Relationship between Exports and Private Final Consumption Expenditure to Economic Growth in Malaysia

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by Rozita Misran
Balance of Payments Statistics Division

Outline of Presentation

1. Introduction
2. Objectives
3. Literature Review
4. Data, Methodology and Model Specification
5. Empirical Results
6. Conclusion and Discussion

1. Introduction

1. Private final consumption expenditure and exports of goods and services are the factors that influence the formation of the Gross Domestic Product (GDP), according to the expenses method

2. GDP based on expenditure approach is the summation of **private final consumption expenditure (PFCE)**, government final consumption, gross fixed capital formation, changes in inventories and valuables, **exports of goods and services** minus imports of goods and services

3. PFCE contributed **57.2** per cent of GDP while exports of goods and services share was **69.2** per cent of GDP at current prices in second quarter 2018

2. Objective

To examine dynamic linkages between economic growth, exports and private final consumption expenditure in Malaysia

3. Literature Review

No.	Researchers	Data series	Methods	Findings
1.	**The impact of exports and imports on economic growth in Iran** Mehdi Taghavi, Masoumeh Goudarzi, Elham Masoudi and Hadi Parhizi Gashti (2012)	Annual 1962 to 2011	Johansson's cointegration test, error correction model, Impulse, response function and Variance Decomposition	Export had direct and positive relationship with economic growth in long run
2.	**The relationship between trade and economic growth in Malaysia** Khairul Hashim and Mansur Masih (2014)	Q1 2005 to Q3 2014	Granger causality test and impulse response functions	Bidirectional long run relationships between the economic growth and exports
3.	**The relationship between exports, imports and economic growth in India** Sachin N. Mehta (2015)	Annual 1976 to 2014	Engle Granger Cointegration analysis, VECM and Granger causality tests	There is a long run co-integrating relationship between GDP, export and import in India. In long term the results of Granger causality tests show that GDP leads to Exports but Exports does not lead to GDP

3. Literature Review (cont'd)

No.	Researchers	Data series	Methods	Findings
4.	**The causal relationship between consumption expenditure and economic growth in Bangladesh** Sakib bin Amin (2011)	Annual 1976 to 2009	Johansen cointegration method and ARDL cointegration method	There exists long run cointegration between consumption expenditure and economic growth in Bangladesh
5.	**The impact of household expenditure on the economic growth in Sri Lanka** A. L. Mohamed Aslam (2017)	Annual 1975 to 2014	Linear multiple regression model with support of ordinary least squares (OLS) technique and Johansen cointegration	The household expenditure had positive relation on the gross domestic product and had long - run relationship on the gross domestic product in Sri Lanka
6.	**The dynamic linkages between economic growth, fixed investment and household consumption in Malaysia** Zulkefly Abdul Karim, Bakri Abdul Karim and Mohd Azlan Shah Zaidi (2012)	Q1 1991 to Q2 2010	Structural vector error correction model (SVECM)	Household consumption-led growth in the short run. In the long run, there is no significant effect of household consumption on growth

4. Data, methodology and model specification

Data

Data series of GDP, private final consumption expenditure, exports of goods and exports of services at constant prices for the period from Q1 2010 to Q2 2018 or 34 observations are used in this study.

Methodology

1. Correlation test using Pearson correlation coefficient value is conducted to establish how forceful the nexus is between variables.
2. Unit root tests of Augmented Dickey Fuller (ADF) and Philip Pherron (PP) is used to ascertain the stationary of variables.
3. Johansen and Juselius (1990) procedure to specify the number of cointegration relationships between variables.
4. Granger causality test is used to examine the incidence of causality.
5. Residual diagnostic test using the Breusch-Godfrey Serial Correlation LM Test, Heteroskedasticity Test: Breusch-Pagan-Godfrey and Histogram-Normality Test is carried out to evaluate the model assumptions.

4. Data, methodology and model specification (cont'd)

Model specification

The considered function and multiple regression model of this study are as follows:

$$GDP_t = f(EG_t, ES_t, PFCE_t, CE_t) \qquad (1)$$

The function can also be represented in a log-linear econometric format thus:

$$\log(GDP_t) = \beta_0 + \beta_1 \log(EG_t) + \beta_2 \log(ES_t) + \beta_3 (PFCE_t) + \beta_4 \log(CE_t) + \varepsilon_t \qquad (2)$$

Where:

GDP	: Gross domestic product
EG	: Exports goods
ES	: Exports services
PFCE	: Private final consumption expenditure
CE	: Currency exchange
β_0	: The constant term
β_1	: coefficient of variable (EG)
β_2	: coefficient of variables (ES)
β_3	: coefficient of variables (PFCE)
β_4	: coefficient of variables (CE)
t	: The time trend
ε	: The random error term assumed to be normally, identically and independently distributed

5. Empirical Results

Correlation Test

	GDP	EG	ES	PFCE
GDP	1	0.8438	0.7887	0.8470
EG	0.8438	1	0.5713	0.7572
ES	0.7887	0.5713	1	0.5409
PFCE	0.8470	0.7572	0.5409	1

The results of the correlation test give us that all the variables studied are positively correlated, that is meant an increase in exports and private final consumption expenditure directly lead to an increase in the gross domestic product and the reverse when is a decrease.

5. Empirical Results (cont'd)

Test for unit roots: ADF and PP

Variables	Log level form			
	ADF		PP	
	t-stat	Prob.	t-stat	Prob.
Log(GDP)	-0.4907	0.8793	-1.1714	0.6748
Log(EG)	-1.4235	0.5589	-1.2544	0.6386
Log(ES)	-1.8137	0.3669	-3.0156	0.0837
Log (PFCE)	-1.5654	0.4865	-0.9426	0.7616
Log (CE)	-0.5427	0.8700	-0.6675	0.8413

Variables	First difference form			
	ADF		PP	
	t-stat	Prob.	t-stat	Prob.
Log(GDP)	-2.9791	0.0488	-11.1535	0.0000
Log(EG)	-6.5110	0.0000	-7.5415	0.0000
Log(ES)	-6.7058	0.0000	-12.8911	0.0000
Log (PFCE)	-3.3344	0.0227	-12.9552	0.0000
Log (CE)	-4.3073	0.0019	-4.2520	0.0022

The result suggests that all variables (in logarithms) are non-stationary at the level form since t-statistic is lower than critical value, thus the H_o: null hypothesis of non-stationary is failed to be rejected, i.e. non-stationary is accepted. The variables become stationary on first differences in both ADF and PP tests.

5. Empirical Results (cont'd)

Cointegration Analysis: VAR Lag Order Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	380.8607	NA	2.03E-17	-24.24908	-24.01779	-24.17369
1	503.3715	197.598	3.85E-20	-30.54009	-29.15237	-30.08773
2	530.1702	34.57903	3.93E-20	-30.65614	-28.11197	-29.82681
3	634.4403	**100.9065***	**3.48e-22***	**-35.77034***	**-32.06973***	**-34.56404***

LR : Sequential modified LR test statistic (each test at 5% level)
FPE : Final prediction error
AIC : Akaike information criterion
SC : Schwarz information criterion
HQ : Hannan-Quinn information criterion

The results of the VAR lag order selection criteria show that the number of lags chosen is equal to 3 since the criteria FPE, AIC, SC and HQ select that the number of lags is equal to 3 based on 5% significance level

5. Empirical Results (cont'd)

Cointegration Analysis: Johanson Test

To determine the number of exist cointegration, Johanson test was conducted.

Johansen Test for Co-integration (Trace Test)

Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.9499	138.6630	69.8188	0
At most 1 *	0.6683	48.7992	47.8561	0.0406
At most 2	0.2847	15.6926	29.7970	0.7337
At most 3	0.1645	5.6388	15.4947	0.7377
At most 4	0.0081	0.2446	3.8414	0.6208

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

Johansen Test for Co-integration (Maximum Eigen value Test)

Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.9499	89.8637	33.87687	0
At most 1 *	0.6683	33.1066	27.58434	0.0088
At most 2	0.2847	10.0538	21.13162	0.7396
At most 3	0.1645	5.3941	14.2646	0.6915
At most 4	0.0081	0.2446	3.841466	0.6208

Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level

Since the trace statistics is greater than critical value, Ho with no cointegration relationship is rejected at 5% significance level. Johanson test indicates cointegration relation exist between the variables studied. Therefore, Vector Error Correction Model (VECM) is used in this study.

5. Empirical Results (cont'd)

Cointegration Analysis: VECM estimation

The equation of error correction model on long-run equilibrium relationship:

$$
\begin{aligned}
D(LogGDP) = {} & C(1)*(LogGDP(-1) - 0.306311575087*LogEG(-1) - 0.5516095855*LogES(-1) - \\
& 0.319677020775*LogPFCE(-1) - 0.190995768621*LogCE(-1) + 0.415091939808) \\
& + C(2)*D(LogGDP(-1)) + C(3)*D(LogGDP(-2)) + C(4)*D(LogGDP(-3)) \\
& + C(5)*D(LogEG(-1)) + C(6)*D(LogEG(-2)) + C(7)*D(LogEG(-3)) \\
& + C(8)*D(LogES(-1)) + C(9)*D(LogES(-2)) + C(10)*D(LogES(-3)) \\
& + C(11)*D(LogPFCE(-1)) + C(12)*D(LogPFCE(-2)) + C(13)*D(LogPFCE(-3)) \\
& + C(14)*D(LogCE(-1)) + C(15)*D(LogCE(-2)) + C(16)*D(LogCE(-3)) + C(17)
\end{aligned}
$$

5. Empirical Results (cont'd)

Cointegration Analysis: VECM estimation

Variables	Coefficient	Standard Error	t- statistics	Prob.
C(1)	-0.463512	0.205087	-2.260078	0.0416
C(2)	-0.334291	0.24368	-1.371846	0.1933
C(3)	-0.867063	0.22517	-3.850698	0.002
C(4)	-0.931426	0.318642	-2.923108	0.0119
C(5)	-0.168475	0.080643	-2.08916	0.0569
C(6)	-0.036136	0.086522	-0.417652	0.683
C(7)	0.005614	0.066158	0.084863	0.9337
C(8)	-0.218344	0.104822	-2.083003	0.0576
C(9)	-0.116411	0.075333	-1.545286	0.1463
C(10)	-0.116824	0.062972	-1.855164	0.0864
C(11)	-0.226883	0.27349	-0.829584	0.4217
C(12)	-0.149046	0.142594	-1.045252	0.315
C(13)	0.078153	0.205698	0.379941	0.7101
C(14)	0.03344	0.050208	0.666029	0.517
C(15)	-0.030404	0.054591	-0.556949	0.587
C(16)	0.001472	0.052183	0.028205	0.9779
C(17)	0.021257	0.00576	3.690329	0.0027

- The coefficient of the variable C(1) is negative and possesses a significant probability. This means that all variables in the long-term relationship are significant in explaining the dependent variables.
- The coefficient is - 0.463512 meaning that system corrects its previous period disequilibrium at a speed of 46.4% quarterly to reach at the steady state.

5. Empirical Results (cont'd)

Cointegration Analysis: VECM estimation

Variables	Coefficient	Standard errors	t- statistics
Log (EG(-1))	-0.306312	-0.0184	-16.5924
Log (ES(-1))	-0.55161	-0.0501	-11.0004
Log (PFCE(-1))	-0.319677	-0.0384	-8.30572
Log (CE(-1))	-0.190996	-0.0235	-8.10868
C	0.415092		

$$Log(GDP) = 0.306312^{*} Log(EG(-1)) + 0.55161^{*} Log(ES(-1)) + 0.319677^{*} Log(PFCE(-1)) + 0.190996^{*} Log(CE(-1)) - 0.415092$$

This study concludes that the private final consumption expenditure, exports of goods and exports of services have positive association with the gross domestic product. These prove that in the long run:

- 1% increase in exports of services may lead to an increase of 0.55161% of GDP
- 1% increase in private final consumption expenditure may leads to an increase of 0.319677% of GDP
- 1% increase in exports of goods may leads to an increase of 0.306312% of GDP

5. Empirical Results (cont'd)

Short-run Causality test: Granger Causality Wald Test

Dependent variable: D(LogGDP)

	Chi-sq	Prob.
D(LogEG)	6.703386	0.0350
D(LogES)	6.004645	0.0497
D(LogPFCE)	25.41236	0.0000

Dependent variable: D(LogEG)

	Chi-sq	Prob.
D(LogGDP)	2.233103	0.3274
D(LogES)	4.843254	0.0888
D(LogPFCE)	7.152188	0.028

Dependent variable: D(LogES)

	Chi-sq	Prob.
D(LogGDP)	8.872604	0.0118
D(LogEG)	0.853221	0.6527
D(LogPFCE)	7.06015	0.0293

Dependent variable: D(LogPFCE)

	Chi-sq	Prob.
D(LogGDP))	141.7646	0.0000
D(LogEG)	7.213933	0.0271
D(LogPFCE)	7.631563	0.0220

- All variables are statistically significant to Granger caused economic growth at a 5% significant level
- There is bidirectional casuality between economic growth, exports of services and private final consumption expenditure in a short run.

5. Empirical Results (cont'd)

Residual Diagnostic Test

Residual Diagnostic Test	
R-squared	0.9866
Adjusted R-squared	0.9702
F-statistic	60.1001
Probability (F-statistic)	0.0000
Durbin-Watson stat	1.8480
Breusch-Godfrey Serial Correlation LM Test:	
F-statistic	0.532067
Obs* R- Squared	4.129458
Prob. F(3,10)	0.6705
Prob. Chi-Square(3)	0.2478
Heteroskedasticity Test: Breusch-Pagan-Godfrey:	
F-statistic	0.961658
Obs* R- Squared	20.43678
Prob. F(20,9)	0.5558
Prob. Chi-Square(20)	0.4309
Normality test:	
Jarque-Bera	0.985578
Probability	0.610920

All residual diagnostic tests are satisfactory and equation model is acceptable and well treated:

- R^2 is greater than 60%
- Fisher statistical probability is less than 5%
- Based on Breusch-Godfrey Serial Correlation LM Test, Prob. Chi-Square(3) is 0.2478. H_0 failed to be rejected at 5% significance level. Thus, the model has no serial correlation.
- Based on Heteroskedasticity Test, Prob. Chi-Square(20) is 0.4309. H_0 failed to be rejected at 5% significance level. Thus, the model has no Heteroskedasticity
- For normality test, at 5% significance level, Ho failed to be rejected. The model is normally distributed.

6. Conclusion and Discussion

1. There is a positive impact of exports of goods, exports of services and private final consumption expenditure on economic growth in the long run term.

2. There is short run unidirectional casual relationship running from exports of goods to economic growth.

3. There is bidirectional casuality between economic growth, exports of services and private final consumption expenditure in a short run.

4. This study recommends the policy makers to design a comprehensive policy to boost the growth of the private final consumption expenditure and exports to make the overall economy to grow at a stronger momentum.

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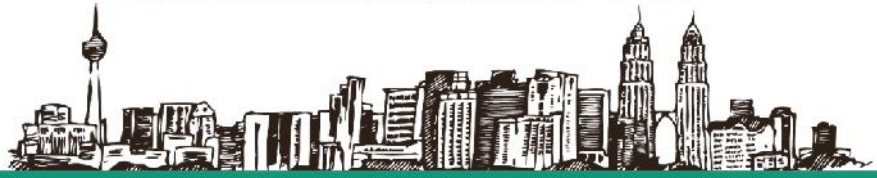

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