inflation may occur.

The unemployment shows a positive and significant relationship in influencing inflation rate in Indonesia. It shows that rising unemployment will affect inflation. The result of the study is similar to Shah et al. (2014), their finding also reveal a positive correlation between unemployment and inflation.

5. CONCLUSIONS AND RECOMMENDATIONS

Based on the result of the study, t-statistic shows that three independent variables have a significant effect on the inflation rate which are GDP growth, FDI and unemployment. Growth of GDP is the most significant factor influencing inflation because the t-statistic value is higher than other variables.

The government of Indonesia should focus on GDP growth and other macroeconomic variables that may have a greater impact on the level of inflation. Since it is the most influential

factor in inflation based on the findings of this study, therefore decision and policy makers are crucial to support the development of GDP while reducing inflation.

References

- Ahiakpor, F. (2014). Rethinking about determinants of inflation in Ghana: Which econometric model tell the true story. *European Journal of Business and Management*, 6(6), 78-86.
- Alexander, A. A., Andow, H. A., & Danpome, M. G. (2015). Analysis of the main determinants of inflation in Nigeria. *Research Journal of Finance and Accounting*, 6(2), 144-155.
- Andinuur, J. (2013). Inflation, foreign direct investment and economic growth in Ghana. *Research Paper*, 1-89.
- Bank Indonesia. (2017). *Pengenalan inflasi*. Retrieved from <http://www.bi.go.id/id/moneter/inflasi/pengenalan/Contents/Default.aspx>
- Enu, P., & Havi, E. D. K. (2014). Macroeconomic determinants of inflation in Ghana: A co integration approach. *International Journal of Academic Research in Business and Social Sciences*, 4(7), 95-110.
- Enu, P., Obeng, P. A., & Hagan, E. (2013). The relationship between GDP growth rate and inflationary rate in Ghana: An elementary statistical approach. *Academic Research International*, 4(5), 310-318.
- Furrukh Bashir, Farzana Yousaf, & Huda Aslam. (2016). Determinants of inflation in Pakistan: Demand and supply side analysis. *Journal of Finance & Economics Research*, 1(1), 43-57.
- Furuoka, F., & Munir, Q. (2014). Unemployment & inflation in Malaysia: Evidence from Error Correction Model. *Malaysian Journal of Business and Economics*, 1(1), 35-45.
- Islam, R., Ghani, A. B. A., Mahyudin, E., & Manickam, N. (2017). Determinants of factors that affecting inflation in Malaysia. *International Journal of Economics and Financial Issues*, 7(2), 355-364.
- Lim, Y. C., & Sek, S. K. (2015). An examination on the determinants of inflation. *Journal of Economics, Business and Management*, 3(7), 678-682.
- Munir, Q., & Mansur, K. (2009). Non linearity between inflation rate and GDP growth in Malaysia. *Economics Bulletin*, 29(3), 1555-1569.
- Ojanpiwa, T. V., & Esan, F. (2013). Does Philips relations really exist in Nigeria? Empirical evidence. *International Journal of Economic and Finance*, 5(9), 123-133.
- Raja Nurul Aini, R. A., & Amalina Azmi. (2017). Factor affecting gross domestic product (GDP) growth in Ghana. *International Journal of Real Estate Studies*, 11(4), 62-67.
- Sekaran, U., & Bougie, R. (2013). *Research methods for business – A Skill-building approach* (6th ed.). New York: John Wiley & Sons.
- Shah, M. A. A., Aleem, M., & Arshed, N. (2014). Statistical analysis of the factors affecting inflation in Pakistan. Middle-East. *Journal of Scientific Research*, 21(1), 181-189.

Sherlock, D. S. (1998, April 8). *Crisis in Indonesia: Economy, society and politics*. Retrieved from https://www.aph.gov.au/About_Parliament/Parliamentary_Departments/Parliamentary_Library/Publications_Archive/CIB/CIB9798/98cib13

Swaminathan, A. S. (2017, July 7). *20 years after the Asian financial crisis, Indonesia has lessons learned — and warnings*. Retrieved from <https://www.cnbc.com/2017/07/07/20-years-after-the-asian-financial-crisis-indonesia-has-lessons-learned--and-warnings.html>

Touwen, J. (2008, March 16). *The economic history of Indonesia*. Retrieved from <http://eh.net/encyclopedia/the-economic-history-of-indonesia/>

Umeora, & Emmanuel, C. (2013). Effects of foreign direct investment (FDI) on economic growth in Nigeria. *Research Paper*, 1-14.

ID037 – Determinants of Inflation in Selected Asian Countries

¹*Nor Jana Salim, ¹Rajmi Mustafa, ¹Mohd Husnin Yusof, ²Hasyaniza Yahya, ¹Sholehah Abdullah

¹Faculty of Business and Management, Universiti Teknologi MARA Cawangan Terengganu, Malaysia

²Faculty of Accounting, Universiti Teknologi MARA Cawangan Terengganu, Malaysia

Abstract

Inflation is considered one of the sensitive macroeconomic phenomena in this present economy. This paper is aimed to examine the determinants of inflation in selected Asian countries which included Bangladesh, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Sri Lanka, Thailand and Vietnam for the period 2006 until 2015. The results are obtained through panel data fixed effect model regression. Inflation is used as a dependent variable which is measured by consumer price index (CPI) whereas the selected independent variables interest rate (IR), gross domestic product (GDP), money supply (MS) and public expenditure (PE). The results indicate that IR and MS are significant and negatively related to inflation. However, money supply is found to be the most salient factor to determine inflation rate in selected Asian countries as 1% increase in money supply will decrease inflation by 2.40% while 1% increase in interest rate reduces inflation by 0.46%.

Keywords: fixed effect model (FEM); consumer price index; interest rate; money supply; public expenditure

1. INTRODUCTION

Over the last three decades, inflation has become a global phenomenon. In the 1980's and 1990's, world inflation rate recorded 16% and 15% respectively. In 1970s, the highest inflation was about 9% recorded by industrial countries while in the 1980s, it was about 37% recorded by developing countries.

However, since the middle of 2009, inflation rate has dropped drastically in many economies. Producer and consumer price index have both declined clearly. Consumer price index dropped from 1.5% in 2010 to 1.4% in 2014 and later 0.3% in 2015. This trend was also noticeable in developing Asian countries. In East Asia, inflation rate dropped from 3% in 2010 to 1.4% in 2015. In Southeast and South Asia, it dropped from 4% to 3% and 10% to 5% respectively between 2010 and 2015 (Al-Shammari & Al-Sabaey, 2012).

1.1 Problem Statement

Jogwanich et al (2016) reported that high inflation emerge a major risk to Asia's macroeconomic outlook during 2007- 2008 although the risk receded since the fall of 2008. The surge of inflation was interrupted in 2009 when both the producer and the consumer price fall noticeably especially in Singapore, Malaysia, Thailand and People's Republic of China (PRC) Consumer price inflation fell markedly in the PRC; HongKong, China; Singapore; Malaysia; and Thailand. The reason behind it is the fall in the price of global commodity and the weekend of economic growth and aggregate demand.

*Corresponding author, e-mail: norja049@tganu.uitm.edu.my

However, inflation rose again in 2010 inflation the first quarter of 2012. Most of the Asian modern economies can maintain high and rapid economic growth even though there is an increase in inflation rate, however some countries may have bad economic condition because of the uncontrollable inflation rate. According to Deyshappriya (2014), some economies are handling this issue quite well while others are running from bad to worse. On the other hand, inflation is a continuous issue that creates instability in economic growth Sri Lanka, Philippines and Vietnam. This study is conducted with the purpose to investigate the determinants of inflation in selected Asian countries. The two objectives are to explore determinants of inflation in these countries and to determine the most influential one.

1.2 Literature review

1.2.1 Interest rate and inflation

Ayub et al. (2014) conducted the study on the relationship between inflation and nominal interest rate in Pakistan. The study employs time series data from 1973 until 2010 and Co-integration techniques of Johansen and Engle-Granger (residual based) are used for the test. Results stated that there exists a long run relationship between the nominal interest rate and inflation. Furthermore, Asgharpur et al. (2014) also examined interest rate and inflation relationship for 40 selected Islamic countries using new causality model and used panel data methodology starting from 2002 to 2005 periods. The results indicate that interest rate has negative relationship with inflation. Meanwhile, Umoru and Oseme (2013) estimated the relationship between interest rate changes and inflation expectations in Nigeria using the Generalized Method of Moment (GMM) estimator. It was found that the variation in interest rate on inflation is negatively related. Using the Euro real interest rate as a proxy for world interest rate Backman (2011) investigated if the real interest rate negatively affects commodity prices. The study used VAR model and he obtained result that the Euro real interest rate negatively affects commodity prices over the medium run.

1.2.2 Gross domestic product and inflation

A recent study in Kenya by Ochieng et al. (2016) revealed that there is an inverse relationship between GDP growth and inflations applying explanatory research design approach. In line with the study by Deyshappriya (2014) in Sri Lanka over the period of 1983 to 2010, both Johansen co-integration test and VECM method came to the same conclusion.

In Iran, a study by Alavinasab (2014) applies the Error Correction Model, while Armesh (2010) applies Ordinary Least Squares (OLS) over a period of 1961 to 2005. Both studies revealed that the GDP has negative influence on inflation rate. Furthermore, Ahmed and Mortaza (2005) conducted the research in Bangladesh from 1980 to 2005 using co-integration and error correction models. The results stated that there is significant negative relationship between GDP and CPI. Similar to the study by Gokal and Hanif (2004) in Fiji, the results also support the negative relationship between inflation and growth.

1.2.3 Money supply and inflation

Mbongo et al (2014) examined money supply reaction on inflation in Tanzania. The research applied OLS, VAR and ECM technique to identified money supply reaction towards inflation. In short and long run equilibrium, OLS and ECM results showed that money supply and exchange rate have significantly influence on inflation rate.

Inam (2014) investigated money supply and inflation relationship in Nigeria for the period of 1970 to 2011. Using multivariate co-integration regression the result showed there is real broad money a negative relationship between real broad money influence and inflation rate and no causality between variables. Ashwani (2014) also support the negative relationship between money supply and inflation in his study in India for the data from 1981 until 2011 using co-integration error correction model. Another consistent result on the relationship between money supply and inflation was found by Akinbobola (2012) in Nigeria. Applying

Vector Error Correction Mechanism (VECM) on a data set from 1986 to 2008, the results revealed that money supply has significantly negative effect on inflation in the long run. Earlier, Ramady (2009) examined the factors that cause and determine inflation in Saudi Arabia. This study used an annual data based on time series from the period 1986 to 2007 using correlation and regression analysis. The result indicates money supply has significantly affect inflation in Saudi Arabia.

1.2.4 Public expenditure and inflation

Ahmed et al. (2013) carried out the research on the factors of inflation in Pakistan. Johansen co-integration is applied to check long run relationship while ECM (Error Correction Model) is to check short run impacts. Using annual data from 1971 to 2012 the result highlighted current government expenditure contributes positively to inflation.

Arif and Ali (2012) conducted a study in Bangladesh to see the relationship between public expenditure and inflation. Applying Johansen-Juselius co-integration on the data from 1978 to 2010 they found a positive relationship exists between public expenditure and inflation. Prior to that Bashir et al. (2011) also revealed that in the long run high public expenditure raise the consumer price index in Pakistan using Johansen Co-integration and Vector Error Correction model for the data from 1972 to 2010.

2. METHOD AND MATERIAL

Due to limitation of data and accessibility this study covers only ten Asian countries which are Bangladesh, Hong Kong, India, Indonesia, Korea, Malaysia, Philippines, Sri Lanka, Thailand and Vietnam. The data is technically extracted from the World Bank, journals and related articles. Yearly data were collected covers the period from year 2006 until year 2015 consisting of one dependent variable and four independent variables.

Panel data estimation model are used which include pooled ordinary least square (POLS), Breush-Pagan, Random Effect Model, Hausman Fixed test and Fixed Effect Model. All the data are transformed into natural log model and they are regressed using Stata 10.1.

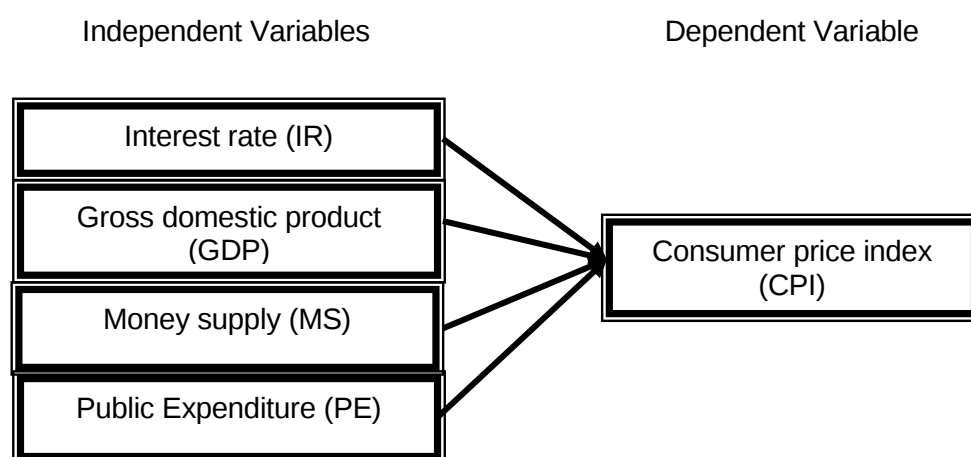


Figure 1: Theoretical Framework

The general form of the model estimation:

$$\ln(CPI)_{i,t} = \alpha + \beta_1 \ln(IR)_{i,t} + \beta_2 \ln(GDP)_{i,t} + \beta_3 \ln(MS)_{i,t} + \beta_4 \ln(PE)_{i,t} + u_{i,t}$$

Where;

ln	= natural log of the variable
i	= the number of country
t	= the number of the years
α	= constant value
$u_{i,t}$	= random error term
CPI	= Consumer Price Index
IR	= Interest Rate
GDP	= Gross Domestic Product
MS	= Money Supply
PE	= Public expenditure

2.1 Hypothesis

H1: There is significant negative relationship between interest rate (IR) and consumer price index (CPI).

H2: There is significant negative relationship between gross domestic product (GDP) and consumer price index (CPI)

H3: There is significant negative relationship between money supply (MS) and consumer price index (CPI)

H4: There is significant positive relationship between public expenditure (PE) and consumer price index (CPI).

3. ANALYSIS AND RESULTS

Table 1 represents the descriptive statistics related to consumer price index with the determinants of inflation; interest rate (IR), gross domestic product (GDP), money supply (MS) and public expenditure (PE). The CV (Standard Deviation/Mean) describes the dispersion of the variables. The higher the CV the higher is the dispersion in the variable and vice versa. money supply has the lowest CV which is 0.1377% which means it has less variability and thus generates higher consistency and stability.

Table 1: Descriptive Analysis

Stats	lgcpi	lgir	lggdp	lgms	lgpe
Min	-.5447272	-.0512933	-1.469676	3.484619	1.61746
Max	3.140698	2.36368	2.169054	5.894568	2.868467
Mean	1.486487	1.329976	1.346168	4.48779	2.285192
CV	.5065512	.4040791	.4647596	.1377449	.1567175
Variance	.5669818	.2888153	.3914308	.3821343	.1282568

Table 2: Correlation Results

Variables	Result
1. IR	-0.1212
2. GDP	0.2404
3. MS	-0.4687
4. PE	-0.3733

Correlation Results in Table 2 above shows that GDP has a positive relationship with CPI while the other three variables; IR, MS and PE have negative relationship with CPI. Regardless of the positive or negative sign MS has the strongest relationship with CPI due to the highest value of correlation which is 0.4687. None of the correlation value exceeds 0.8 which means there is no multicollinearity exists among the variables.

Table 3: Pooled Ordinary Least Square (OLS) Regression

Source	SS	df	MS	No of obs	=	86
Model	15.4616226	4	3.86540566	F(4,81)	=	12.12
Residual	23.8566211	81	.294526186	Prob > F	=	0.0000
Total	39.3182437	85	.462567573	R-squared	=	0.3932
				Adj R-squared	=	0.3633
				Root MSE	=	.5427

	Coef.	Std.Err.	t	P> t	(95% Conf. Interval)	
lgcpi						
lgir	-0.3976667	.1169572	-3.40	0.001	-0.6303748	-.1649586
lggdp	.0593604	.1027862	0.58	0.565	-.145152	.2638728
lgms	-.5301175	.103847	-5.10	0.000	-.7367405	-.324945
lgpe	-.5789626	.1708204	-3.39	0.001	-.9188416	-.2390837
_cons	5.616411	.6915706	8.12	0.000	4.240402	6.992419

From Table 3 above, the result of R^2 which is 0.3633 indicated that almost 36% the variation in the CPI can be explained by the variation in the independent variables while the remaining is unexplained due to randomness and other factors not included in this study. Probability t-test shows that interest rate, money supply and public expenditure are significant at 1% with all of them have negative relationship with CPI. The coefficient values show that any 1% increase in interest rate, money supply and public expenditure will decrease inflation rate by 0.4%, 0.5% and 0.6% respectively. However, the negative coefficient in PE is against the hypothesis.

Table 4: Breush and Pagan Langrangian Multiplier test

lgcpi [code, t] = Xb + [code] + e [code,e]		
Estimate Results :	Var	sd = sqrt(Var)
lgcpi	.4625676	.6801232
e	.1840205	.4289761
u	.0845714	.2908116
Test : Var (u) = 0		
Chi2(1) = 13.41		
Prob > chi2 = 0.0003		

Breush and Pagan test is to decide whether to use POLS or panel data analysis (PDA) for further analysis. Based on the result in Table 4 above the p-value of chi2 is 0.0003 which is less than 0.05. Hence it supports the rejection of the null hypothesis and this study can proceed to Random Effect Model (REM).

Next Hausman Fixed test is conducted to select either Random Effect Model or Fixed Effect Model. The probability chi2 in Table 5 which is 0.0018 is significant, therefore, the null hypothesis is successfully rejected, and therefore, the study proceeds to Fixed Effect Model (FEM) regression.

Table 5: Hausman Fixed test

-----coefficients-----				
	(b) fixed	(B)	(b-B) Difference	Sqrt(diag(V-b-V_B))
lgir	-.4566832	-.467399	.0107158	.
lggdp	-.0530773	.0144477	-.067525	.
lgms	-2.397054	-.7349627	-1.662091	.5117471
lgpe	.3275982	-.2367213	.5643195	.2796921
b = consistent under H_0 and H_a ; obtained from xtreg				
B = inconsistent under H_a , efficient under H_0 ; obtained from xtreg				

Test : H_0 : difference in coefficients not systematic

$$\begin{aligned}\text{Chi2}(4) &= (B-b)' [(V_b - V_B)^{-1}] (b-B) \\ &= 17.19 \\ \text{Prob} > \text{chi2} &= 0.0018 \\ (V_b - V_B) &\text{ is not positive definite}\end{aligned}$$

Table 6 represents the result of REM. The value of R-squared which is 0.3463 shows that 34.63% of the variation in the independent variables explaining the dependent variable, while the remaining of 65.37% is unable to explain due to unknown variables. Only IR and MS are significant at 1% level since the probability of z-value is less than 0.01. They are also negatively related to CPI where, 1% increase in interest rate and money supply will decrease inflation by 0.4674% and 0.735% respectively.

Table 6: Random Effects Model result

Group variable : code		Number of obs =	86
		Number of group =	10
R-sq : within	= 0.2921	Obs per group	min = 6
Between	= 0.4594		Avr = 8.6
Overall	= 0.3463		Max = 10
Random effects u _i ~ Gaussian		Wald chi2(4)	= 35.37
Corr (u _i , x)	= 0	Prob > chi2	= 0.000

	Coef.	Std.Err	z	P> z	[95% Conf. Interval]	
lgcpi						
Lgir	-.467399	.1050955	-4.45	0.000	-.6733823	-.2614156
Lggdp	.0144477	.0927675	0.16	0.876	-.1673733	.1962686
Lgms	-.7349627	.1814673	-4.05	0.000	-1.090632	-.3792933
Lgpe	-.2367213	.2652753	-0.89	0.372	-.7566515	.2832088
Cons	5.898628	1.027801	5.74	0.000	3.884175	7.913081
sigma_u	.29081159					
Sigma_e	.42897608					
rho	.31486948	(fraction of variance due to u _i)				

Table 7 represents the result of Fixed Effect Model (FEM) regression. From the value of R-squared, 22.74% in the variation of CPI can be described by all the independent variables, while the remaining 77.26% is unable to define due to unknown variables. Only two variables which are IR and MS are significant at 1%. Both IR and MS have negative relationship with which indicate that, 1% decrease in IR and MS will increase inflation rate by 0.46% and 2.40% respectively. Although PE remains insignificant it is positively related to CPI.

Table 7: Fixed Effects Model Regression

Group variable : code		Number of obs =	86
		Number of group =	10
R-sq : within	= 0.36934	Obs per group	min = 6
Between	= 0.3355		Avr = 8.6
Overall	= 0.2274		Max = 10
Corr (u _i , x) = -0.9244		Wald chi2(4,72)	= 11.68
		Prob > F	= 0.000

	Coef.	Std.Err	z	P> z	[95% Conf. Interval]	
lgcpi						
Lgir	-.4566832	.0988335	-4.62	0.000	-.6537041	-.2596623
Lggdp	-.0530773	.0887413	-0.60	0.552	-.2299789	.1238252
Lgms	-2.397054	.5429691	-4.41	0.000	-3.479443	-1.314664
Lgpe	.3275982	.385485	0.85	0.398	-.4408521	1.096048
Cons	12.14869	2.692964	4.51	0.000	6.780363	17.51701
sigma_u	1.2200519					
Sigma_e	.42897608					
rho	.8899759	(fraction of variance due to u _i)				
F test that all u _i =0:		F(9,72) = 6.40		Prob > F = 0.0000		

4. CONCLUSIONS AND RECOMMENDATIONS

Based on the fixed effect model (FEM) regression this study suggests that interest rate and money supply are significant at 1% level in determining the inflation with negative relationship. Money supply is the most important factor as 1 % increase in money supply will decrease inflation by 2.40%. The studies that are consistent to this are reported by Inam (2014), Ramady (2009), and Ashwani (2014). Increasing in the money supply faster than the growth in real output will cause inflation because more money chasing for the same number of goods. However, increase in money supply does not always cause inflation if the real output growth is the same as increase in money supply. It is because the increase in money supply is absorbed in the increase in the real output. This is also explained in the Keynesian view of liquidity trap where prevailing low interest rate and high savings with a fall in the velocity of circulation can cause deflation. In this situation, increasing the money supply will not necessarily cause inflation.

While 1% increase in interest rate will decrease only 0.46% of inflation. In general, as interest rates are lowered, more people are able to borrow more money. The result is consumers have more money to spend, causing the economy to grow inflation increase. However the rising interest rate caused consumers to save as returns from savings are higher. With less disposable income being spent, the economy slows and inflation increases. Many previous studies support the significant negative relationship between interest rate and inflation as revealed by Umoru and Oseme (2013) Asgharpur et al. (2014), Backman (2011) and Ayub et al. (2014).

These findings suggest that monetary policy is an effective policy to control inflation. Therefore, the countries need to control the money supply in circulation and control interest rate level in order to control inflation. However it should be noticed that inflation is a relative not an absolute.

From the result analysis, the modified logarithm equation is written as below:

$$\ln(CPI)_{i,t} = 12.14869 - 0.4566832\ln(IR)_{i,t-1} - 2.397054\ln(MS)_{i,t-1} + u_{i,t}$$

It is recommended that future researchers should enlarge the scope of study by adding more data and adding other determinants of inflation to get more robust findings. Similar study also can be conducted by comparing determinants of inflation among different countries.

References

- Akinbobola, T. O. (2012). The Dynamics of Money Supply, Exchange Rate and Inflation in Nigeria. *Journal of Applied Finance and Banking*, 2(4), 117-141. Retrieved from http://www.scienpress.com/Upload/JAFB/Vol%202_4_8.pdf
- Alavinasab, S. M. (2014). Determinants of Inflation: The Case of Iran. *International Journal of Social Science and Management* 1(1), 71-77. Retrieved from http://www.intjournalssm.com/files_site/paperlist/Journal1-1-140607134244.pdf
- Al-Shammari, N. & Al-Sabaey, M. (2012). Inflation Sources Across Developed and Developing Countries; Panel Approach. *International Business & Economics Research Journal*, 11(2), 185-194. Retrieved from <https://www.cluteinstitute.com/ojs/index.php/IBER/article/view/6773>

Arif, K. M., & Ali, M. M. (2012). Determinants of Inflation in Bangladesh: An Empirical Investigation. *Journal of Economics and Sustainable Development*, 3(12), 9-17. Retrieved from <http://www.icbmd.org/index.php/ICBF/7thICBF/paper/view/12/15>

Armash, H., Salarzehi, H., Yaghoobi, N. M., & Heydari, A. (2010). Causes of Inflation in the Iranian Economy. *International Review of Business Research Papers*, 6(3), 30-44. Retrieved from <http://www.irbrp.com/static/documents/August/2010/4.%20Hamed.pdf>

Asgharpur, H., Kohneshahri, L. A., & Karami, A. (2014). The Relationship Between Interest Rates and Inflation Changes: An Analysis of Long-Term Interest Rate Dynamics in Developing Countries. Retrieved from <http://repo.uum.edu.my/2416/>

Ashwani. (2014). Determinants of Inflation in India: A Co-Integration Approach. *International Journal of Multidisciplinary Consortium* 1(1), 1-11. Retrieved from http://etd.uum.edu.my/6078/2/s817759_02.pdf

Ayub, G., Rehman, N. U., Iqbal, M., Zaman, Q., & Atif, M. (2014). Relationship between Inflation and Interest Rate: Evidence from Pakistan. *Research Journal of Recent Sciences*, 3(4), 51-55. Retrieved from https://businessperspectives.org/images/pdf/applications/publishing/templates/article/assets/9781/BBS_2017_

Backman, T. (2011). Commodity Prices and Interest Rates: The Euro Zone. *Master Thesis*, 1-40. Retrieved from <https://www.cobank.com/NewsroomFinancials/~media/Files/Searchable%20PDF%20Files/Newsroom%20Financials>

Bashir, F., Nawaz, S., Yasin, K., Khursheed, U., Khan, J., & Qureshi, M. J. (2011). Determinants OF Inflation in Pakistan: An Econometric Analysis Using Johansen Co-Intergation Approach *Australian Journal of Business and Management Research*, 1(5), 71-82. Retrieved from <http://ajbmr.com/articlepdf/ajbmr01n0509.pdf>

Deyshappriya, N. P. R. (2014). Inflation Dynamics in Sri Lanka: An Application of VECM Approach *Ruhuna Journal of Management and Finance* 1(2), 17-28. Retrieved from http://www.mgt.ruh.ac.lk/rjmf/pdfs/RJMF0102_JA_p17.pdf

Gokal, V., & Hanif, S. (2004). Relationship between Inflation and Economic Growth. *Economics Department Reserve Bank of Fiji*, 1-50. Retrieved from http://rbf.gov.fj/docs/2004_04_wp.pdf

Inam, U. S. (2014). An Empirical Investigation of the Relationship between Money Supply and Inflation in Nigeria (1970-2011). *International Journal of Humanities Social Sciences and Education (IJHSSE)*, 1(12), 65-76. Retrieved from <https://www.arcjournals.org/pdfs/ijhsse/v1-i12/9.pdf>

Jongwanich, J., Wongcharoen, P., & Park, D. (2016). Determinants of Consumer Price Inflation versus Producer Price Inflation in Asia. *ADB Economics Working Paper Series*, 1-30. Retrieved from <https://www.adb.org/sites/default/files/publication/188864/ewp-491.pdf>

Mbongo, J. E., Mutasa, F., & Msigwa, R. E. (2014). The Effects of Money Supply on Inflation in Tanzania. *Science Publishing Group*, 3(2), 19-26. Retrieved from <http://article.sciencepublishinggroup.com/pdf/10.11648.j.econ.20140302.11.pdf>

Ochieng, O., Mukras, M. S., & Momanyi, G. (2016). The Determinants of Inflation in the Kenyan Economy. *International Journal of Economics* 1(1), 46-60. Retrieved from: <https://www.iprjb.org/journals/index.php/IJECON/article/download/45/77/>

Olatunji, G. B., Omotesho, O. A., Ayinde, O. E., & Ayinde, K. (2010). Determinants of Inflation in Nigeria: A Co-Integration Approach. *Joint 3rd African Association of Agricultural Economists (AAAE) and 48th Agricultural Economists Association of South Africa (AEASA) Conference*, 1-12. Retrieved from <https://ageconsearch.umn.edu/.../103.%20Determinants%20of%20inflation%20in%20...>

Ramady, M. A. (2009). External and Internal Determinants of Inflation: A Case Study of Saudi Arabia. *Middle East Journal of Economics and Finance*, 2(1-2), 25-38. Retrieved from <https://pdfs.semanticscholar.org/9ad2/7c8fb3bdc8397c6938e632e46748dec41245.pdf>

Umoru, D., & Oseme, A. S. (2013). Inflation Expectations and Interest Rate Variation in Nigeria: An Econometric Assessment of the Evidence. *International Journal of Development and Economic Sustainability*, 1(2), 1-12. Retrieved from <https://www.eajournals.org/.../Inflation-Expectations-And-Interest-Rate>

ID058 – Macroeconomic Fundamentals and KLCI Stock Price: Evidence in Malaysia

Nur Awra Damia Mustafa, *J. M. Shukri

Faculty of Business and Management, Universiti Teknologi MARA, 23000 Dungun,
Terengganu, Malaysia

Abstract

In 2008, a high-impact economy phenomenon had occurred on a global scale. Better known as the Global Financial Crisis, it had also set foot in Malaysia, causing KLCI stock price to suffer massive losses. That phenomenon had set a precedent for this study to be conducted. With that in mind, this study aimed to observe the behavior of KLCI stock price on the selected macroeconomic variables, namely gross domestic product (GDP), money supply (M1), exchange rate (EXR) and inflation rate (INF). The sample of data used in this study was measured from the year of 1980-2016 based on annual basis, which accumulated to a total of 37 observations. Using Ordinary Least Square (OLS) method, this study revealed that gross domestic product, money supply and inflation rate have a positively significant relationship with KLCI stock price, whereas the exchange rate is observed to have a negatively significant relationship with KLCI stock price. The result provided some useful insights on the macroeconomic fundamentals related to KLCI stock price, which consequently could guide and enhance potential investors in their decision making process, particularly on the portfolio investment.

Keywords: KLCI stock price; macroeconomic fundamentals; volatility; ordinary least square (OLS); time series

1. INTRODUCTION

Stock market, which is also known as the equity market is a place where public listed companies trade their business ventures in forms of equities, bonds or other sort of securities. It is an important part of the economy for a country that plays vigorous role in the growth of industry, as well as sustaining the commerce of the country, that would eventually affect the economy of the country to some great extent. The rising stock market is always a good sign of thriving industrial sector and a growing economy of any country. Furthermore, the stock market does not only provide the much required funds for boosting the business, but also provides a common place for stock trading, which means that the stock market trade the stocks in form of liquid assets, unlike the real estate investment. At any point of time, it is possible to sell the stocks and get back the investment along with the profit. In fact, it will make the stocks much more liquid in nature, thereby attracting more investors to invest in the stock market.

According to Kalyanaraman and Tuwajri (2014), the behaviour of stock market index will be affected by the movement of stock price. This is because when the stock price increase, thus the stock market will increase and vice versa. In regards to the present value model, current stock price is determined by discounting cash that is expected to receive in the future to the value at the current time, and a part of the calculation of present value when doing a discounted cash flow analysis. There is no concrete theory that can ensure that all the

*Corresponding author, email: mohdshukri@uitm.edu.my

macroeconomic variables could influence the share prices, although all macroeconomic factors which affect the expected cash flows or the discount rate are said to be impacted by the share price. It is only based on intuitive finance theory and in fact, when it comes to value stocks then the investors will consider to macroeconomic.

In addition, micro forces and macro forces are two types of forces that have been said to influence the stock prices (Qamri, Abrar, Haq and Akram, 2015). Micro force that influence price in the main source of finance of a firm is demand and supply force, as in bullish trend when people think the prices are going up and therefore enter the market with a buy due to excessive demand. Similarly, this situation is the same in bearish trend, when people think the prices are going to get worse and therefore enter the market with a sell due to excess in supply. On another spectrum, macro forces also include government policies, industry and firm's image with its performance pressure that demand behaviour of investors. Not only that, macroeconomic forces also include politics, the condition of economic in general (performance of economy); as in competitors and changes in interest rate, government regulation etc.

However, since the market usually reacts to changes in macroeconomics factors and occasionally for some irrational reasons, the investors are frequently unsuccessful to acquire their preference returns from their investments, as trading in the stock market is unforeseeable. Besides, Kumar, Puja, Naik, Padhi and Author (2012) stated that actually, before the investors invest their funds, they cautiously observe the performance of stock markets by surveying the market index which equips them with a prior stock market performance; the indicator to measure the performance of one's financial and potential investors for predicting coming trends in the market. Ramadan (1946) opined that most of academic researchers as well as investors have become concerned to the factors that cause to the motion of stock price; meanwhile some of them have worked on the elements influencing the movement of stock prices at microeconomics level as well as in studying these factors at macroeconomic level.

1.1 Problem statement of the study

In Malaysia, stock price volatility is not a new issue anymore, since the recent years before the stock price had faced the quite similar rise and fall index, which happened due to the certain factors of macroeconomic or microeconomic fundamentals. However, the economic phenomenon during an early 2008 which is known as Global Financial Crisis (henceforth GFC) has brought to the second biggest impact on KLCI stock price volatility after the East Asian Financial Crisis. During the period of time, Malaysia was affected especially in securities that suffered large losses during the crisis.

According to Angabini and Wasiuzzaman (2011), it caused a huge impact on all financial markets around the world during the financial crisis that happened at the end of 2007 and beginning of 2008. A liquidity shortfall in the United States banking system was responsible to trigger to the crisis. The impact on global stock market affected by questions regarding bank solvency, declines in credit availability and damaged investor confidence had made the securities suffered large losses during the late 2008 and early 2009. Within the period of 14th of January 2008 to 12th of September, the KLCI, the main index and market indicator in Malaysia dropped around 670 points and this comes to around a 45% drop in its value. After the East Asian financial crisis of 1997, that was the largest decline in the KLCI value.

Besides, Central Bank of Malaysia also found that the GFC started to affect Malaysia's economy in the fourth quarter of 2008, when exports and manufacturing production declined by 7.4% and 11.1% respectively. Ringgit weakened to RM3.7255 against US dollar on March 2, 2009, and total investment declined significantly by 10.8%. The stock market fell severely, with the Kuala Lumpur Composite Index (KLCI) dropped from 1,445 in December 2007 to the lowest of 838.4 points on March 12, 2009, during the crisis. The impact of GFC

was reflected through the declining of most macroeconomic indicators and stock market indices (Yeap and Lean, 2009).

Mustafa, Samsudin, Shahadan and Yi (2015) discovered that due to crisis incurred from October 2008 until March 2009, KLCI was in a descending trend and fell below its benchmark of 1000 point. As a consequence, due to the global financial crisis, it shows that Malaysia stock market had received huge impact when KLCI fall below 1000 point with the lowest index was during October 2008 and the index was about 863.63 point. In this situation, to reduce risk of loss, the investors from stock market had to find other investment alternatives.

The fall of KLCI stock price impacted both on the economy growth and also the confidence level of investors towards the country's stock performance. Thus, it shows that the KLCI stock price plays a crucial role in the economic performance of Malaysia. This is because the study on KLCI stock price can bring great benefits for the government policy makers as well as the investors' sentiment and confidence regarding the future predictions movement of stock price as according to the macroeconomic forces in the country. Consequently, this study seeks to highlight the relationship between the macroeconomic factors and KLCI stock price.

1.2 Literature review

Studies conducted by Hunjra et al. (2014), Hui et al. (2014), Pilinkus and Boguslauskas (2009), and Ramadan (1946) are focusing on the effect of macroeconomic factors against the movements of stock prices. The result reveals that gross domestic product have a positive relationship with stock price. In contrast, further study conducted by Hunjra et al. (2014) employed Granger causality test in investigating the role of gross domestic product on movement of stock price. The short term result reveals a negative relationship between gross domestic products with stock price.

Besides that, many studies was conducted to investigate the roles of money supply on stock price behaviour such as Chia and Lim (2015), Hui et al. (2014), Kalyanaraman and Tuwajri (2014), Adjasi (2009), Pilinkus and Boguslauskas (2009), Maskay (2001), and Ramadan (1946). Most of the result reveals that the stock price is influenced positively by money supply. These studies explained that by increasing in money supply, it will increase the demand for equity investment, thus increases the stock prices (Chia and Lim, 2015; Hui et al., 2014; Kalyanaraman and Tuwajri, 2014; Pilinkus and Boguslauskas, 2009; and Ramadan, 1946). However, study conducted by Adjasi (2009) and Maskay (2001) found that money supply have negatively relationship on the stock price.

Furthermore, the exchange rate is another important variable in order to study stock price behaviour. Studies conducted by Jayashankar and Rath (2017), Hui et al. (2014), and Pilinkus and Boguslauskas (2009) found that there is negative relationship between exchange rate and stock price movement, whilst Hunjra et al. (2014), Kalyanaraman and Tuwajri (2014), and Kurihara (2006) found positive relationship between exchange rate and stock price. However, Kumar et al. (2012) failed to prove the relationship between these two variables where the result reveals the exchange rate is insignificant in determining stock prices.

Finally, many studies were also conducted to investigate the impact of inflation rate towards stock price movements. For instance, studies conducted by Qamri et al. (2015), Chia and Lim (2015), and Kumar et al. (2012) shows that inflation rate as a negatively influencing factor against the stock price volatility. However, another studies conducted by Hunjra et al. (2014), Ratanapakorn and Sharma (2007), and Cooper, Lee, Howe and Hamzah (2004) find the long run relationship between the inflation rate and stock prices movements which the result showed that there is a long term positive relation existed between those variables.

2. METHOD AND MATERIAL

2.1 Data Collection Method

The study has been conducted in Malaysia where the data for the variables have been collected from year 1980 to 2016. The data only utilizes the secondary data with the total number of observations is 37 observations measured based on annually basis. The data was derived from several sources such as World Development Indicator (WDI), International Monetary Fund (IMF) and Data Stream. In studying the relationship between macroeconomic fundamentals and KLCI stock price, the study used the following variables: KLCI stock price as dependent variable and the rest of the variables – Gross Domestic Product (GDP), Money Supply (M1), Exchange Rate (EXR) and Inflation Rate (INF) as independent variables. The Ordinary Least Square (OLS) method has been applied by using the E Views 9.

KLCI stock price represents the 100 component stocks on KLSE's Main Board share price performance. Meanwhile, GDP in this study represent the GDP annual percentage growth rate at market price based on constant local currency. Meanwhile M1 which is also called as narrow money, which also includes coins and notes in circulation and other money equivalents that are easily convertible into cash. EXR denotes as official exchange rate refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. Whilst, INF in the regression analysis is measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a basket of goods and services that may be fixed or changed at specified intervals, such as yearly.

2.2 Empirical Function

The function of dependent variable and independent variables can be formed as below:

$$SP = f(GDP, M1, EXR, INF) \quad (a)$$

where, SP is the stock price, f is the function, GDP is the gross domestic product, $M1$ is the money supply, EXR is the official exchange rate and INF is the inflation rate.

2.3 Empirical Model

From the estimating function on Equation (a) above, it generates the estimating model which explained the estimated relationship between dependent variable and independent variables. The estimated model can be written as:

$$LSP_t = \gamma_0 + \gamma_1 LGDP_t + \gamma_2 LM1_t - \gamma_3 LEXR_t - \gamma_4 LINF_t + \varepsilon \quad (b)$$

where, t , γ_0 , $\gamma_{1,2,3,4}$, and ε denotes as time, constant, coefficients of independent variables and error term. LSP is a stock price. $LGDP$ and $LM1$ are gross domestic product and money supply respectively; $LEXR$ denotes exchange rate and $LINF$ is inflation rate. All variables are in natural logarithm. A prior precedent of the relationship between those variables is expected that $\gamma_1, \gamma_2 > 0$ and $\gamma_3, \gamma_4 < 0$. By using the OLS regression, the null hypothesis of macroeconomic fundamentals on the KLCI stock price is tested on

$$H_0: \gamma_1 = \gamma_2 = \gamma_3 = \gamma_4 = 0, \text{ against } H_1: \gamma_1 \neq \gamma_2 \neq \gamma_3 \neq \gamma_4 \neq 0.$$

3. RESULTS AND DISCUSSIONS

3.1 Descriptive Statistics

Table 1: Descriptive Statistics

	KLCI	GDP	M1	EXR	INF
Mean	881.0678	5.874978	110512.7	3.074054	3.002448
Maximum	1866.960	10.00270	380841.2	4.150000	9.700000
Minimum	233.4600	-7.359415	9761.398	2.180000	0.290008
Std. Dev.	497.3931	3.765709	113162.3	0.601957	1.903812
Skewness	0.492121	-1.585839	1.138358	0.207436	1.288804
Kurtosis	2.000410	5.870548	3.036129	1.548460	5.522352
Observations	37	37	37	37	37

Notes: KLCI-Kuala Lumpur Composite Index (or, stock price); GDP-Gross Domestic Product; M1- Money Supply; EXR- Exchange Rate; INF- Inflation Rate

Table 1 shows the summary of descriptive statistics. It indicates that the mean value of KLCI stock price is RM881.07 and the standard deviation of RM497.39. The standard deviation of KLCI stock price is lower than the mean value of stock price, which meant the data has a low variability. The maximum and minimum value of KLCI stock prices are at RM1,866.96 and RM233.46 respectively. For gross domestic product, it has the mean value of 5.87% and the standard deviation is 3.77%. It is the same as KLCI stock price where the data has low variability due to the value of standard deviation is lower than the mean value. The maximum value of gross domestic product is 10.00%, while the minimum value is -7.36%. The data of money supply is observed to have a mean value of RM110,512.7 while the standard deviation is RM113,162.3 which meant that the data has a high variability. The maximum and minimum values of money supply are RM380,841.2 and RM9,761.40 correspondingly. Next, the data of exchange rate shown that it has a low variability due to the value of standard deviation (RM0.60195/USD) is lower than the mean value (RM3.07405/USD). The maximum value of exchange rate is RM4.15000/USD and the minimum value is RM2.18000/USD. Inflation rate has a mean value of 3.00% and a standard deviation of 1.90%. Thus, it indicates that the data of inflation rate has a low variability. The maximum value of inflation rate is 9.70% and the minimum value is 0.29%.

The skewness of the result shows that there are mixed results obtained from the data distribution because there is a positive value and negative value presented by the variables. If the value of data is positive, thus it will skew to the right whereas if the value of data is negative then it will skew to the left. Meanwhile the skewness for the normal distribution is zero value. The result revealed that the variables which are KLCI stock price (0.4921), money supply (1.1384), exchange rate (0.2074) and inflation rate (1.2888) are skewed to the right because of the positive value obtained, whereas the gross domestic product (-1.5858) is skewed to the left due to negative value of the data distribution.

Kurtosis is used to measure the data distribution which is normally distributed or not normally distributed. It is also used as an indicator to show the peakedness or flattening of the data distribution. The data distribution is high peakedness if the value is above than three, while in contrast the data distribution seems to be flattening once the value is below than three. However, if the value is around 3, it shows that the data distribution is normal. From the result above, KLCI stock price and exchange rate are below than 3 which are 2.0004 and 1.5484 respectively. Thus, it indicates the data distribution is flattened. Nonetheless, gross domestic product (5.8705) and inflation rate (5.5223) are above than 3 which signal the data distribution are high peakedness. The value of money supply (3.0361) is around 3 which is meant that it has a normally distribution data.

3.2 Pearson's Correlation

Table 1: Pearson's Correlation

	KLCI	GDP	M1	EXR	INF
KLCI	1.000000				
GDP	0.034976	1.000000			
M1	0.894293	-0.172766	1.000000		
EXR	0.461144	-0.382297	0.573615	1.000000	
INF	-0.226385	0.179907	-0.266708	-0.383149	1.000000

Notes: KLCI-Kuala Lumpur Composite Index (or, stock price); GDP-Gross Domestic Product; M1- Money Supply; EXR- Exchange Rate; INF- Inflation Rate

The Pearson's correlation is applied to analyse the magnitude of association, or direction of the relationship between the variables. Besides, it also used to measure the multicollinearity problem in the regression. When the result of correlation is below than 0.8, it indicates that there is no multicollinearity problem, whereas when the result of correlation is above than 0.8, it shows that there is multicollinearity problem exist between the variables. From the table 2 above, it showed a positive correlation exist between KLCI stock price and the variables of gross domestic product (0.0350), money supply (0.8943) and exchange rate (0.4611). However, for inflation rate (-0.2264), it showed there is a negative correlation exist with KLCI stock price. The gross domestic product is observed to correlate negatively with money supply and exchange rate with the value of -0.1728 and -0.3823. Nevertheless, inflation rate (0.1800) showed a positive correlation exist with gross domestic product. In addition, money supply is observed to have positively correlation with exchange rate (0.5736) and negatively correlation with inflation rate (-0.2668). Besides, inflation rate also showed a negative correlation exist with exchange rate at the value of -0.3831. Overall, from the result in table 3, there is no multicollinearity problem exist between the variables as the value of correlation exist are below than 0.8.

3.3 Multiple Regression Analysis

3.3.1 Model

In reference to table 3, it can explain the analysis of goodness of fit (*R*-squared), *F*-statistics, Durbin Watson and coefficient of variables. The result shows the *R*-squared of the study is 0.909349. It indicates that 90.93% in the changes of dependent variable (KLCI stock price) can be explained by all of the independent variables (GDP, M1, EXR and INF). Only 9.07% is unexplained.

The *t*-statistics for this study is 80.25049 which is greater than 4 and the probability of *f*-statistics (0.000000) is at the 1% significant level. Therefore, it shows that all the independent variables (gross domestic product, money supply, exchange rate and inflation rate) as a whole are statistically significant in influencing the dependent variable (KLCI stock price). Meanwhile, the Durbin Watson value is 2.115357, which revealed that there is no autocorrelation problem existed in this study.

Table 2: Results of Multiple Regression Analysis

Variables	Coefficient	Standard Error	T-Statistics
LGDP	0.027418	0.009737	2.815749***
LM1	0.600250	0.046116	13.01607***
LEXR	-0.621356	0.296720	-2.094079**
LINF	0.034362	0.019092	1.799821*
C	0.409999	0.368228	1.113437*
F-Statistics		80.25049***	
R-Squared		0.909349	
Durbin Watson		2.115357	

Notes: ***, ** and * denotes statistically significant at 1%, 5% and 10% respectively. LGDP- gross domestic product; LM1- money supply; LEXR- exchange rate; LINF- inflation rate and C-constant. All variable are in logarithm.

The coefficient of variables shows that if the independent variables are held constant, the KLCI stock price will increase by 0.41%. There is a positive relationship between gross domestic product and KLCI stock price. If GDP increase by 1%, it will increase KLCI stock price by 0.027%. Therefore, when the GDP increase, it will increase the KLCI stock price. In table 3, it shows that the GDP and KLCI stock price is positively significant at 1% significant level.

Moreover, there is a positive relationship exist between money supply and KLCI stock price. If the M1 increases by 1%, it will increase the KLCI stock price by 0.600%. It shows that it followed the expected sign which indicates that when the money supply increase, it will also increase the KLCI stock price. The variables, M1 and KLCI stock price is positively significant at 1% level of significant.

Nonetheless, exchange rate and KLCI stock price showed a negative relationship. Thus, it indicates that, if the exchange rate is experiencing appreciation by 1%, it will decrease the KLCI stock price by 0.621%. From table 3, it shows that the exchange rate and KLCI stock price is negatively significant at 5% significant level.

Inflation rate and KLCI stock price is observed to have a positive relationship. It shows that if the inflation rate increases by 1%, it will increase the KLCI stock price by 0.034%. However, the empirical sign shows a contradicting result to the expected sign where it indicates when the inflation rate increase, it will increase the KLCI stock price. The model above shows that inflation rate and KLCI stock price are positively significant at 10% significant level.

3.4 Results Discussion

The gross domestic product represents the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products in the economy of Malaysia. The finding from OLS regression indicates that gross domestic product as a positively significant influence in relation to the KLCI stock price. This is supported by several researchers such as Khan and Zaman (n.d.) and Hui et. al (2014) who found a positive and highly significant influence of gross domestic product on stock price. The GDP in Malaysia, during the period of study shows an upward increase. The increase in GDP has been attributed to the peace and political stability, social security and the friendly business environment enjoyed in the country which can boost up the investors' confidence as well as increase the stock purchasing in the market. Therefore, the higher the volume of stock purchasing, the higher the KLCI stock price will be, which it can apparently contribute to the positive relationship existence between the variables.

According to Chia and Lim (2015), the M1 is mainly used as a medium of exchange as compared to M2 and M3. This is because M1 is much more liquid in comparison to M2 and M3, therefore it shows M1 is precisely the money supply to be used as an indicator measured for the purpose of this study. The finding shows that there is a positively significant relationship between money supply and KLCI stock price. Kumar et al (2012) expressed that money supply brings the economic stimulus and therefore the stock prices increase. The funds in the hand of investors increase due to the increase in money supply, therefore it cause the demand on stocks increase and consequently increase the stock price. The finding is in line with the previous research works from Ramadan (1946), Hui et al (2014) and Pilinkus and Boguslauskas (2009) who also found that money supply as a positively significant influence to the stock price.

On another spectrum, exchange rate is determined by national authorities or to the rate determined in the legally sanctioned exchange market which is measured based on local currency units relative to the U.S dollar. The finding depicts a negatively significant relations influence of exchange rate on KLCI stock price. This is consistent with the research works conducted by Hunjra et al (2014), Dar et al (n.d.), Hui et al (2014) and Pilinkus and

Boguslauskas (2009) who also found that exchange rate and the stock price is negatively and highly significant. According to Kumar et al (2012), the impact of exchange rate on stock price is determined by the level of international trade importance and the degree of trade balance in the country itself. When the value of local currency depreciates against the foreign currency, thus the returns on foreign currency become higher and enhance the investors to convert their funds from local stocks to the foreign stocks due to the plummeted price in their home country. In sharp contrast to the condition, when there is an appreciation of local currency which it will cause the competitiveness of exporting to become lower and consequently will give a negative impact on the stock prices.

The inflation rate measure by consumer price index shows a contrary result to the expectation, a positively significant relationship with KLCI stock price. An increase in the inflation rate will significantly increase the stock price. However, the finding of the study supported by research works conducted by Cooper et al (2004) and Ratanapakorn and Sharma (2007) who found a positive relationship exist between inflation rate and stock price. Nonetheless, the findings is a contradiction to the previous research by Qamri et al(2015), Chia and Lim(2015), Hunjra et al (2014) and Kumar et al(2012) who found inflation rate have a negative relationship with stock price. According to Qamri et al (2015), inflation rate itself is a macroeconomic variable which depends on a wide range of elements like oil costs and legislative arrangements, therefore the impact might be different between one country to the other country, as well as the varying economy conditions of the country itself. Therefore, Ratanapakorn and Sharma (2007) suggested in their study that equities act as an effective hedge against inflation. Besides, Cooper et al (2004) stated that if inflation is caused by money shock, it will cause the interest rate to become lower and the investors will turn their cash holdings to buy the stocks to maximize their potential gains. If the demand of stock increases, thus it will increase the stock prices. An increase in inflation rate indicates the potential increase in the real activity and production which cause the stock returns to become high. Thus, it supported the finding that inflation rate is positively significant influence to the KLCI stock price.

Therefore, based on the findings in *Table 2*, it shows that exchange rate has the highest sensitivity among other macroeconomic fundamentals. An appreciation of 1% in exchange rate, will decrease the KLCI stock price by 0.621356% which consequently showed that increase in exchange rate will cause the KLCI stock price to have a largely negative movement. Hence, the result implies that exchange rate is the most significant factor influencing the KLCI stock price.

4. CONCLUSION

The aim of this study is to investigate the relationship between macroeconomic fundamentals with KLCI stock price in Malaysia, and to determine the most significant factor(s) in influencing the KLCI stock price. In order to understand deeper about the influential factors of macroeconomic fundamentals on the KLCI stock price, the OLS method is used. By adopting the multiple regression analysis, this study able to make a correct analysis on the relationship between the variables. Hence, this study reveals that the macroeconomic fundamental factors namely gross domestic product, money supply, exchange rate and inflation rate have an empirical relationship with KLCI stock price in the economy of Malaysia.

Therefore, the finding shows that there is a positively significant relationship between KLCI stock price and the independent variables namely gross domestic product, money supply and inflation rate. In contrast, the exchange rate is found to be negatively significant influence the KLCI stock price. Contrary to the expectation, inflation rate shows a positive and significant relationship with KLCI stock price. This implies that, for Malaysia the stock

investment provides an effective hedge against inflation (Kumar et al., 2012). The positive effect to the stock market also happened due to the stable inflation rate which indicates that the volatility of stock market is highly elastic to the inflation rate.

Besides, exchange rate shows that it was the most significant factor that influenced the KLCI stock price, as slight increase in the value of exchange rate caused the KLCI stock price to have a largely negative movement. Hence, based on the empirical result of this study, it can be concluded that KLCI stock price in Malaysia is driven by its macroeconomic variables. Overall, this study has achieved its objectives and provides a solid ground for further research.

References

- Adjasi, C. K. D. (2009). The Journal of Risk Finance Macroeconomic uncertainty and conditional stock-price volatility in frontier African markets: Evidence from Ghana. *The Journal of Risk Finance The Journal of Risk Finance Iss The Journal of Risk Finance*, 10(10), 333–349.
- Angabini, A., & Wasiuzzaman, S. (2011). Impact of the Global Financial Crisis on the Volatility of the Malaysian Stock Market. *Proceeding of 2010 International Conference on E-Business, Management and Economics*, 3, 79–84.
- Ariff, M., & Abubakar, S. Y. (1999). The Malaysian Financial Crisis: Economic Impact and Recovery Prospects. *The Developing Economies*, 4(December), 417–438.
- Chia, R. C. J., & Lim, S. Y. (2015). Malaysian stock price and macroeconomic variables: Autoregressive distributed lag (ARDL) bounds test. *Kajian Malaysia*.
- Hui, C. J., Yi, C. P., Chyn, L. S., Gnoh, L. B., & Mun, W. Y. (2014). Determinants of Stock Price Fluctuations: Evidence from Singapore.
- Cooper, R., Lee, M., Howe, C., & Hamzah, M. A. (2004). Relationship between Macroeconomic Variables and Stock Market Indices: Cointegration Evidence from Stock Exchange of Singapore's All-S Sector Indices. *Jurnal Pengurusan*, 24, 47–77.
- Dar, A. B., Shah, A., Bhanja, N., & Samantaraya, A. (n.d.). The relationship between stock prices and exchange rates in Asian markets: A wavelet based correlation and quantile regression approach. *South Asian Journal of Global Business Research South Asian Journal of Global Business Research Journal of Economic Studies Iss African Journal of Economic and Management Studies*, 3(2), 209–224.
- Hunjra, A., Irfan Chani, M., Shahzad Ijaz, M., Farooq, M., Khan, K., & Shahzad, M. (2014). M P RA The Impact of Macroeconomic Variables on Stock Prices in Pakistan The Impact of Macroeconomic Variables on Stock Prices in Pakistan. *International Journal of Economics and Empirical Research*, 2(21), 13–21.
- Jayashankar, M., & Rath, B. N. (2017). The dynamic linkage between exchange rate, stock price and interest rate in India. *Studies in Economics and Finance*.
- Kalyanaraman, L., & Tuwajri, B. Al. (2014). Macroeconomic Forces and Stock Prices: Some Empirical Evidence from Saudi Arabia. *International Journal of Financial Research*, 5(1), 81–92.
- Khan, M. N., & Zaman, S. (n.d.). Impact of Macroeconomic Variables on Stock Prices: Empirical Evidence from Karachi Stock Exchange, Pakistan. *Business, Economics, and Financial Sci., Manag. AISC*, 143, 227–233.

Kumar, N. P., Puja, P., Naik, P. K., Padhi, P., & Author, C. (2012). M P RA The impact of Macroeconomic Fundamentals on Stock Prices revisited: An Evidence from Indian Data The impact of Macroeconomic Fundamentals on Stock Prices revisited: An Evidence from Indian Data.

Kurihara, Y. (2006). The Relationship between Exchange Rate and Stock Prices during the Quantitative Easing Policy in Japan. *International Journal of Business*, 11(4).

Maskay, B. (2001). Analyzing the Effect of Change in Money Supply on Stock Prices. *The Park Place Economist*. XV, 72-79.

Mustafa, N. N. S., Samsudin, S., Shahadan, F., & Yi, A. K. J. (2015). Flight-to-Quality between Stock and Bond Markets: Pre and Post Global Financial Crisis. *Procedia Economics and Finance*, 31(15), 846–855.

Pilinkus, D., & Boguslauskas, V. (2009). The Short-Run Relationship between Stock Market Prices and Macroeconomic Variables in Lithuania: An Application of the Impulse Response Function. *ISSN Inzinerine Ekonomika-Engineering Economics ECONOMICS OF ENGINEERING DECISIONS*, (5), 1392–2785.

Qamri, G. M., Abrar, M., Haq, U., & Akram, F. (2015). The Impact of Inflation on Stock Prices: Evidence from Pakistan. *Microeconomics and Macroeconomics*, 3(4), 83–88.

Ramadan, I. Z. (1946). Macroeconomic Approach of the Determinants of Stock Price Movements in Jordan. *Asian Journal of Finance & Accounting ISSN & Udegbumam and Eriki Ibrahim Chaudhuri and Smiles Asian Journal of Finance & Accounting ISSN*, 8(2).

Ratanapakorn, O. and Sharma, S. C. (2007). Dynamics analysis between the US Stock Return and the Macroeconomics Variables, *Applied Financial Economics*, 17 (4): 369-377.

Yeap, G. P., & Lean, H. H. (2009). Macroeconomic Volatility on Stock Prices Volatility During Global Financial Crisis in, 1–13.

ID087 – A Multivariate Cointegration Analysis of the Macroeconomic Determinants of Carbon Emissions in Malaysia

^{1*}Ratneswary Rasiah, ¹Sotheeswari Somasundram, ²Geetha Subramaniam

¹Taylor's Business School, Taylor's University, Subang Jaya 47500, Malaysia

²Faculty of Business and Management, Universiti Teknologi MARA Kampus Puncak Alam
42300 Bandar Puncak Alam, Malaysia

Abstract

Global warming is one of the greatest threats to mankind, as it adversely affects Mother Earth and its ecosystem, human health, the greater economy and is considered a threat to national security. There has been an exponential growth in the number of environmental studies carried out over the past few decades as scholars, climate researchers and governments search for the various factor causing global warming and the feasible solutions to address this potentially catastrophic problem. This paper will contribute further to the existing body of knowledge on the underlying causes of global warming, with the specific aim of investigating the long-run relationships between carbon emissions and its regressors comprising of per capita income, energy use, trade openness, and financial development in Malaysia over the period 1970 to 2016. The econometric time series analysis of multivariate cointegration is applied in this study to establish the possible causal relations between the variables concerned. The cointegration test and the vector error correction model display evidence of positive long-run relationships between per capita income and carbon emissions, and between trade openness and carbon emissions, while energy use is negatively related to carbon emissions. The study concludes with an examination of policy implications of the findings.

Keywords: Carbon emissions; trade openness; energy; financial development; VECM

1. INTRODUCTION

One of the greatest challenges facing the world today is global warming. Global warming has posed an alarming threat not only to the planet Earth, but also to the entire ecosystem, human health, economy and national security. In essence, global warming refers to the progressive rise in Earth's mean temperature due to the emission of greenhouse gases (GHG). Global sea level has escalated for the past decade due to the acceleration of warming oceans, shrinking ice sheets and glacial retreat. Furthermore, global warming has also heightened the ferocity and frequency of extreme calamities such as heat waves, drought, wildfires, hurricanes, floods and storm surges (NASA, 2016). Collectively, global warming could cause a devastating impact on the entire planet and community if no further mitigation measures are taken.

This study attempts to eliminate the gaps in the prevailing literature by offering a fresh perspective on carbon emissions. This is done by including additional exploratory variables, such as trade openness and financial development, to investigate if they also contribute to carbon emissions besides the highly studied variables, economic growth and energy use. Most importantly, this research hopes to contribute to the formulation of better economic and environmental policies surrounding the keys drivers of carbon emissions to efficaciously address global warming.

*Corresponding author, e-mail: Ratneswary.RASIAH@taylors.edu.my

1.1 Problem statement of the study

Countries across the globe are facing the aftermath of global warming, resulting mainly from the emission of carbon dioxide. Climate change has heavily impacted the economy in many ways, ranging from the reduction in agricultural productivity to the spread of diseases resulting in lesser labour productivity in various ways. Job losses, productivity losses, increased absenteeism and reduced turnover rates resulting from climate change-induced diseases could lead to decreased household income. The overall decrease in economic efficiency could hinder economic growth. These problems can escalate further as global warming is a real and serious issue which will not stop unless proper mitigation measures are taken. In view of the life-threatening effects that global warming has brought and continues to bring to the planet as a whole, it is imperative that countries, climate scientists, researchers and individuals work together to act promptly on this issue. There is a pertinent need for further studies to address this problem. Hence, this paper attempts to study the underlying causes of carbon emissions which is an important source of global warming and the actions that could be taken to address it.

1.2 Literature review

Carbon emission is the liberation of carbon dioxide (CO₂) gas from human activities such as fossil fuel combustion, cement production and deforestation (World Bank 2016). Many scholars (Manabe and Stouffer, 1980; Plattner et al., 2008; Eby et al., 2009; Solomon et al., 2009) have attempted to study carbon emissions in particular because CO₂ is regarded as the main contributor to global warming and climate change. The use of carbon emissions, CO₂, as a proxy for environmental degradation is supported by Lean and Smyth (2009), Akpan and Chuku (2011), Ong and Sek (2013), and Albiman, Suleiman and Baka (2015).

GDP per capita is the total income of people, divided by the country's population (World Bank 2016). A number of studies have included income as a key determinant of environmental degradation by applying the Environmental Kuznets Curve analysis (Lacheheb et al. 2015; Grossman & Helpman 1991; Harbaugh et al. 2002; Galeotti et al. 2006; Cole et al. 1997; Moomaw & Unruh 1997). The Environmental Kuznets Curve proposes an inverted U-shaped relationship between income and CO₂, where the early stage of growth leads to higher environmental degradation, however after a peak, economic growth will lead to a decrease in CO₂ emission (Lacheheb et al. 2015; Grossman & Helpman 1991). However, the studies on the relationship between income and environmental degradation has remained largely inconclusive. A number of studies have confirmed the possibility of an inverted U-shaped relationship (Aldy 2005; Cole et al. 1997; Galeotti et al. 2006), while others studies have disputed this (Lacheheb et al. 2015; Harbaugh et al. 2002; Moomaw & Unruh 1997). Other studies have moved away from the Kuznet Curve analysis and proposed a linear relationship between income and CO₂ emission (Shafik 1994; Azomahou et al. 2006).

Energy use is the utilization of primary energy from the source before it transforms into other end-use fuels (World Bank 2016). Studies indicate a positive relationship between energy consumption and CO₂ emission in a wide number of countries such as Saudi Arabia (Alshehry & Belloumi 2015), the BRIC countries (Pao & Tsai 2010), Japan (Hossain 2012), Turkey (Halicioglu 2009), and South Africa (Kohler 2013). Interestingly, the industrial, transportation and commercial sectors that have historically been considered as high polluters are replaced by the consumers sector. A study by Wei et al. (2007) highlights that energy use in homes, food, education, personal travel are the most energy-intensive and carbon-emission-intensive activities in China. A conclusion supported by Bin & Dowlatabadi (2005) highlighting that consumer demands are instrumental for the energy use and the resulting CO₂ emission in the US while Feng et al. (2011) dissects the consumer market further by highlighting increased CO₂ emissions among urban households.

Trade Openness is measured as the sum of exports and imports, as share of GDP (World Bank 2016). Literature investigating the role of trade openness on environmental degradation

provides mixed findings. Sebri & Ben-Salha (2014) and Halicioglu (2009) highlighted the toxic impact of trade openness on the environment. Similar conclusion is reported by Chebbi et al. (2011) of a direct positive effect in both the short and long run, but reports of a negative indirect effect through income and economic activity in the long-run. However, a number of other studies have also highlighted that trade openness does not impact CO₂ emission (Hossain 2011; Jayanthakumaran et al. 2012).

Financial Development is proxied by domestic credit provided by financial sector (% of GDP) (World Bank 2016). Studies examining the impact of financial development on environmental degradation are rather consistent in reporting a positive relationship between the two variables (Sadorsky 2010; Zhang 2011; Tamazian & Rao 2010). The negative impact of financial development is said to encourage investment in new projects, attract investment and encourage domestic consumption which eventually culminates in increased carbon emission (Zhang 2011). While, Tamazian & Rao (2010) highlights a concern that financial development without a strong institutional framework could be harmful for environmental quality.

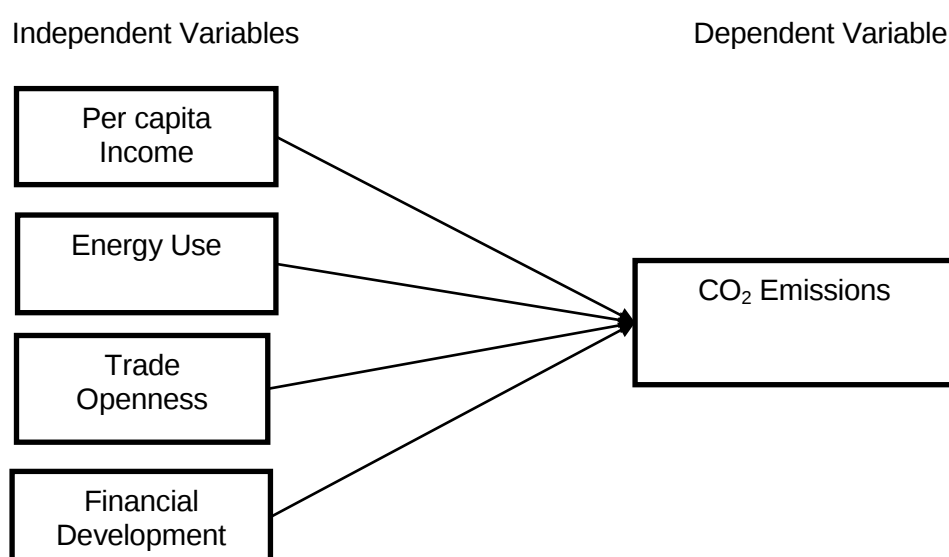


Figure 1: Theoretical framework

2. METHOD AND MATERIAL

Following Lean and Smyth (2009), the empirical long-run relation between carbon emissions, real GDP per capita, energy use, trade openness, and financial development is written in the following form:

$$LCO_2_t = \beta_0 + \beta_1 LGDPC_t + \beta_2 LEU_t + \beta_3 LTO_t + \beta_4 FD_t + \varepsilon_t \quad [1]$$

where CO₂ is carbon emissions (metric tons per capita), GDPC is real GDP per capita (constant 2011 USD), EU is energy use (kg of oil equivalent per capita), TO is trade openness which is calculated as follows: $TO = (Exports + Imports)/GDP$, and FD is financial development, proxied by domestic credit provided by financial sector (% of GDP). The subscripts indicate time (t) and ε is the usual error term.

2.1 Data collection method

The study utilises annual time series data of carbon emissions (CO₂), gross domestic product per capita (GDPC), energy use (E), trade openness (TO) and financial development (FD) from 1970 to 2016 for Malaysia. The data was sourced from World Bank Development Indicators.

3. ANALYSIS AND RESULTS

The study first tests the variables for stationarity by employing the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests. Thereafter, the maximum likelihood approach to cointegration test developed by Johansen (1988) and Johansen and Juselius (1990) was employed to analyse whether the set of non-stationary variables under consideration are tied together by the long-run equilibrium path.

3.1 Unit Root Test

The order of integration of the relevant variables was determined prior to performing a cointegration test as only integrated variables of the same order could be co-integrated. Table 1 shows evidence that confirms the stationarity of the variables when they are first-differenced, that is, all variables used in this time series are I (1).

Table 1: ADF and PP Unit Root Tests

	Augmented Dicky-Fuller	Phillips-Perron
LEVEL		
LCO ₂	-0.9323 (0)	-0.9323 [0]
LGDP	-1.5663 (0)	-1.5663 [0]
LEU	-1.1008 (0)	-1.6425 [11]
LTO	-1.1571 (0)	-1.1571 [0]
FD	-2.0386 (0)	-2.0386 [0]
FIRST DIFFERENCE		
LCO ₂	-7.9412 (0) ***	-7.9340 [1]***
LGDP	-5.793 (0)***	-5.8036 [1]***
LEU	-6.9402 (0)***	-7.1511 [6]***
LTO	-5.7203 (0)***	-5.7203 [0]***
FD	-6.1332 (0)***	-6.1332 [0]***

Note: *** denotes significant at 1% significance level. The figure in parenthesis (...) represents optimum lag length selected based on Schwartz Info Criterion. The figure in bracket [...] represents the Bandwidth used in the Phillips-Perron test selected based on Newey-West Bandwidth criterion.

3.2 Johansen's Cointegration Test

The Johansen-Juselius Cointegration test was performed using non-correlated errors as the lag selection criterion. Since all variables in this time series are I(1), there is a likelihood of an equilibrium relationship between them. The cointegration test of Johansen (1988) and Johansen-Juselius (1990) was applied to investigate the presence of a long-run equilibrium relationship among the variables in study. Table 2 estimates the number of long run relationships that exist between carbon emissions and its explanatory variables. There is evidence of the presence of a long run cointegrating relationship between carbon emissions and its regressors made up of per capita income, energy use, trade openness and financial development, as shown by both the trace statistics and maximum-eigenvalue statistics, indicating the presence of a unique cointegrating vector at 1 percent level.

Table 2: Results from Johansen's Cointegration Test: Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

NULL	Test Statistics			Critical Value (5%)		
	Trace	Max	Eigenvalue	Trace	Max	Eigenvalue
r = 0	80.225***	40.514***		69.819	33.877	
r ≤ 1	39.712	20.566		47.856	27.584	
≤ 2	19.145	13.676		29.797	21.132	
r ≤ 3	5.469	4.204		15.495	14.265	
r ≤ 4	1.266	1.266		3.842	3.842	

This table shows the results from Johansen's Cointegration Test for both Trace and Maximum Eigenvalue which shows the presence of cointegration for this system of variables. Note: *** denote significance at 1 percent.

3.3 Vector-Error Correction Model

The Vector-Error Correction model (VECM) was utilised in order to capture the long-run equilibrium dynamics of the time series. With the evidence of the existence of cointegration, the dynamic relationships between the cointegrated variables can be studied using an error-correction model. The cointegrating vector (normalized on the CO₂ emissions) representing the long-run relationship (with lag 1) is shown as follows:

$$LCO_{2t} = 7.574 + 1.697LGDPC_t^{***} - 0.775LEU_t^{***} + 0.642LTO_t^{***} - 0.000289FD_t + \varepsilon_t \quad [4]$$

(Note: *** denotes significance at 1%)

The coefficients found in the normalized cointegrating vector in Equation [4] are long-term elasticity measures, as the variables have undergone logarithmic transformation. The coefficients reveal that energy use, per capita income and trade openness have significant relationships with CO₂ emissions, while financial development does not.

It must also be noted that the estimated coefficients of the cointegrating vector shown above only represents the long-term relationship that exists.

4. DISCUSSION

The results in Section 3 clearly show evidence of the damaging effect per capita income and trade openness have on CO₂ emissions in Malaysia, while energy use mitigates this effect. As revealed by the coefficients in the VECM model in equation [4], energy use has a negative relationship with CO₂ emissions, with increases in energy use bringing about lower CO₂ emissions, which is a step closer to a cleaner environment. However, per capita income and trade openness have a positive and significant impact on CO₂ emissions, reflecting the damaging effects of economic development (proxied by per capita income) and international trade (proxied by trade openness) on the environment, as far as Malaysia is concerned.

The positive relationship between income per capita and carbon emission is consistent with the findings of a number of studies (Tucker, 1995; Adrangi, Dhanda and Hill, 2004; and Halicioglu, 2009). The negative relationship between energy use and carbon emissions was found to contradict the empirical evidence provided by Ang (2009), and Jalil and Mahmud (2009). The plausible explanation for the negative energy use-CO₂ link is the possibility that national and global environment policies and cooperation between governments have provided a stronger push for cleaner environment, and the use of alternative cleaner energy. Such policies include the imposition of green taxes on pollutants and subsidies for green companies, encouraging the use and further development of more sustainable energy technologies.

5. CONCLUSIONS AND RECOMMENDATIONS

This paper investigates the causal relationship between gross domestic per capita, energy use, trade openness, financial development and carbon emissions in Malaysia between 1970 to 2016. The Johansen-Juselius Cointegration test yields evidence of a long-run relationship between carbon emissions and per capita income, energy use, trade openness and financial development. The long-run equilibrium dynamics in the time series is captured by this study using the vector error-correction model which reveals that energy use, per capita income and trade openness are significant in explaining carbon emissions for Malaysia.

It is imperative that governments and policymakers acknowledge the devastating impact of economic development and international trade on the environment. Countries should invest in clean, renewable and sustainable energy sources such as biofuel, hydroelectricity,

geothermal, solar, wind, tidal and wave energy that are less harmful to the environment. More stringent pollution controls should be put in place, and greater use of green technology and methods of production should be encouraged or incentivized, with the hope that it leads to a drop in carbon emissions. This is a more effective mitigating measure to control global warming as compared to the enforcement of carbon taxes that will not only hinder growth but also leave the problem unsolved. In conclusion, it is imperative that countries join forces and work towards a common sustainable environmental goal for the benefit of the society as a whole.

References

Aldy, J.E. (2005). An Environmental Kuznets Curve Analysis of U.S. State-Level Carbon Dioxide Emissions. *The Journal of Environment & Development*, 14(1), pp.48–72. Available at: <http://journals.sagepub.com/doi/10.1177/1070496504273514>.

Alshehry, A.S. & Belloumi, M. (2015). Energy consumption, carbon dioxide emissions and economic growth: The case of Saudi Arabia. *Renewable and Sustainable Energy Reviews*, 41, pp.237–247. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S1364032114006790>.

Azomahou, T., Laisney, F. & Nguyen Van, P. (2006). Economic development and CO2 emissions: A nonparametric panel approach. *Journal of Public Economics*, 90(6–7), pp.1347–1363. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0047272705001301>.

Bin, S. & Dowlatabadi, H. (2005). Consumer lifestyle approach to US energy use and the related CO2 emissions. *Energy Policy*, 33(2), pp.197–208. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0301421503002106>.

Chebbi, H.E., Olarreaga, M. & Zitouna, H. (2011). Trade openness and CO 2 emissions in Tunisia. *Middle East Development Journal*, 3(1), pp.29–53.

Cole, M.A., Rayner, A.J. & Bates, J.M. (1997). The environmental Kuznets curve: an empirical analysis. *Environment and Development Economics*, 2(4), p.S1355770X97000211. Available at: http://www.journals.cambridge.org/abstract_S1355770X97000211.

Feng, Z.-H., Zou, L.-L. & Wei, Y.-M. (2011). The impact of household consumption on energy use and CO2 emissions in China. *Energy*, 36(1), pp.656–670. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0360544210005281>.

Galeotti, M., Lanza, A. & Pauli, F. (2006). Reassessing the environmental Kuznets curve for CO2 emissions: A robustness exercise. *Ecological Economics*, 57(1), pp.152–163. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0921800905001680>.

Grossman, G.M. & Helpman, E. (1991). Trade, knowledge spillovers, and growth. *European Economic Review*, 35(2–3), pp.517–526. Available at: <http://linkinghub.elsevier.com/retrieve/pii/001429219190153A>.

Halicioglu, F. (2009). An econometric study of CO2 emissions, energy consumption, income and foreign trade in Turkey. *Energy Policy*, 37(3), pp.1156–1164. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0301421508007027>.

Harbaugh, W.T., Levinson, A. & Wilson, D.M. (2002). Reexamining the Empirical Evidence for an Environmental Kuznets Curve. *Review of Economics and Statistics*, 84(3), pp.541–551. Available at: <http://www.mitpressjournals.org/doi/10.1162/003465302320259538>.

Hossain, M.S. (2011). Panel estimation for CO₂ emissions, energy consumption, economic growth, trade openness and urbanization of newly industrialized countries. *Energy Policy*, 39(11), pp.6991–6999.

Hossain, S. (2012). An Econometric Analysis for CO₂ Emissions, Energy Consumption, Economic Growth, Foreign Trade and Urbanization of Japan. *Low Carbon Economy*, 3(3), pp.92–105. Available at: <http://www.scirp.org/journal/doi.aspx?DOI=10.4236/lce.2012.323013>.

Jayanthakumaran, Verma & Liu. (2012). CO₂ emissions, energy consumption, trade and income: a comparative analysis of China and India. *Energy Policy*, 42, pp.450–460.

Kohler, M. (2013). CO₂ emissions, energy consumption, income and foreign trade: A South African perspective. *Energy Policy*, 63, pp.1042–1050. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0301421513009464>.

Lacheheb, M., Rahim, A.S.A. & Sirag, A., 2015. Economic growth and CO₂ emissions: Investigating the environmental Kuznets curve hypothesis in Algeria. *International Journal of Energy Economics and Policy*, 5(4).

Moomaw, W.R. & Unruh, G.C., 1997. Are environmental Kuznets curves misleading us? The case of CO₂ emissions. *Environment and Development Economics*, 2(4), p.S1355770X97000247. Available at: http://www.journals.cambridge.org/abstract_S1355770X97000247.

Pao, H.-T. & Tsai, C.-M., 2010. CO₂ emissions, energy consumption and economic growth in BRIC countries. *Energy Policy*, 38(12), pp.7850–7860. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0301421510006609>.

Sadorsky, P., 2010. The impact of financial development on energy consumption in emerging economies. *Energy Policy*, 38(5), pp.2528–2535.

Sebri, M. & Ben-Salha, O., 2014. On the causal dynamics between economic growth, renewable energy consumption, CO₂ emissions and trade openness: fresh evidence from BRICS countries. *Renewable and Sustainable Energy Reviews*, 39, pp.14–23.

Shafik, N., 1994. Economic Development and Environmental Quality: An Econometric Analysis. *Oxford Economic Papers*, 46(Supplement_1), pp.757–773. Available at: <https://academic.oup.com/oep/article/2568539/Economic>.

Tamazian, A. & Rao, B.B., 2010. Do economic, financial and institutional developments matter for environmental degradation? Evidence from transitional economies. *Energy Economics*, 32(1), pp.137–145.

Wei, Y.-M. et al., 2007. The impact of lifestyle on energy use and CO₂ emission: An empirical analysis of China's residents. *Energy Policy*, 35(1), pp.247–257. Available at: <http://linkinghub.elsevier.com/retrieve/pii/S0301421505003022>.

World Bank, 2016. World Development Indicators, 1960 - 2016. Available at: <http://data.worldbank.org/data-catalog/world-development-indicators>.

Zhang, Y.J., 2011. The impact of financial development on carbon emissions: An empirical analysis in China. *Energy Policy*, 39(4), pp.2197–2203.

ID088 – Presenteeism Vs Productivity Perception of the Malaysian Female Labour Market

^{1*}Geetha Subramaniam, ²Bala Maniam, ³Ratneswary Rasiah, ¹Siti Maharah Binti Dzulkarnain

¹Faculty of Business And Management, Universiti Teknologi MARA, Puncak Alam
Selangor, Malaysia

² Sam Houston State University, Texas, USA

³Taylor's Business School, Taylor's University, Subang Jaya 47500, Selangor, Malaysia

Abstract

In today's dynamic work environment, flexible working arrangements are nothing new in many developed countries where many flexible options are provided at the workplace. However, the issue is employers still relate presenteeism with productivity. In a developing country like Malaysia, women employees still face a great challenge of balancing work and home which has a significant economic effect on the labour market. While flexible working arrangements (FWA) have been provided by multinationals and are being encouraged by the Malaysian government, most employers do not provide this work option. Using a self-administered questionnaire, 256 working women were surveyed to examine their perception of FWA in Malaysia. The main aim of this study was to examine to what extent do the women perceive that FWA may have an impact on their productivity at work. The results from this study show that age is an important demographic factor which influences the demand for FWA among working women in Malaysia. Interestingly, it was found that women in the Generation X category favour FWA as compared to Generation Y women. The results also show that nature of work, perceptions about FWA and family friendly policies have significant influence on the demand for FWA. Providing support network and incentives in terms of tax deduction will encourage more employers to provide FWA and this should be the policy in place. These results have a far reaching implication on talent loss and the Malaysian labour market if workplace strategies are not implemented immediately.

Keywords: flexible working arrangements; productivity; working women

1. INTRODUCTION

In today's dynamic work environment, flexible working arrangements (FWA) are nothing new in many developed countries where many flexible options are provided at the workplace. Flexible working arrangement (FWA) is a work arrangement that allows people to make changes on the hours they work or the location they work from.

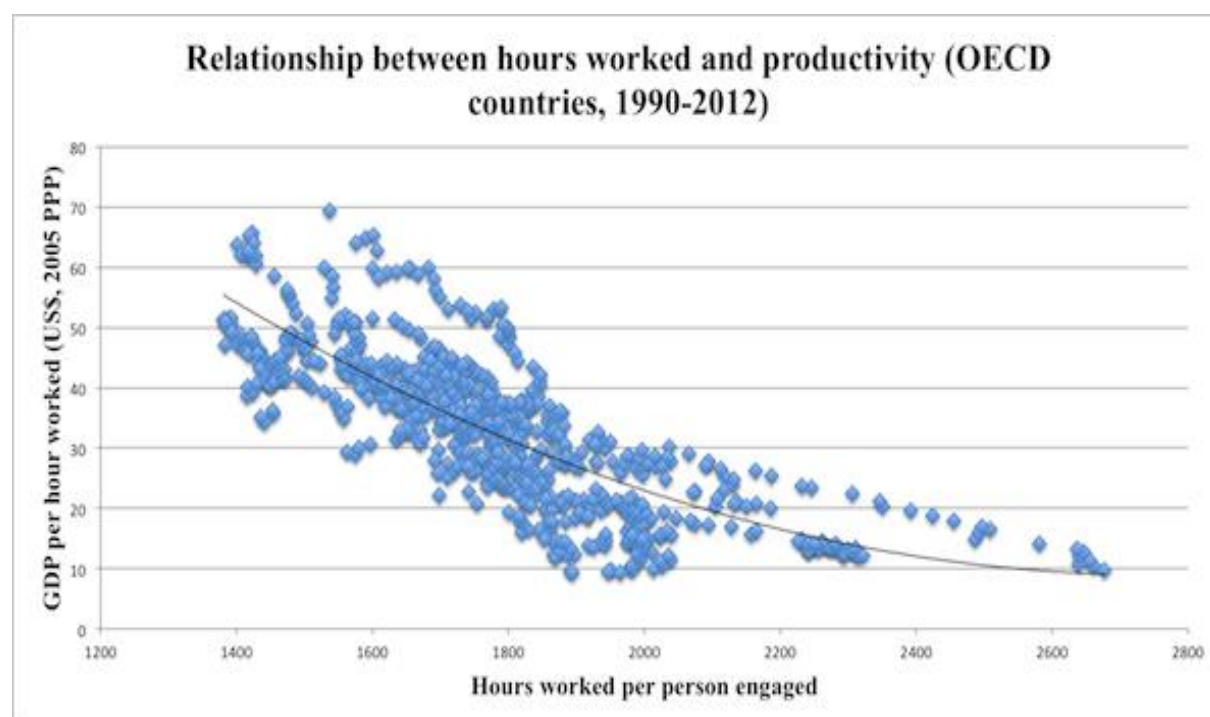
In a developing country like Malaysia, while women are recognised as a key economic resource in the labour market, accounting for 70 percent of university enrolment, a large proportion of them are not in paid labour compared to most Asia Pacific countries. Labour force statistics show that only 54.3% of women of working age are in the workforce, while one of the national goals of the 10th Malaysia Plan was to attain a higher female labour force participation rate of 55% by 2015 (Talentcorp, 2015).

* Corresponding author: e-mail:geethamaniem@gmail.com

1.1 Problem statement of the study

Based on the Malaysian female labour force participation rate (LFPR) most of the working women are in the age range between 25 to 34 years which is considered the peak and this figure tends to decline after 35 years. Unlike the double-peaked female LFPR pattern observed in most countries, Malaysian women do not return to the labour force after marriage and childbirth. Hence, it creates a single-peaked profile of female LFPR in Malaysia and this has made Malaysia one of the very few countries having a single-peak female LFPR pattern in the region (Subramaniam, 2011). Work-family advocates have long championed the implementation of FWAs to positively influence female LFPR in paid labour. While FWAs have been provided by multinationals and are being encouraged by the Malaysian government, most employers do not provide this work options. However, the main issue in this study is employers still relate presenteeism with productivity. Presenteeism refers to fixed working schedules and being visible at the workplace.

Figure 1 shows the relationship between hours of working and productivity by OECD countries. As we can see, the more the hours per person are engaged, the lower is the Gross Domestic Product (GDP) per hour of working by the OECD countries. Working arrangement can influence employees' productivity because some of them will value their time to leisure activities. The more they are at the workplace, the more stressful they are, so this translates to lower productivity.



Source: OECD data

Figure 1: Working Hours and Productivity

This study hence attempts to examine to what extent do the Malaysian women perceive that FWAs may have an impact on their productivity at work.

This study employed a quantitative method with 256 female employees answering a self-administered questionnaire. Using a regression analysis, this exploratory study tried to examine how the employees perceive the relationship between workplace flexibility and productivity. This paper finally concludes with discussions on family friendly policies and long-term measures which might have an effect on women's continued participation in the labour market.

1.2 Literature review

Flexible working arrangements (FWAs) are work practices (explained by the employer in employment policies and contracts) that allow the employees a certain degree of freedom in deciding how the work will be done and how they will coordinate their schedules with those of other employees.

The basic economic theory of labour supply theory discusses the total hours that workers are willing to work at a given real wage rate and shows that an increase in the real wage rate would increase the number of people willing to work; therefore, it will increase the supply. However, the hours of work do not only depend on the income itself; other non-labour income also influences such changes. In addition, in recent years, technological changes in the labour market have allowed an increasing number of workers to do much of their work at home, which further changes labour supply incentives. A recent study also reports that women who find it expensive to enter the employees market such as women with small children have strong incentives to use their home as their work base. The prevalence of home-based work will likely rise as firms discover and adopt new technologies which allow them to out-source much of their work to other sites (Borjas, 2013).

Studies show that firms enjoyed positive outcomes created by FWAs. Productivity increased, as work effort and hours intensified among employees who enjoyed flextime. Productivity gains from flextime are rooted in an employee's willingness to maintain equilibrium between themselves and employers. Since the employer has created a positive social exchange benefiting their employees which is flexible time, the worker is interested in maintaining equity and adapts by performing better. Employee's productivity has a close relationship with economic growth. The workplace environment plays a crucial role for the employees. According to Leblebici (2012), it is proven that workplace environment affects employee's performance and productivity. This is further supported by Akinyele (2000) who shows that a conducive and better work environment can lead to improvement in employees' productivity.

Working arrangement can influence employees' productivity because some of them will value their time to leisure activities. The more they are at the workplace, the more stressful they are, so they turn to translate it to lower productivity. Rigid working hours will only make employees feel depressed; consequently, it will affect their productivity in the workplace and resulted in low output and low GDP. Hence, FWA is considered one of the working environments which can influence employees' productivity.

Existing literature shows that women's participation in the labour force is affected to a large extent by their workplace environment and their working hours which has a bearing on their participation in the labour market (Kaur, 2004; Subramaniam, Mohamad & Selvaratnam, 2010). Therefore, it might be pertinent to look at the link between FWAs, presenteeism and productivity and women's participation in the labour market which is the main focus of this study.

2. METHODOLOGY

This exploratory study used a survey approach using a self-administered questionnaire to examine the perception of female employees in Malaysia.

A pre-test was done to check questionnaire comprehension and to correct any ambiguity. Target population of this study is working women in Malaysia based on four selected industries namely, education, manufacturing, banking and finance and services. The four industries which were identified was based on the Labour Force Statistics Report (2016) which showed that most Malaysian women employees were concentrated in these four

industries. Using purposive sampling in the 4 industries, questionnaires were distributed to 300 respondents, either through face to face or online. However, only 256 questionnaires were usable.

This study was done in Malaysia including Sabah and Sarawak in late 2017 and it took a month to complete the questionnaire distribution and data collection the data. Using descriptive statistics and regression analysis, the study tried to examine the perception of employees regarding presenteeism and productivity.

3. RESULTS AND DISCUSSION

In an attempt to identify to what extent women employees perceive that FWAs will have an influence on productivity, based on Jones (2006) a Likert scale statement was posed to the respondents, where 1- refers to “do not agree at all” and 5 refers to “totally agree”. The statement was “FWAs increase productivity levels as employees are able to schedule their work accordingly”.

As shown in Figure 2, 94 percent of the women employees perceived that if they could have flexibility in scheduling their work, their productivity will increase. These findings conform to studies done by Leblebici (2012) and also Akinyele (2000). Interpreting this statement shows us that majority (94%) of the respondents agreed that one way to increase their productivity is by providing FWAs at the workplace. Thus, the employers have to consider this policy if they want their organization to be successful because if productivity increases, the profits will also be maximized.

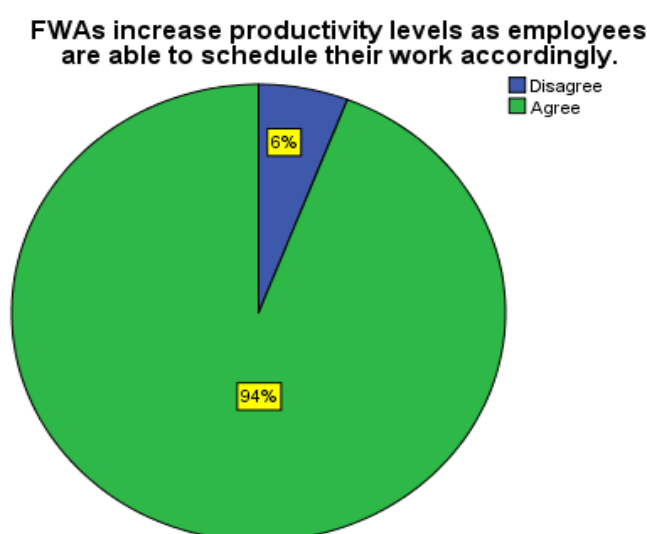


Figure 2 – Women employees' perceptions towards FWA and productivity

Table 1- Perception of women employees towards productivity and demand for FWA

Variables	Category	Interested in FWA		Not Interested in FWA		Significance Level
		n	%	n	%	
FWAs increase productivity levels as employees are able to schedule their work accordingly	Agree	220	91	21	9	0.000***
	Disagree	8	53	7	47	
TOTAL		228		28		

***Significant at 0.01 significant level

Further analysis was done using cross tabulation analysis to examine how many women are interested in FWAs whether or they do not mind working fixed schedules. Out of 256 female employees, 89 percent reported that they were interested in FWAs, meaning that they didn't favour presenteeism or visibility. Table 2 also reveals that out of the 241 respondents who agree that FWA increases productivity levels as employees are able to schedule their work accordingly, only 91 per cent of them are interested to have FWA whereas another 9 per cent of the respondents are not interested in FWA. In contrast, while 15 of the respondents disagree that FWA increases productivity levels of the employees, 53 per cent still prefer to have FWA whereas 47 per cent of them are not interested in FWA. This table shows that women who are interested in FWA feel that FWAs will increase their productivity and they do not need to be present to be productive.

Table 2 - Demographic factors which affect women's demand for FWA

Variables	Category	Interested in FWA		Not Interested in FWA		
		n	%	n	%	
Age	Gen Y (17 – 38)	189	88	27	13	0.063*
	Gen X (39 – 49)	39	98	1	3	
Ethnicity	Malay	179	88	24	12	0.842
	Indian	15	94	1	6	
	Chinese	27	90	3	11	
	West Malaysia	7	100	0	0	
Marital status	Married	141	90	15	10	0.397
	Single	87	87	13	13	
Educational Level	SPM/STPM/Diploma	97	87	13	13	0.452
	Undergraduate/ Post Graduate	131	90	14	10	
Location	Kuala Lumpur	57	88	8	12	0.739
	Selangor	139	90	15	10	
	Other places	32	87	5	14	
Work status	Full Time	208	89	26	11	0.772
	Part Time	20	91	2	9	
Industry	Education	61	90	7	10	0.903
	Manufacturing	36	88	5	12	
	Banking & Finance	44	92	4	8	
	Services	87	87	12	12	
Employment level	Administrative	99	89	12	11	0.890
	Middle management	70	88	10	13	
	Higher management	14	88	2	13	
	Academician	45	92	4	8	
Occupational sector	Private	134	89	16	11	0.651
	Government/Statutory Body/GLC	80	90	9	10	
	University	14	82	3	14	
Monthly income	Less than RM2000	82	85	14	15	0.344
	RM2001 to RM3000	69	89	9	12	
	RM3001 to RM5000	59	94	4	6	
	RM5001 & above	18	95	1	5	
TOTAL		228		28		

As can be seen from Table 2, age has a significant effect on women's interest in FWAs. Besides, a higher percentage (98%) of Generation X (Gen X) or the older women employees favour FWAs compared to the younger women. Also among Generation Y (Gen Y) or also known as the IT generation, employees aged below 40 years who are on social media and prefer to communicate through email and text messages, 88 percent of them prefer FWAs. However, this finding is in contrast with the study done by Subramaniam et al. (2015) which revealed that age does not significantly influence the demand for FWA. This could be due to the age of the respondents in this study who are majority of them in the 20 to 29 years old age category.

Many studies have shown that by improving the working environment such as modifying the working arrangements may reduce complaints and absenteeism besides increasing productivity (Roelofsen, 2002). By improving working environment will result in a reduction in the number of complaints and absenteeism which in turn will increase employees' productivity.

Using a multiple regression analysis, this study further tried to examine whether nature of work, working environment and perception on flexible working time will have an influence on the demand for FWAs and hence productivity.

Table 3- Anova Table

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	40.779	4	10.195	65.196	.000 ^b
Residual Total	39.249	251	.156		
	80.027	255			

Dependent Variable: FWA increase productivity levels as employees are able to schedule their work accordingly

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	.225	.265		.850	.396
now	.031	.009	.180	3.597	.000
np	-.027	.009	-.149	-3.100	.002
pp	.083	.007	.558	11.368	.000
ffp	.033	.009	.177	3.754	.000

a. Dependent Variable: FWA increases productivity levels as employees are able to schedule their work accordingly.

where:

now = nature of work

np = negative perception on flexible working time

pp = positive perception on flexible working time

ffp = family friendly policies.

The Regression model is as follows:

$$\text{Demands for FWA} = \alpha + \beta_1 \text{now} + \beta_2 \text{np} + \beta_3 \text{pp} + \beta_4 \text{ffp} + \varepsilon$$

$$\text{Demands for FWA} = 0.225 + 0.031 \text{now} - 0.027 \text{np} + 0.083 \text{pp} + 0.033 \text{ffp} + \varepsilon$$

The results show that nature of work (now), negative perception on flexible working time (np), positive perception on flexible working time (pp) and family friendly policies (ffp) have an influence on the demands for FWA. Overall, it can be concluded that positive perception (0.558) has the greatest influence on the demands for FWA, followed by nature of work (0.180), family friendly policies (0.177) and negative perceptions (0.149). In addition, the demand for FWA has a positive relationship with nature of work, positive perception on flexible working time, and family friendly policies but possess a negative relationship with negative perception on flexible working time. This result confirms to the study done by Albion and Chee (2006) who found that individual work life balance is reflected in more positive interactions within the workplace and FWA is recommended for people who want to balance their life and work.

Weiss (2000) found that workplace satisfaction will lead to job satisfaction. In addition, job satisfaction is determined by workplace conditions and environment which has been recognized as one of the important factors in measuring productivity. The working condition was found to have the biggest effect on productivity in relation to job stress and job dissatisfaction. Patterson, West, Lawthorn and Nickell (2003) also found the evidence that the more satisfied the workers are with their jobs, the better the company is likely to perform in terms of profitability and particularly productivity.

4. CONCLUSIONS AND RECOMMENDATIONS

Based on this study, the main conclusions which can be drawn are: firstly, there is a positive link between FWAs at the workplace and productivity. This means that the respondents do not perceive that presenteeism is important for productivity. Secondly, majority of the respondents (89%) of the respondents in this study prefer to have FWA in their workplace due to their positive perceptions on flexible working time. Thirdly, age is the only demographic factor which has an influence on the demand for FWAs. In this study, Generation X favour FWAs as compared to those from Generation Y. Finally, nature of work, negative perceptions on flexible working time, positive perceptions on flexible working time, and family friendly policies have significant effects on the demands of FWA because they think FWAs can increase their productivity levels as they are able to schedule their time accordingly.

It is hoped that as more female students graduate and enter the labour market, participatory decision-makers will design work policies to ensure women have flexibility at their workplace. At a micro level, employers should try to reap the local talent of an educated labour force by formulating work policies which are more flexible. Many FWAs policies such as flexi-work time and working from the home, create a positive and friendly workplace environment with less traffic congestion and better family management. At the macro-level, the Malaysian government has been supportive of FWAs at the workplace, but the state should play a more proactive role in implementing, regulating and monitoring the implementation of these policies. More incentives should be given to organizations which facilitate FWAs and other family friendly policies.

The most apparent implication from this study is for organizations to implement FWAs which may provide workplace flexibility and this can be a possible tool to retain women in the labour market as it allows women to juggle the double burden of work and home. Another pertinent point is that workplace flexibility will encourage women who quit the labour force to re-enter the labour market again. Even though FWAs are very beneficial, it is acknowledged that FWAs are not a comprehensive package but should be carefully implemented on a case to case basis. This study only looked at a small sample throughout the country, so future studies should look at a larger sample to draw further conclusions and to recommend policy implications.

As Malaysia moves towards achieving an industrialised nation status, for effective policies to be successful, a change in mindset is highly crucial as women's decision to participate in the labour market starts from the home. Hence by leveraging on the idea of FWAs as a strategic approach, employers, society and the nation can empower women and the end result will be a win-win strategy.

Encouraging more employers to provide FWAs by providing the support network and incentives in terms of tax deduction should be the policy in place. These results have a far reaching implication on talent loss and the Malaysian labour market if workplace strategies are not implemented immediately.

References

- Akinyele, S.T. (2000). *The Influence of Work Environment on Workers Productivity*. African Journal of Business Management. Vol.4-3 pp. 299-307.
- Albion, M. J. & Chee, M. (2006). *Flexible Work Options within Organisational System*. University of Southern Queensland, Toowoomba.
- Borjas, G. J. (2013). *Labor Economics*. Singapore: McGraw Hill Company.

Leblebici, D. (2012). *Impact of workplace quality on employee's productivity: Case study on a bank in Turkey*. Volume 1. Issue 1. Turkey' Okan University.

Mystaronline (2013). Budget 2014: *Human capital development the biggest beneficiary* Retrieved November 7, 2014 from <http://www.thestar.com.my/Business/Business-News/2013/10/26/Human-capital-development-the-biggest-beneficiary/?style=biz>

Patel, S. (2012). *Determinants of Women's Labour Force Participation Rate in India: An Econometric Analysis*, 5997 (May).

Subramaniam, G., Overton, J. & Maniam, B. (2015) "*Flexible Working Arrangements, Work Life Balance and Women in Malaysia*," *International Journal of Social Science and Humanity*, vol. 5, no. 1, pp. 34-37, January 2014.

Subramaniam, G. (2011). *Flexible Working Arrangements in Malaysia and the Participation of Women in the Labour Force*. Doctoral Thesis. Victoria University of Wellington.

The Times of India. (2015). *Let workers have quality family time*. Retrieved May 17, 2015 from <http://timesofindia.indiatimes.com/lifestyle/relationships/work/Let-workers-have-quality-family-time/articleshow/46918796.cms>

Todaro, M, P., & Smith S.C (2011). *Economic Development*. United States: Pearson Education Limited. 11th Edition.