Journal of Scientific Research & Reports
3(17): 2373-2381, 2014; Article no. JSRR.2014.17.010

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Household Consumption, Domestic Investment, Government Expenditure and Economic Growth: New Evidence from Malaysia

Abdul Rahim Ridzuan[1*], Mohamad Idham Md Razak[2], Zakimi Ibrahim[2], Abdul Halim Mohd Noor[2] and Elsadig Musa Ahmed[3]

[1]Economic Department, Faculty of Business Management, Universiti Teknologi MARA, Malacca City Campus, Malaysia.
[2]Economic Department, Faculty of Business Management, Universiti Teknologi MARA, Alor Gajah Campus, Malaysia.
[3]Economic Unit, Faculty of Business, Universiti Multimedia, Malacca Campus, Malaysia.

Authors' contributions

This work was carried out in collaboration between all authors. All authors read and approved the final manuscript.

Original Research Article

Received 9th May 2014
Accepted 9th July 2014
Published 23rd July 2014

ABSTRACT

This paper examines the dynamic linkages between economic growth, household consumption, domestic investment and public expenditure in Malaysia by adopting ARDL approach for the period of 1960-2010 based on Keynesian and Wagner's law hypothesis. We have also created two dummies variables in the model to capture two major economic crises: Asian Financial Crisis 1997-1998 and Global Financial Crisis 2008-2009. The empirical result showed that there is a long run relationship exists in the model proposed. Mixed evidence is found for the short run and the variables are mostly significant for the long run elasticity. The contribution of consumption is said to be the largest followed by gross domestic investment and public expenditure. The empirical findings showed that the policies employed by the government are currently effective and help to promote growth in the long run. Moreover, the policies are also capable in sustaining the economy during recession period. The findings help to give clear pictures for the policymaker to construct suitable policies that can accelerate higher economic growth for Malaysia and achieving the target of high income country in the year 2020.

**Corresponding author: E-mail: Aimaz84@yahoo.com;*

Keywords: Economic development; ARDL; consumption; investment; government expenditure.

1. INTRODUCTION

The Keynesian macroeconomic model stated that household consumption, domestic investment as well as government expenditure play an important role in influencing economic growth. With the appropriate policy adaptation such as fiscal and monetary policy, these variables play crucial role in sustaining the growth of the small country such as Malaysia. Consumption and investment are largely dependent on the economic movement whereas economic growth will result in increasing income and thus expanding consumption and investment. This is described as a cyclical relationship. However, for government expenditure, it is set by the government and is usually fixed regardless of growth or recession in the economy. Therefore, a good understanding of the role of consumption, investment and expenditure on growth is crucial to policymaker in understanding the key driver of economic growth and also to suggest an appropriate policy in stimulating those variables even during the critical period. Previous studies in Malaysia context are commonly focusing on the export-led growth (ELG) and the finance led growth (FLG). For example, [1,2] have supported the evidence of finance led growth hypothesis. In contrast, [3] have supported the evidence of export led growth in Malaysia. However, previous studies have given little attention in examining other growth hypothesis such as consumption-led growth (CLG), investment led growth (ILG) and expenditure led growth (ELG). Besides, in the context of Malaysia, recent years shows that household consumption (HC), government expenditure (GE) and domestic investment (DI) have contributed significant portion of Malaysia national income. As a developing country moving towards developed country in year 2020, it is critical for Malaysia to detect all its engine of growth and its significant towards achieving the goals. Based on the Diagram 1 below, the overall trend of household consumption as percentage of GDP at first was at decreasing trend from 1960 up to 2000 but then slowly increased and improved until 2010. The lowest level of household consumption was detected during Asian Financial Crisis 1997-1998 where at that time, Malaysia economy was badly hurt due to speculative attack on her currency, Ringgit Malaysia. The trend of government expenditure seems consistent from 1960 up to 2010. The government has set the amount of its expenditure carefully according to the proposed budget policy. Nevertheless, these consistencies help to stabilize the growth of Malaysia economy. Last but not least, the level of domestic investment as percentage of GDP was at increasing trend from 1960 up to 1996. It fell sharply during Asian Financial Crisis but overall at sustained level during 2000 up to 2010. At this period, Malaysia mainly focus on attracting foreign direct investment inflow to boost the growth of the economy but due to the arising of new competitor such as China, Vietnam and Myanmar, the country started to implemented better policies to increase their domestic investment in order to support the country's development. Overall, household consumption, domestic investment and government expenditure play vital roles in influencing the growth of Malaysia's GDP.

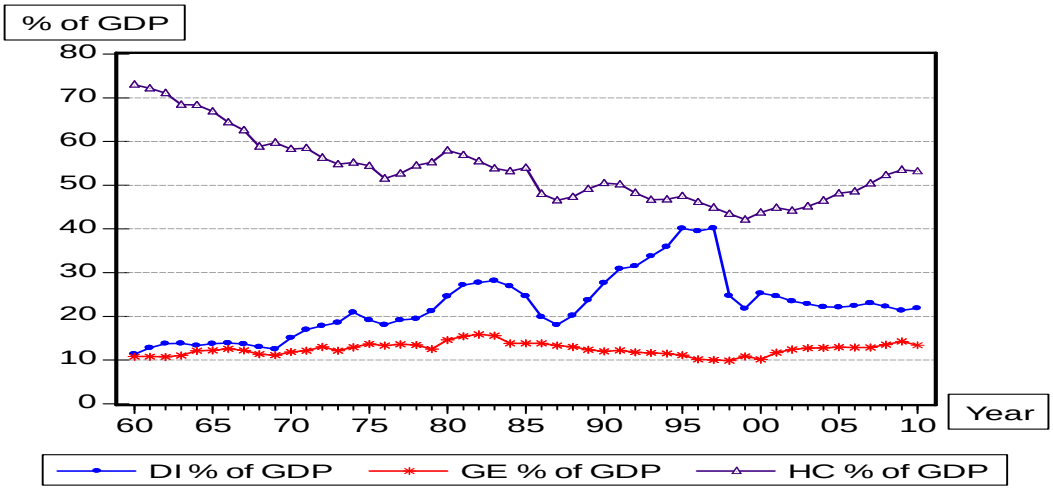

Diagram 1. Household Consumption (HC), Domestic Investment (DI) and Government Expenditure (GE) as % of GDP

Year	GDP (constant 2000 US$)	HC % of GDP (constant 2000 US$)	DI % of GDP (constant 2000 US$)	GE % of GDP (constant 2000 US$)
1960	6631037036	72.98600533	11.40589459	10.7965648
1965	9246896226	66.85687445	13.75834938	12.24341727
1970	12428892426	58.28564133	15.11545891	11.89685545
1975	17535397065	54.40719816	19.20419721	13.71038901
1980	26414956134	57.91794792	24.62227711	14.60696452
1985	33880956357	54.01625106	24.64914891	13.83773762
1990	47206007492	50.45644613	27.66127688	12.03174153
1995	74220828751	47.52830476	40.14912109	11.13072515
2000	93789736842	43.75436657	25.29201658	10.16523523
2005	118223684210	48.13511408	22.09593767	12.99833055
2010	147250929612	53.18599069	21.88225081	13.40507793

2. LITERATURE REVIEWS

Many past studies addressed the relationship between economic growths and finance (Financial Development Led Growth) as well as export (Export Led Growth). However, there are a limited number of studies that focus on the relationship between consumption, investment and government expenditure on economic growth. Earlier studies done by [4] in the developing countries has supported the important role of investment in influencing economic growth. From this study, it can be concluded that a rapid growth is found when the capital investment is high, and slow growth when the equipment investment is low. The importance of investment is realised by many developing countries such as Malaysia. This is because higher investment ratio is believed to be able to generate a positive impact on economic growth. Similarly, other studies done by [5] in China found out that fixed investment is a key determinant of China's economic growth. Here they concluded that an increase in economic growth also lead to further increase in the investment ratio by realising the importance of investment towards generating economic growth, this paper is potentially

able to help researchers to learn the role of domestic investment towards Malaysian economy. The existing consumption led growth studies is focusing on the role of energy consumption (electricity) on economic growth. This is because electricity plays a vital role in both the production and consumption goods and services within an economy. In the Malaysia context, there is a study that examines the electricity consumption led growth by [6]. The finding of the study has shown that there is a mixed evidence of energy-income causality in Malaysia.

Many empirical studies have been investigating the validity of Wagner's law and Keynesian hypothesis both at single country and cross country level but there is no clear behaviour on the empirical results. Empirical tests of Wagner's Law have yield results that differ from country to country and period to period [7]. Some of studies found that supportive evidence of the validity of the law. While some group found evidence that do not support the Wagner's law. Some found mixed results in the relationship between spending and national income. Among studies that have been done that related to Malaysia are [8,9,10,11,12]. [8] for example has found a long-run relationship between GDP and government expenditure in Malaysia for the sample period 1950-1992 besides detecting the evidence of causality between the macroeconomic variables tested. On the other hand, [9] applied Johansen's multivariate cointegration tests and he found no cointegration between national income and government expenditure, while a short-run causality was observed from national income to government expenditure that supporting Wagner's law over the period 1960 to 1998. Contrast to [11] the author detect a long run relationship between economic development and government expenditure only in the long run while the Wagner's law is supported by the data in the short run. Studies done in by [9] found empirical support of both Wagner's law and Keynesian view in Malaysia over 1960 to 2005. [12] reinvestigate these two macroeconomic hypotheses and found a favourable empirical finding that both hypotheses hold in Malaysia in the long run.

The mixed evidences on Wagner's law and Keynesian has given the motivation for the research of this paper to find out more clearly the dynamic relation between household consumption, domestic investment and government expenditure towards the economic growth.

3. METHODOLOGY AND SOURCES OF DATA

Macroeconomics is the branch of economics which studies economic activities including economics issues or economic problems at the level of an economy as a whole. It considers the aggregate performance of all the markets in the system. Its variables are Aggregate Demand and Aggregate Supply. AD is the aggregate expenditure on the purchase of the domestically produced goods and services during the accounting period. The view of Keynesian model is also known as Aggregate Demand (AD) and Aggregate Supply (AS) model for goods and services market. [13] state that the public spending as an endogenous factor, which is determined by the growth of national income. Generally, as per capita income increases, public sector's importance will grow. Inversely, the Keynesian view hypothesized that the public expenditure is an exogenous factor that can be used as a policy variable, and which can impact upon growth and development in the short-run. The following is an equation for national income identity:

$$GDP = C + I + G \quad \text{---------- (1)}$$

where Y represents GDP (national income), C refers consumption, I represents investment, and G is government expenditure. In this study, the short and long-run dynamic relationships between economic growth and household final consumption, domestic investment and government final expenditure are estimated by using the ARDL bound testing approach which was initially introduced by [14]. The ARDL model used in this study can be written as follow:

$$GDP = \beta_0 + \beta_1 HC_t + \beta_2 DI_t + \beta 3GEt + D1 + D2 + \varepsilon_t \quad \text{----------(2)}$$

GDP_t = Gross Domestic Product (constant 2000 USD) HC_t = Household Final Consumption of % GDP DI_t = Domestic Investment in terms of % GDP GE_t = Government Final Expenditure as % GDP D1 = Asian Financial Crisis 1997-1998 D2 = Global recession 2007 - 2008	Based on Keynesian model; β_1, β_2 and $\beta_3 > 0$ Based on Wagner's law; $\beta_3 > 0$

The error correction version of ARDL framework pertaining to the variables in the equation 2 can be reproduced as follows:

Let the long run relationship between the four variables in log linear form be given as follows:

$$LnGDP_t = \alpha + \beta_1 LnHC_{t-1} + \beta_2 LnDI_{t-1} + \beta_3 LnGE_{t-1} + \varepsilon \quad \text{----------(3)}$$

Equation 4 below basically incorporates the short run dynamics into the adjustment process.

$$\Delta LnGDP_t = \alpha + \sum_{i=1}^{v} \sigma_i \Delta LnGDP_{t-i} + \sum_{i=0}^{s} \beta_i \Delta LnHC_{t-i} + \sum_{i=0}^{r} \epsilon_i \Delta LnDI_{t-i} + \sum_{i=0}^{q} \epsilon_i \Delta LnGE_{t-i} + \gamma_1 D1 + \gamma_1 D2 + d\varepsilon_{t-i} + u_t \quad \text{----------} (4)$$

Finally, we transform the model into Bound testing approach.

$$\Delta LnGDP_t = \alpha + \sum_{i=1}^{v} \sigma_i \Delta LnGDP_{t-i} + \sum_{i=0}^{s} \beta_i \Delta LnHC_{t-i} + \sum_{i=0}^{r} \epsilon_i \Delta LnDI_{t-i} + \sum_{i=0}^{q} \epsilon_i \Delta LnGE_{t-i} + \beta_0 LnGDP_{t-1} + \beta_1 LnHC_{t-1} + \beta_2 LnDI_{t-1} + \beta_3 LnGE_{t-1} + \gamma_1 D1 + \gamma_1 D2 + u_t \quad \text{----------} (5)$$

where Δ is the first-difference operator, u_t is a white-noise disturbance term and all variables are expressed in natural logarithms. The above final model also can be viewed as an ARDL of order, (v s r q). The model indicates that economic growth in terms of GDP (constant 2000 USD) tends to be influenced and explained by its past values, so it involves other disturbances or shocks. Equation 3 exhibits the long run relationship while the term with the summation signs, $\sum$ in the equation 4 represents the error correction dynamic.

From the estimation of ECMs, the long-run elasticities are the coefficient of the one lagged explanatory variable (multiplied by a negative sign) divided by the coefficient of the one lagged dependent variable. The short-run effects are captured by the coefficients of the first-differenced variables.The null of no cointegration in the long run relationship is defined by: H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$ is tested against the alternative of H_1: $\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$, by means of familiar F-test.

The main aim for the model used in this paper is to verify the Keynesian hypothesis and Wagner's law based on Malaysia economic scenario. This research contributes to a better

understanding of the nature of Wagner's law and Keynesian hypothesis, and the empirical application in a small open economy- Malaysia. The model assume that household consumption, domestic investment and government expenditure has positive relationship with economic growth.

3.1 Sources of Data

The data for the variables used in this paper was obtained from World Development Indicator 2011. Fixed capital formation is used to represent domestic investment. Due to limited number of quarterly data available, this paper used annual data starting from 1960 up to 2010 with 51 number of observation.

4. EMPIRICAL RESULT

The first step in the analysis was to test for the stationarity of the data. Two tests are adopted: Dickey Fuller/ Augmented Dickey Fuller (DF/ADF) as well as Phillip Perron Unit Root test. Based on the result in Table 2, it shows that the dependent variable, GDP is only stationary after the first difference while there is a mix evidence of stationarity for its independent variables. The result shows that the household final consumption is found to have a unit root even at level when tested using more powerful unit root test known as PP unit root. The result met the condition to precede the analysis by using recent econometric analysis known as ARDL or Bound testing.

Table 1. Unit root test

Country Malaysia	DF/ADF unit root test			
	Level		First difference	
	No trend	With trend	No trend	With trend
LGDP	-1.421 (0)	-1.129 (0)	-6.047 (0)***	-6.167 (0)***
LHC	-2.396 (1)	-1.163 (1)*	-5.187 (0)***	-5.743 (0)***
LDI	-2.086 (1)	-2.203 (1)	-4.921 (0)***	-4.944 (0)***
LGE	-1.948 (0)	-1.917 (0)	-6.726 (0)***	-6.660 (0)***
	PP unit root test			
LGDP	-1.394 (2)	-1.314 (2)	-6.020 (2)***	-6.172 (1)***
LHC	-2.510 (0)	-0.735 (2)*	-5.176 (2)***	-5.633 (6)***
LDI	-2.043 (0)	-1.481 (0)	-4.793 (4)***	-4.723 (5)***
LGE	-1.991 (1)	-1.960 (1)	-6.726 (0)***	-6.660 (0)***

Note: (*),(**),(***) indicate significant at 10%,5% and 1% significant level respectively. Number in bracket represent number of lag. The test used Akaike Info Criterion

The next step is to detect the existence of long run relationship among the variables. The result in Table 2 shows that Malaysia F-statistic, 4.024 is greater at 5 and 10 significance level given their F-statistic value is larger than the critical value for both restricted intercept with no trend and with trend. For restricted intercept and trend, Malaysia F-statistic is larger for both I(0) and I(1) at 10% significance level only. This implies that the null hypothesis of no cointegration is rejected and therefore proving that there is a relationship between the variables in the long run.

Table 2. F-statistics for testing the existence of long run relationship

Malaysia F statistics	Significant level	Bound testing (restricted intercept and no trend)		Bound testing (restricted intercept and trend)	
		I (0)	I (1)	I (0)	I (1)
	1%	4.188	5.328	4.865	6.360
4.024**	5%	3.048	4.002	3.500	4.700
	10%	2.538	3.398	2.873	3.973

Lags=2, k=3 and n-2=49 (choose 50 since it's the closest). This bound test statistic based on Narayan (2004)

Table 3 below present the result of diagnostic checking, long run elasticities and short run estimation. The model passed all diagnostic checking which renders the long term estimates of these models to be reliable. In summary, the models have no evidence of serial correlation and heteroscedasticity effect in disturbances. Besides, those models have passed the Jarque-Bera normality test which suggests that the errors are normally distributed and all the model's specification are well specified. Based on short run estimation, all variables are found to have a significant impact towards the GDP at 1% significant level except for GE where it is only significant at 10% level. Thus, GE is said to have a weak influence towards the growth of the GDP. Both D1 and D2 do not influence the GDP during the short run period of the estimation.

Table 3. Diagnostic Checking and Short Run Estimation

Diagnostic checking		Short run estimation	
Test	**Value**	**Dependent variable: D(LGDP)**	**ARDL (2,1,0,0)**
Serial correlation[a]	1.333 (0.248)	Constant	0.692*** (0.042)
Functional Form[b]	3.942 (0.147)	ECT_{t-1}	-0.0714* (0.042)
Normality[c]	1.524 (0.467)	$D(LGDP)_{t-1}$	0.5256*** (0.0942)
Heteroscedasticity[d]	1.513 (0.219)	D(LHC)	0.5509*** (0.0615)
		D(LDI)	0.0697*** (0.0121)
		D(LGE)	-0.042* (0.253)
		D1	-0.005 (0.016)
		D2	-0.006 (0.013)

Note: (*),(**),(***) indicate significant at 10%,5% and 1% significant level respectively. [a] Langrange multiplier test of residual; [b]Ramsey's RESET test using the square of the fitted values; [c]Based on a test of skwness and kurtosis of residuals; [d]Based on the regression of squared residuals on squared fitted values

Next, the long run elasticities in Table 4 show that all variables except D2 are significant and can influence the national income of the country. The Keynesian and Wagner's law hypothesis is applicable here where the result proved that there is a positive relationship between household consumption, domestic investment and government expenditure towards the GDP. The largest contribution for the growth is household consumption where 1 percent increase in household consumption can lead to 0.77% increase in GDP. The second largest contribution for Malaysia GDP is the domestic investment where 1% increases in this variable lead to 0.67% increase in GDP. The third contribution is the government expenditure where 1 percent increases in GE lead to 0.59% increase in GDP.

Besides, D1 which representing Asian financial crisis 1997-1998 had also shaken the GDP of the country where 1% increase in D1 lead to reduction of Malaysia's GDP for about

0.50%. Since D2 which represents global recession 2007-2008 is not significant at any level, therefore it can be concluded that the variable is not suitable to explain the model. The short run analysis had exhibit similar result like the long run elasticities where all the variables used to explain the dependent variable are significant mostly at 1% significance level except for D1 and D2. It shows that the economy crisis did not influence the GDP growth in the short run. The negative value for error correction term (ECT) proved that in the long run, all the variable are going to converge and thus giving the view to the policymakers to come up with better economic policies as it can be implemented even in the long run.

Table 4. The long run elasticities

Dependent variable: LGDP*	ARDL (2,1,0,0)
Constant	9.698 (6.433)
LHC	0.777** (0.423)
LDI	0.675* (0.550)
LGE	0.599* (0.399)
D1	-0.501** (0.473)
D2	-0.084 (0.643)

Note: (*),(**),(***) indicate significant at 10%,5% and 1% significant level respectively

5. POLICY RECOMMENDATION AND CONCLUSION

This paper attempted to examine the validity of Keynesian and Wagner's law towards the growth of Malaysia economy. The empirical analysis was conducted by making use of relatively recently developed estimation technique known as ARDL approach which is deemed to be robust in small sample. The result showed that both Keynesian and Wagner's law do hold in term of supporting the growth of the country both for short run and the long run. The only thing that differs here is the validity of the dummy, D used to capture two major financial crisis events where in the short run, Asian financial crisis (D1) and global recession (D2) did not affect the growth of the country but in the long run but only D1 influence the growth of the nation. In overall term, the result shows that household consumption play the most vital role in accelerating growth, followed by domestic investment and the government expenditure. Consumption activities play the most critical role to sustain the growth of the country. In the case of Malaysia, consumption generates more economics activities and providing more income to the country. The implementations of expansionary policy by the government such as fiscal and monetary policy are important to boost spending activity among the citizen especially during the recession. Besides that, government should monitor the level of investment in the country carefully. For example, government can provide subsidies or reduce the taxes so that the producer can use the money to invest more in their company for research and development (R&D) to produce better quality products. Last but not least, government spending in the form of operating and development expenditure also helps to generate economic activity in the country. The result proved the consumption led growth, investment led growth and government expenditure led growth hypothesis is also valid for Malaysia economy during the tested period of study. In other words, Keynesian and Wagner's law are still practical and valid for Malaysian economy to achieved sustainable growth in the long run. With the right policies and healthy economic climate, it is possible for Malaysia to achieve a status of developed and high-income nation in the future.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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Peer-review history:
The peer review history for this paper can be accessed here:
http://www.sciencedomain.org/review-history.php?iid=594&id=22&aid=5437