Australian Journal of Basic and Applied Sciences, 9(11) Mayl 2015, Pages: 298-306

ISSN:1991-8178

Australian Journal of Basic and Applied Sciences

Journal home page: www.ajbasweb.com

Regression Model Building and Forecasting on Imports in Malaysia

Mohamed A.H. Milad, Rose Irnawaty Ibrahim, Samiappan Marappan

Universiti Sains Islam Malaysia (USIM) ,Mathematical Finance, Faculty of Science & Technology, Bandar BaruNilai, 71800 Nilai, Negeri Sembilan, Malaysia

ARTICLE INFO

Article history:
Received 12 December 2014
Received in revised form 26 December 2014
Accepted 28 January 2015
Available online 1 April 2015

Keywords:
Forecast; Malaysia 'imports; Regression analysis; Stepwise multiple regression.

ABSTRACT

Background: Linear regression analyses fall into six different kinds namely; simple linear regression, multiple linear regression, logistic regression, ordinal regression, multinomial regression and discriminate analysis(Ghani and Ahmad.2010).Conducting linear regression analysis aims for analyzing and modeling relationships between a dependent variable and one or more independent variables using various techniques. The current study used a stepwise multiple regression which is known as a combination of forward selection and backward elimination method. **Objective:** The study reported in this paper mainly aimed at selecting the suitable controlled variables in the forecast Malaysia's imports. The study will be limited to six variables which are the exchange rate, producer price index of imports of (MT), G.D.P, the value of exports of (MT), the average of tariff tax of imports of (MT), the average sales tax of imports of (MT). According to the data available, the time frame for this study will be determined by using quarterly data covering the period from 1991 to 2013 (the period of building the model). **Results:** Based on the results obtained from the stepwise regression method, It was found that the dependent variable follows the normal distribution with the level of significance 0.01.The four multiple regression models were also estimated and were found to be all good in terms of the coefficient of determination R2.It was found that the first and fourth models are good in terms of VIF, but the first model is the best among all models. By performing the test of Durban Watson, results showed that the linear model suffers from the problem of autocorrelation in residuals. However, after treating the model and solving the problem, we obtained an effective model which does not suffer from this problem and is capable of prediction, and consistent with the economic theory in terms of signal parameters. It was also found that the first model is good in terms of its predictive ability. Diagnostic measures showed that the model is very suitable for predicting. **Conclusion:** it was found that only three controlled variables which are G.D.P, the value of exports and the average of Tariff tax were selected in this study, and consistent with the economic theory in terms of signal parameters. This indicates that only these variables affect the value of imports of (MTE) in Malaysia.

To Cite This Article: Mohamed A.H. Milad, Rose Irnawaty Ibrahim, Samiappan Marappan, Regression Model Building and Forecasting on Imports in Malaysia. ***Aust. J. Basic & Appl. Sci.,*** *9(11): 298-306, 2015*

INTRODUCTION

The imports in the world occupy a big place. It has been proven that there is a relationship between imports and economic growth of any country. As stated in (Liu. 2001), (Chen 2009), (Azgun and Servinc 2010), (Alam, *et al*. 2009), (Wong. 2004), and (Kogid, *et al*. 2011) concluded that imports have an impact on the economic growth in the Malaysian context, and he recommended that future research should focus on investigating the imports. Based on this, the current work reported in this paper attempted to build an appropriate statistical model for predicting the value of imports in Malaysia. In order to help Malaysia to draw imports policies in the future, we developed a decision support system for forecasting Malaysia' imports by computing forecasting values for production of imports in Malaysia from first quarter 1991 to the fourth quarter 2013. This was achieved by using a regression analysis. The regression approach enables meaningful interpretation of the data obtained. In other words, it provides an objective and systematic approach to modelling and forecasting discrete time series. According to (Ghani and Ahamad. 2010), there are six kinds of linear regression analyses. The current study used a multiple linear regression for the purpose of building a model of Malaysia's imports. Some other methods which are classified under the stepwise type or stepwise regression were also used in the present study. The study mainly aimed at selecting the suitable controlled variables in

Corresponding Author: Dr. Rose Irnawaty Ibrahim, Universiti Sains Islam Malaysia (USIM) ,Mathematical Finance, Faculty of Science & Technology, Bandar BaruNilai, 71800 Nilai, Negeri Sembilan, Malaysia.
Tel: +60132915541. E-mail: rose.irnawaty@usim.edu.my

Australian Journal of Basic and Applied Sciences, 9(11) Mayl 2015, Pages: 298-306

forecasting the Malaysia's imports. As reported by the Department of Statistic in Malaysia, the classification of imports differs according to their objectives. The following study uses the (SITC) classification developed by the United Nations and in which, imports of commodities are divided into 10 parts as in Figure (1) below, but the major focus of the present study is the imports of Machinery and Transport Equipment (MTE) in Malaysia.

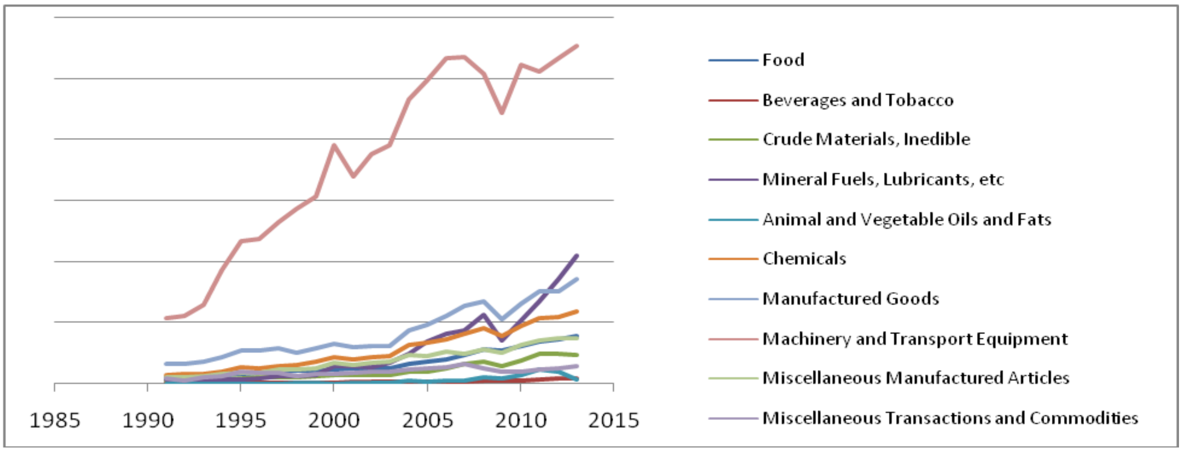

Fig. 1: Value of imports in Malaysia during the study period: 1991 to 2013.

Notation and Abbreviation:

The following notation and abbreviation are used. MTE: Machinery and Transport Equipment, SITC: Standard International Trade Classification, D.W: Durbin Watson, VIF: Variance inflation factor, R^2: coefficient of determination, PPI: Producer Price Index, GDP: Gross Domestic Products, MLR: Multile linear regression.

Literature review:

(Alias. 1978) reported an econometric study of a dynamic import function for West Malaysia using a time-series data for the period from 1960 to1974. The theoretical basis of the investigation is a postulated behavioural relationship between the quantity of imports including goods and services and several explanatory variables namely; relative prices, lagged imports and gross national product. The function form was linear-linear, and the results from the most preferred regression equation showed that the coefficients for the relative price variable and income variable (represented by gross national product) are significant. However the coefficient for lagged imports was insignificant. This was due to the problem of multicollinearity, and the estimated R^2 ranging from a low of 0.65 as in the first equation to a high of 0.90 as in the last equation. (Abu Bakar 2000) used a multiple linear regression concept to analyze the long-run relationship of Malaysia's import demand function, and the dynamic OLS method and the Johansen Maximum Likelihood were used. Two variables which were used in their research were real GDP and price. The function form was log-log. The results from the most preferred regression equation show that the R^2 = 0.48, S.E of Regression = 0.18, DW= 2.14, and F-stat = 4.25. (Tang and Nair. 2002) also presented an empirical analysis of the aggregated import demand behaviour for Malaysia by using a regression method to analyze the long-run elasticises of import demand with respect to the income and relative prices. The regression formula was a log-log regression, and the results from the most preferred regression equation show that the R – Squared = 0.782, DW= 2.407, F-stat = 4,25 ,and Sum Squared Error = 0.116. In addition, (Arshad, el at. 2011) used a multiple linear regression method in selecting the suitable controlled variables of Malaysia 'imports of palm oil. The three variables used in their research are G.D.P, Real world price of palm oil, stock, and real world price of soybean oil. Estimated structural equation was linear-linear, and R^2 = 0.5607 , F-stat = 10.25, DW = 2.1839. The relevant DW-Statistic and F- stat showed that the autocorrelation is not series. All the variables expected signs and significant coefficients except stock of palm oil with correct sign but insignificant value. (Prambudia and Nakano. 2012) used a multiple linear regression concept to analyze the relationship of Malaysia's oil import demand function for the period 1985–2009. According to their study, it was found that imports were affected by two factors: oil production and consumption. The results show that the function form was linear-linear and coefficient of determination equal to 0.92. (Mohamed, el at.2014) considered variables such as exchange rate, tariff, sales tax, producer price index , and value of export in previous years and used the regression method to forecast future values of imports in Malaysia.

Methodology:

Data:

The data covered a period of 23 years starting from the first quarter of 1991 until the fourth quarter in 2013.The major focus of the present study was the imports of Machinery and Transport Equipment in Malaysia. Table (1) shows the data definitions and sources used in the present study.

Table 1: Data definition and sources.

Variable	Definition	Source
The value of imports of (MTE).	The value of imports of (MTE) of Malaysia, unit (Million RM)	Department of Statistics Malaysia.
The value of exports of (MTE).	The value of export of (MTE) of Malaysia, unit (Million RM).	Department of Statistics Malaysia.
PPI of (MTE)	PPI (producer price index) constitutes local production and import price indices of (MTE), 2005=100.	Department of Statistics Malaysia.
G.D.P	Gross domestic product, 2005=100.	Department of Statistics Malaysia.
Exchange Rate	Exchange Rate ,against the USD.	Bank Negara Malaysia
Tariff tax	The average of tariff tax of imports of (MTE).	Royal Malaysian customs department.
Sales tax	The average sales tax of imports of (MTE).	Royal Malaysian customs department.

Research method:

Using a multiple regression analysis, the relation between the value of imports and its influence factors was investigated by analyzing the exchange rate, producer price index, G.D.P., the value of exports, the average of tariff tax, and the average sales tax and the model was revised and completed. There were five general steps to build a forecasting model of imports in multiple linear regressions. The general steps were checking assumptions, developing equitation of multiple linear regression, regression model and hypothesis, predictive ability, and diagnostic measures.

Step1: Checking assumption:

Table 2: Partal Correlation Coeficient.

Second Variables	First Variables				
	Exchange rate x_1	Price index x_2	G.D.P. x_3	Exports x_4	Tariff tax x_5
Price index x_2	0.650				
Sig.	0.000				
G.D.P. x_3	-0.793	0.869			
Sig.	0.000	0.000			
The value of exports x_4	0.549	-0.007	0.421		
Sig.	0.000	0.951	0.000		
The average of tariff tax x_5	-0.219	0.194	-0.289	-0.154	
Sig.	0.041	0.070	0.006	0.152	
The average sales tax x_6	0.307	-0.324	0.547	-0.382	0.334
Sig.	0.004	0.002	0.000	0.000	0.001

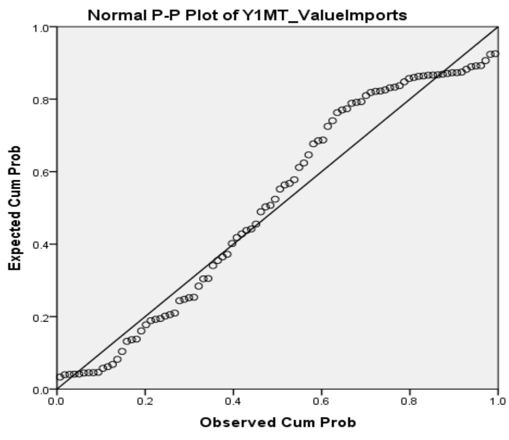

Fig. 2: Normal P-P plot of Malaysya'imports of Macinery and Transport Equipment (MTE).

There is a weak relationship between the average of tariff tax x_5 and all other variable, and there is also a weak relationship between the price index x_2 and the value of exports x_4 while there is a significance partial correlation between other variables.

Four assumptions were applied in the study namely; normality, linearity, heteroscedasticity and multicollinearity as stated by (Ghani and Ahmad. 2010). Dependent variable must follow a normal distribution which can be seen via a chi-squared test (when $n > 30$), histogram graph, plot P-P, plot Q-Q, kurtosis and skewness. In case the distribution of the data is not normal, it is important to use transformation. From the chi-square test, the normality assumption was accepted.(p>0.01).

Figure 2: It is the shape we find points clustered around the line and thus the data (residuals) were distributed according to the normal distribution.

Then, it is important that a multiple linear regression should show a linear relationship pattern between the response variable and controlled variables. In the regression the model of this study, the fit is a linear mode adopted from (Andy .2005) and which shows that the 'linear model' just means a 'model which is based on a straight line'. In checking whether each two variables are related to each other, we used the Pearson linear correlation by measuring the linear relationship using a simple correlation analysis between the dependent and independent variables.

Table 3: Chi-Squared Goodness of fit test, Chi-Square = 7.02005, *df* = 2, *p* = 0.02990.

	Observed Frequency	Percent Observed	Expected Frequency	Percent Expected	Observed Expected
< 20000	12	13.04348	7.52369	8.17792	4.47631
20000-35000	17	18.47826	17.99562	19.56046	-0.99562
35000-50000	21	22.82609	28.20164	30.65395	-7.20164
50000-65000	22	23.91304	24.00349	26.09075	-2.00349
> 65000	20	21.73913	14.27556	15.51692	5.72444

Table 4: Correlations between dependent variable and independent variables.

Dependent Variable	Independent Variables					
	Exchange rate x_1	price index x_2	G.D.P. x_3	The value of exports x_4	The average of tariff tax x_5	the average sales tax x_6
Correlation	0.538	0.935	0.902	0.957	-0.809	-0.118
Sig.	0.000	0.000	0.000	0.000	0.000	0.263

Using a 0.01 particular significance level and 0.05 significance level, there is a significance positive linear correlation between the value of imports and the influence factors in terms of their exchange rate, PPI, G.D.P, and the value of exports. There is a significance negative linear correlation between the value of imports and the average of tariff tax. Secondly, there is no significance linear correlation between the value of imports, and the average sales tax. It is also assumed according to MLR that any data should be free from heteroscedasticity which is expected to occur in a case when an interruption in the model is not fulfilled. For instance, in case of having missing important variables in the model, there will be heteroscedasticity. Thus, in checking the heteroscedasticity in any model, on Spearman's rank correlation test should be carried out or based on F – test.

Step 2: Developing Equation of Multiple Linear Regression:

In this research, the hypotheses that used:

$H_0 : \beta_1 = \beta_2 = ... = \beta_6$

H_1 : At least one of the $\beta_1, \beta_2, ... and \beta_6$, does not equal to 0

Which says that

H_0 : None of the controlled variables $x_1, x_2, x_3, x_4, x_5, and x_6$ is significantly related to y.

H_1 : At least one of the controlled variables $x_1, x_2, x_3, x_4, x_5, and x_6$ is significantly related to y.

The model of multiple linear regression can be represent as:

$$y_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + ... + \beta_6 x_{6t} + et$$

Where

y_t =Dependent variable (The value of imports), at period t .

β_0 = Constant variable.

β_1 = Coefficient of first control variable, x_1

β_2 = Coefficient of second control variable, x_2

β_3 = Coefficient of third control variable, x_3

β_4 = Coefficient of fourth control variable, x_4

β_5 = Coefficient of fifth control variable, x_5

β_6 = Coefficient of sixth control variable, x_6

$x_{1t}, x_{2t}, x_{3t}, x_{4t}, x_{5t}, and x_{6t}$ are called predictor variables or independent variables at period *t*.
Where

x_{1t} = Independent variable (Exchange rate).

x_{2t} = Independent variable (PPI of MTE).

x_{3t} = Independent variable (G.D.P).

x_{4t} = Independent variable (The value of export of MTE).

x_{5t} = Independent variable (The average of tariff tax of imports of MTE).

x_{6t} = Independent variable (The average sales tax of imports of MTE).

e_t = The random Error.

Table 5: Model Summary.

Model	R^2 (%)	adjusted R^2 (%)	$D.W$	F -Test	Sig.
Model 1 - Linear- Linear	96.2	96.0	1.29075	737.35	0.000
Model 2 - Log-Log	97.59	97.45	1.03615	696.42	0.000
Model 3 - Log-linear	95.16	94.94	0.918121	427.77	0.000
Model 4 - Linear-log	95.6	95.47	0.684	631.274	0.000

Model 1: The model summary is based on Table 5. The model of multiple linear-linear regression can be represented as follows:

$$y_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + ... + \beta_6 x_{6t} + e_t$$

The model summary is based on Table 5. The value of R^2 calculated as. 9617 (Model 1) reveals almost 96.17% changes in the response variable y_t and their occurrence could be due to the changes in the combination of the three controlled variables which are. $x_3, x_4, and x_5$.

Model 2: The model of multiple log-log regression can be represented as:

$$Lny = \beta_0 + \beta_1 Lnx_{1t} + \beta_2 Lnx_{2t} + ... + \beta_6 Lnx_{6t} + e_t$$

From Table 5, the value of R^2 calculated as .9759 (Model 2) indicates that there are 97.59% changes in the response variable y_t which took place as a result of the changes in the combination of five controlled variables namely; $x_{1t}, x_{2t}, x_{3t}, x_{4t}, and x_{6t}$.

Model 3: The model of multiple log-linear regression can be represented as the following:

$$Lny_t = \beta_0 + \beta_1 x_{1t} + \beta_2 x_{2t} + ... + \beta_6 x_{6t} + e_t$$

From Table 5, it is evident that the value of R^2 is .9516 (Model 3), and there are 95.16% changes in the response variable y_t . These changes can be attributed to the changes in the combination of the four controlled variables: $x_{1t}, x_{3t}, x_{4t}, and x_{5t}$.

Model 4: The model of multiple linear-log regression can be represented as:

$$y_t = \beta_0 + \beta_1 Lnx_{1t} + \beta_2 Lnx_{2t} + ... + \beta_6 Lnx_{6t} + e_t$$

Based on Table 5, the value of R^2 is .9567 (Model 4), which shows that there are 95.67%, changes in response variable y_t that occurred because of the changes in the combination of the three controlled variables: $x_{3t}, x_{4t}, and x_{6t}$.

By comparing the four models, Model 2 is a better model that fits the data better than Model 1, Model 3and Model 4. This is because the higher the value of R^2 and adjusted R^2 (Model1= .9604; Model 2 = .9745; Model 3 =0.9494 and Model 4 =0.9547).

Table 6: Stepwise regression results:

Model		Coefficients	Standard Error	t -value	Significance Value	VIF
1	Constant	14058	2174.000	6.47	0.000	
Linear-Linear	x_{3t}	0.099	0.011	9.39	0.000	3.112
	x_{4t}	0.474	0.037	12.91	0.000	4.507
	x_{5t}	-18646.000	4937.000	-3.78	0.000	2.632
2	Constant	8.285	1.343	6.17	0.000	
Log - Log	x_{1t}	0.4550	0.1239	3.67	0.000	5.570
	x_{2t}	-2.5374	0.4818	-5.27	0.000	27.153

	x_{3t}	0.82491	0.09923	8.31	0.000	44.702
	x_{4t}	0.34195	0.05411	6.32	0.000	16.349
	x_{6t}	-0.06366	0.02577	-2.47	0.000	1.185
3	Constant	9.85	0.1293	76.16	0.000	
Log-linear	x_{1t}	0.0831	0.04096	2.03	0.000	3.035
	x_{3t}	0.0000017	0.00000043	4.03	0.000	5.404
	x_{4t}	0.000011	0.0000017	6.31	0.000	9.660
	x_{5t}	-1.2794	0.1546	-8.28	0.000	2.653
4	Constant	-315031.935	9099	-34.623	0.000	
Linear-log	x_{3t}	23311	1683	13.850	0.000	5.430
	x_{4t}	7629	1552	4.915	0.000	5.680
	x_{6t}	-3839	1242	-3.091	0.003	1.161

Table 6 shows the coefficients based on which four models can be developed using the MR equation presented below:

Model 1: $y_t = 14058 + 0.099\,x_{3t} + 0.474\,x_{4t} - 18646\,x_{5t}$

Model 2: $Lny_t = 8.285 + 0.45\,Lnx_{1t} - 2.54\,Lnx_{2t} + 0.825\,Lnx_{3t} + 0.342\,Lnx_{4t} - 0.064\,Lnx_{6t}$

Model 3: $Lny_t = 9.850 + 0.083\,x_{1t} + 0.000002\,x_{3t} + 0.00001\,x_{4t} - 1.28\,x_{5t}$

Model 4: $y_t = -315032 + 23311\,Lnx_{3t} + 7629\,Lnx_{4t} - 3839\,Lnx_{6t}$

Based on the Model 1, the coefficients for x_{3t} ($\beta_3 = 0.099,\ p < 0.05$) and x_{4t} ($\beta_4 = 0.474, p < 0.05$) and x_{5t} ($\beta_5 = -18646, p < 0.05$) are significant. This explained that $x_{3t}, x_{4t}, and x_{5t}$ are factors to the y. In Model 2, the coefficients for the coefficients for x_{1t} and ($\beta_1 = 0.45, p < 0.05$) and x_{2t} ($\beta_2 = -2.54, p < 0.05$) and x_{3t} ($\beta_3 = 0.825, p < 0.05$) and x_{4t} ($\beta_4 = 0.342, p < 0.05$) and x_{6t} ($\beta_6 = -2.54, p < 0.05$) are significant. This explained that $x_{1t}, x_{2t}, x_{3t}, x_{4t} and x_{6t}$ are factors to the y. While in Model 3, the coefficients for x_{1t} ($\beta_1 = 0.083, p < 0.05$), x_{3t} ($\beta_3 = 0.000001, p < 0.05$), x_{4t} ($\beta_4 = 0.00001, p < 0.05$) ,and x_{5t} ($\beta_5 = -1.28, p < 0.05$) are significant. This explained that $x_{1t}, x_{3t}, x_{4t}, and x_{5t}$ are factors to the y.

While in Model 4, the coefficients for x_{3t} ($\beta_3 = 23311, p < 0.05$), x_{4t} ($\beta_4 = 7629, p < 0.05$), and x_{6t} ($\beta_6 = -3839, p < 0.05$) are significant. This explained that $x_{3t}, x_{4t}, and x_{6t}$ are factors to the y.

Step 3: Regression Model and Hypothesis Testing:

Making a use of the multiple linear regression analysis, we started our investigation model and obtained the regression model between the value of imports and exchange rate, PPI ,G.D.P., the value of exports, the average of tariff tax ,and the average sales tax,. It is presented as follows:

Variance inflation factor VIF:

Any analysis can detect presence of multicollinearity by checking the value of the variation inflation factor (VIF). When the value of VIF is less than 5, hence multicollineaity is not series. However, if VIF is more than 5, then multicollinearity is substantial. Multicollinearity will be more serious whenever the value of VIF is more than 10.

Decision:

VIF in Model 1(linear model) is less than 5, thus Model 1 is a better than others models.

Durbin-Watson statistic (D.W):

We will need to compare the displayed statistic with lower and upper bounds in a table. If *D.W* > upper bound, no correlation exists; if *D.W* < lower

Australian Journal of Basic and Applied Sciences, 9(11) Mayl 2015, Pages: 298-306

bound, positive correlation exists; if *D.W* is in between the two bounds, the test is inconclusive.

Decision:

D.W < lower bound =1.59. At the 5% level of significance with *n*=92 and *k*=3 there is evidence of a positive autocorrelation for the first model (linear model). Then, in tackling the problem of autocorrelation, the results were as follows.

$S = 2980 \quad R^2 = 82.0\% \quad R^2\,(adg) = 81.4\%$

$Durbin - Watson\ Statistic = 1.83475$

$$y_t = 5327 + 0.169\,x_{3t} + 0.248\,x_{4t} - 12090\,x_{5t}$$

The results show that x_{3t} and x_{4t} coefficients are positive and x_{5t} coefficient is negative, and such results are consistent with the economic theory.

Step 4: predictive ability:

Use predicted R^2 to determine how well the model predicts responses for new observations. A higher value of predicted R^2 indicate that models are of greater predictive ability. Predicted R^2 ranges between 0 and 100% and is calculated from the PRESS statistic.

$$P\ PRESS = \sum_{i=1}^{n} \left(\frac{e_i}{1-h_i}\right)^2$$

$$R^2(\text{Pred}) = 1 - \frac{\sum_{i=1}^{n}\left(\frac{e_i}{1-h_i}\right)^2}{\sum_{i=1}^{n}(y_i - \bar{y})^2}$$

$PRESS = 1041446698 \quad R^2(Pred) = 76.01\%$

Through the value of $R^2\,(\text{Pred})$, conclude that the model has good predictive ability.

Step 5: Diagnostic measures:

Table 7. Illustrates the diagnostic measures to make sure that the model suitable to predict.

Residual	Standard residual	Studentized Residual	Leverage	Cook 'distance	DFIT	Fitted values	I
1652.0	0.64562	0.64347	0.263114	0.03721	0.38450	7159.9	1
-466.5	-0.16000	-0.15911	0.043145	0.00029	-0.03379	6283.4	2
-1943.7	-0.66540	-0.66328	0.039627	0.00457	-0.13473	7367.5	3
-2015.0	-0.69048	-0.68841	0.041514	0.00516	-0.14327	6844.3	4
-1820.4	-0.62499	-0.62281	0.045188	0.00462	-0.13549	5957.8	5
-2835.4	-0.97113	-0.97082	0.040557	0.00997	-0.19960	7023.5	6
-1864.4	-0.63794	-0.63578	0.038733	0.00410	-0.12762	7696.8	7
-2577.3	-0.88272	-0.88160	0.040527	0.00823	-0.18119	7154.7	8
-2869.0	-0.98300	-0.98281	0.041263	0.01040	-0.20389	6879.8	9
345.9	0.11830	0.11764	0.037963	0.00014	0.02337	8013.2	10
-3038.9	-1.03925	-1.03972	0.037625	0.01056	-0.20558	8181.5	11
-272.1	-0.09313	-0.09260	0.039267	0.00009	-0.01872	7494.7	12
1463.3	0.50218	0.50004	0.044352	0.00293	0.10772	6535.2	13
-610.7	-0.20916	-0.20802	0.040587	0.00046	-0.04279	9832.9	14
1389.7	0.47482	0.47272	0.035949	0.00210	0.09128	9246.3	15
-279.4	-0.09547	-0.09493	0.036280	0.00009	-0.01842	9053.2	16
-3125.8	-1.21419	-1.21752	0.254119	0.12557	-0.71065	11276.2	17
2316.2	0.78669	0.78497	0.024391	0.00387	0.12412	10993.5	18
-403.0	-0.13679	-0.13603	0.023400	0.00011	-0.02106	11249.7	19
1701.6	0.58489	0.58269	0.047384	0.00425	0.12996	8937.2	20
-2231.9	-0.75846	-0.75661	0.025377	0.00374	-0.12209	11544.0	21
-1426.6	-0.48420	-0.48208	0.022955	0.00138	-0.07389	11253.7	22
-2149.6	-0.72955	-0.72760	0.022880	0.00312	-0.11134	11343.9	23
128.6	0.04366	0.04341	0.023670	0.00001	0.00676	11248.0	24
-1605.3	-0.55560	-0.55341	0.060414	0.00496	-0.14033	8954.6	25
1904.1	0.64573	0.64358	0.021342	0.00227	0.09504	12968.4	26
-1639.1	-0.55517	-0.55298	0.018905	0.00148	-0.07676	13049.8	27
3127.1	1.05794	1.05866	0.016671	0.00474	0.13784	13905.6	28
1153.2	0.39336	0.39146	0.032699	0.00131	0.07198	11349.2	29
-3810.6	-1.29003	-1.29498	0.017964	0.00761	-0.17515	11967.4	30
1220.5	0.41324	0.41128	0.018163	0.00079	0.05594	13082.4	31
-1159.8	-0.39312	-0.39122	0.020398	0.00080	-0.05645	12358.2	32
-2294.7	-0.77979	-0.77804	0.025398	0.00396	-0.12560	12506.1	33
147.7	0.04995	0.04967	0.016614	0.00001	0.00646	14060.0	34
1082.7	0.36711	0.36530	0.021093	0.00073	0.05362	14708.2	35
2342.9	0.79589	0.79422	0.024696	0.00401	0.12638	15158.8	36
46.0	0.01556	0.01548	0.014915	0.00000	0.00190	13051.0	37
5736.3	1.94797	1.98003	0.024046	0.02337	0.31080	15567.9	38
4628.2	1.58381	1.59772	0.038944	0.02541	0.32162	17391.6	39
-1001.0	-0.33814	-0.33644	0.013714	0.00040	-0.03967	14553.2	40

40.6	0.01398	0.01390	0.052000	0.00000	0.00326	12591.4	41
-2798.0	-0.94615	-0.94558	0.015737	0.00358	-0.11956	14035.2	42
-2233.3	-0.75507	-0.75321	0.015376	0.00223	-0.09412	14420.4	43
2161.6	0.73239	0.73045	0.019650	0.00269	0.10342	14744.2	44
-622.0	-0.21949	-0.21830	0.096183	0.00128	-0.07121	15380.8	45
3469.4	1.17914	1.18179	0.025664	0.00916	0.19180	16350.0	46
-189.3	-0.06428	-0.06391	0.024060	0.00003	-0.01004	17120.2	47
-1072.3	-0.36461	-0.36280	0.026523	0.00091	-0.05989	15781.1	48
-1552.1	-0.53021	-0.52803	0.035566	0.00259	-0.10140	12981.5	49
1537.2	0.52014	0.51798	0.017054	0.00117	0.06823	16399.2	50
4059.6	1.37142	1.37841	0.013799	0.00658	0.16305	16713.5	51
3469.2	1.17628	1.17888	0.020995	0.00742	0.17264	17709.3	52
816.2	0.27551	0.27406	0.012141	0.00023	0.03038	15717.5	53
3259.7	1.10703	1.10847	0.024150	0.00758	0.17438	18828.2	54
3778.5	1.28365	1.28845	0.024805	0.01048	0.20549	19386.1	55
3266.2	1.10298	1.10436	0.013078	0.00403	0.12712	17519.3	56
-2656.8	-0.90041	-0.89943	0.020130	0.00416	-0.12892	17202.7	57
3693.3	1.28823	1.29314	0.074929	0.03360	0.36803	21174.3	58
5106.4	1.73737	1.75788	0.027752	0.02154	0.29700	21462.7	59
173.6	0.05913	0.05880	0.030338	0.00003	0.01040	20606.2	60
13665.2	5.50918	6.76785	0.307547	3.37004	4.51036	6691.6	61
-2980.5	-1.16071	-1.16304	0.257916	0.11706	-0.68566	27757.7	62
1861.7	0.63714	0.63498	0.039040	0.00412	0.12798	22808.5	63
2306.9	0.78025	0.77850	0.016129	0.00250	0.09968	19420.4	64
919.0	0.31042	0.30882	0.013674	0.00033	0.03636	17532.4	65
1472.3	0.49854	0.49640	0.018371	0.00116	0.06791	21197.8	66
2712.3	0.92570	0.92494	0.033817	0.00750	0.17304	23869.6	67
1837.8	0.62481	0.62264	0.026276	0.00263	0.10228	23034.2	68
-1792.9	-0.61348	-0.61130	0.038692	0.00379	-0.12264	18250.2	69
-4216.8	-1.45270	-1.46206	0.051710	0.02877	-0.34141	26328.3	70
-432.0	-0.14768	-0.14686	0.036953	0.00021	-0.02877	25051.6	71
-634.4	-0.21610	-0.21493	0.029994	0.00036	-0.03779	16354.3	72
-7627.8	-2.59558	-2.68564	0.027994	0.04851	-0.45577	14233.1	73
-419.7	-0.14229	-0.14150	0.020643	0.00011	-0.02054	21664.1	74
-400.4	-0.13648	-0.13572	0.031283	0.00015	-0.02439	24104.5	75
2657.1	0.90769	0.90677	0.035547	0.00759	0.17408	24863.3	76
-4642.8	-1.57422	-1.58777	0.021052	0.01332	-0.23284	20381.0	77
5074.8	1.72370	1.74356	0.024453	0.01862	0.27605	22168.8	78
670.7	0.22859	0.22735	0.030940	0.00042	0.04062	23493.6	79
-1580.2	-0.54093	-0.53874	0.039488	0.00301	-0.10924	23773.3	80
-6490.4	-2.21819	-2.26992	0.036429	0.04651	-0.44136	21752.1	81
-1456.4	-0.49822	-0.49608	0.038299	0.00247	-0.09900	24273.4	82
249.5	0.08557	0.08508	0.042942	0.00008	0.01802	24633.2	83
-1293.3	-0.44515	-0.44311	0.050015	0.00261	-0.10167	24214.7	84
-3297.7	-1.12865	-1.13043	0.039201	0.01299	-0.22834	22423.2	85
569.7	0.19591	0.19484	0.048445	0.00049	0.04396	25032.5	86
-501.7	-0.17267	-0.17172	0.049898	0.00039	-0.03935	24939.5	87
-3976.0	-1.37887	-1.38607	0.064218	0.03262	-0.36310	24701.9	88
-1434.4	-0.49071	-0.48858	0.038383	0.00240	-0.09761	21521.3	89
-787.9	-0.27113	-0.26970	0.049656	0.00096	-0.06165	25137.7	90
942.8	0.32739	0.32572	0.066620	0.00191	0.08702	27843.5	91
-3627.9	-1.27487	-1.27947	0.088599	0.03950	-0.39893	28078.9	92

Conclusions:

The current study aimed to build a forecasting model for y by using the multiple regression (MR). The statically analyzed and obtained output from SPSS 21.0 showed four models for building this. In using the SPSS 21.0 for the purpose of comparing the four models, it was found that Model 1(linear model) is the best model among other three models since it fits the data. Model 1(linear model) shows that there are only three controlled variables by using stepwise regression and produced a regression model such as follows:

$$y_t = 5327 + 0.169\,x_{3t} + 0.248\,x_{4t} - 12090\,x_{5t}$$

ACKNOWLEDGEMENT

The authors are grateful to the Faculty of science and Technology, University Science Islam Malaysia (USIM) in providing the facilities to carry out the research.

REFERENCES

Abu Bakar, Nor'Aznin, 2000. Time series estimation of Malaysia's export and import demand : a dynamic old method. Analisis, 7 (1&2): 61-77, UUM.

Alias, M.H., 1978. A demand equation for West Malaysian imports.Akademika, 12: 53-64.

Andy, P., 2005. Discovering Statistics Using SPSS:(and Sex and Drugs and Rock'n'Roll). Sage publications.

Arshad, F.M., M.N. Shamsudin, A.A.A. Hameed, 2011. An econometric analysis of the link between biodiesel demand and malaysian palm oil market.International Journal of Business and Management, 6(2): 35.

Azgun, S. and H. Servinc, 2010, Are imports a reason of growth?: evidence from Turkey, The Social Sciences, 5(2): 66-9.

Chen, H., 2009. A literature review on the relationship between foreign trade and economic.

Ghani, I.M.M., S. Ahmad, 2010. Stepwise multiple regression method to forecast fish landing. Procedia-Social and Behavioral Sciences, 8: 549-554.

Kogid, M., D. Mulok, K.S. Ching, J. Lily, M.F. Ghazali, N. Loganathan, 2011. Does Import Affect Economic Growth in Malaysia.

Liu, X., 2001. A positive analysis on import-export increase and economic growth, China Economic Issues, 4.

Milad, M.A., I.B.I. Rose, S. Marappan, 2014. Modeling and Forecasting the Volumes of Malaysia's Import. In *International Conference on Global Trends in Academic Research, Bali, Indonesia Global Illuminators, Kuala Lumpur, Malaysia*.

Prambudia, Y., M. Nakano, 2012. Exploring Malaysia's transformation to net oil importer and oil import dependence. Energies, 5(8): 2989-3018.

Tang, T.C., M. Nair, 2002. A cointegration analysis of Malaysian import demand function: reassessment from the bounds test. Applied Economics Letters, 9(5): 293-296.

Wong, Hock Tsen, 2004. "Terms of trade and economic growth in Malaysia." Labuan Bulletin of International Business and Finance, 2(2): 105-122.